

Web Appendix

Tables

Table A1: Comparison of Marketing Analytics Studies vs. Our Study

Aspect	Marketing Analytics Studies	Our Study
Context	Mostly larger firms in developed markets (Bar-Gill <i>et al.</i> 2024 study small firms)	Micro entrepreneurs in emerging markets
Decision Maker	Multiple stakeholders and/or departments	Single entrepreneur (owner-operator)
Identification Strategy	Observational/quasi-experimental	Randomized controlled field experiment
Technology Adoption	Organization-wide implementation	Individual-level implementation
Measurement of Impact	Primarily revenue and business practices	Comprehensive evaluation including: revenue, profits, business practices, and mental aptitude improvements (mental performance)
Agency Issues	Present due to organizational structure	Minimal due to owner-operator context
Examples from Literature	Data analytics technology for businesses (e.g., Germann, Lilien, Fiedler, et al. 2014; Berman & Israeli 2022); Bar-Gill et al. (2024)	

Table A2: Comparison of Traditional Business Training Studies vs. Our Study

Aspect	Traditional Business Training Studies	Our Study
Objective	Develop broad management practices in firms through business training, e.g., customer credit, quality control, supplier management, etc.	Develop technology-driven data analytics capability in entrepreneurs. No business training provided.
Intervention	Intervention deals directly with business issues	Intervention deals with analytics based on recorded data from business
Format	Can be structured with a fixed curriculum or unstructured with flexibility to solve individual business problems	Structured tools for data analyses with standard reports
Measurement of Impact	Business outcomes only (e.g., sales, profits, business practices)	Both mental aptitude improvements (mental performance) and business outcomes
Skills Development	Fixed set of taught skills	Dynamic learning through continued technology interaction
Sustainability	Dependent on trainer-trainee relationship	Self-sustaining through technology platform, with tech-support visits
Examples from Literature	Training, coaching or consulting on sales techniques, financial planning, marketing strategies (e.g., Bloom <i>et al.</i> 2013; McKenzie & Woodruff 2014; Bruhn <i>et al.</i> 2018; Cai & Szeidl 2018; Cole <i>et al.</i> 2024; Anderson, Chintagunta, et al. 2024)	

Table A3: Mobile Phone Usage Statistics

Variable	Mean	SD
<i>Usage Patterns</i>		
Daily usage (minutes/day)	87.7	84.5
Days used per week	6.4	1.03
<i>Business Usage</i>		
Used phone to call/message customers (%)	14	
Set up social media for business (%)	6	
<i>Most Common Apps</i>		
Calls/SMS (%)	100	
WhatsApp (%)	92	
YouTube (%)	64	
Facebook (%)	42	
Google Search (%)	16	
Banking (%)	16	
Instagram (%)	14	
Email (%)	2	
Newspapers (%)	2	

Notes: SD reported only for continuous variables. $N = 50$ placebo firms. Percentage variables (%) are binary indicators denoting the share of firms that reported using the respective app or feature. Several entrepreneurs reported that their phone was also used by family members, including children, spouse, or other relatives.

Table A4: Intervention Design: Treated vs. Placebo Firms

Component	Treated Firms	Placebo Firms
Smartphone and Internet	Firms received a smartphone, internet connection	Firms received a smartphone, internet connection
Business Data Capture	Firms used the “Market Manager” app to record business data related to daily sales, products, customers, and marketing activities	No access to the app
Analytics and Insights	- Basic analytics on recorded data presented as simple tables and visuals in the app and provided as hard copy. - Also presented a static list of generic marketing actions (3Cs and 4Ps)	No analytics provided
Technology Support	Tech-support visits focused on maintaining the functionality of the “Market Manager” app, smartphone/internet and explaining how the data entry and analytics in the app worked.	Tech-support visits focused on maintaining the functionality of the smartphone/internet

Table A5: Sample Size and Power Calculations

	1 Baseline Survey and 1 Follow-up Survey	
	Treatment/Control	Placebo/Control
30% increase in profits		
Treatment Sample Size needed for 70% power	108/108	65/322
Treatment Sample Size needed for 75% power	121/121	73/361
Treatment Sample Size needed for 80% power	137/137	82/408
35% increase in profits		
Treatment Sample Size needed for 70% power	80/80	48/239
Treatment Sample Size needed for 75% power	90/90	54/268
Treatment Sample Size needed for 80% power	102/102	61/303
40% increase in profits		
Treatment Sample Size needed for 70% power	62/62	37/182
Treatment Sample Size needed for 75% power	69/69	41/205
Treatment Sample Size needed for 80% power	78/78	47/231

Notes : This table summarizes power calculations computed apriori to estimate the optimal sample size for the firms in our field experiment with the following design features. Coefficient of Variation (standard deviation/mean) is 1. Controls from baseline survey were assumed to capture 20% of the variation in the outcome for the ANCOVA specification (we use ANCOVA regressions to analyze the main-effects of the intervention on sales profits of the firms). Power of the test is 70%, 75% or 80%. Significance level of the test: $\alpha = 0.05$ (two-sided). Treatment and control group sizes are equal, while the placebo sample size is 20% of the control. Effect sizes: 30%, 35% and 40% (i.e., impact of treatment on the change in sales for treated firms versus control firms).

Table A6: Balance Checks with the sample at Baseline

Variable	(1) Control (N=250) Mean (SE)	(2) Placebo (N=50) Mean (SE)	(3) Treatment (N=250) Mean (SE)	(4) Total (N=550) Mean (SE)	(5) t-test (p-value) (1)-(2) C vs P	(6) t-test (p-value) (1)-(3) C vs T	(7) t-test (p-value) (2)-(3) P vs T	(8) F-test Joint orthogonality
Capital with which Business was started ('000 RWF)	387.188 (37.852)	326.673 (47.561)	473.545 (54.532)	421.134 (30.573)	0.489	0.195	0.239	1.384
Paid full-time employees working at the business	0.584 (0.128)	0.340 (0.109)	0.428 (0.064)	0.491 (0.066)	0.402	0.276	0.561	0.900
Number of Business Partners	0.088 (0.021)	0.260 (0.075)	0.084 (0.020)	0.102 (0.015)	0.003***	0.891	0.002***	5.633***
Total value of Assets of the Business ('000 RWF)	2713.421 (371.563)	1680.400 (420.316)	2515.626 (377.339)	2529.603 (243.716)	0.227	0.709	0.335	0.681
Number of different products sold at the shop	15.320 (0.951)	13.160 (1.916)	16.480 (1.014)	15.651 (0.656)	0.347	0.404	0.172	1.077
Number of loyal customers	30.760 (8.273)	24.160 (4.400)	19.804 (1.455)	25.180 (3.841)	0.723	0.193	0.253	0.928
Number of new customers	47.092 (12.662)	29.300 (5.056)	28.268 (1.925)	36.918 (5.847)	0.532	0.142	0.832	1.264
Basket-size of a loyal customer per visit ('000 RWF)	4.023 (0.534)	3.602 (0.855)	5.558 (0.851)	4.683 (0.464)	0.736	0.128	0.313	1.519
Basket-size of a new customer per visit ('000 RWF)	3.363 (0.702)	6.568 (4.149)	3.128 (0.423)	3.540 (0.522)	0.186	0.775	0.095*	1.662
Last month sales (30 days, '000 RWF)	707.908 (63.890)	668.237 (165.005)	762.440 (89.309)	729.089 (52.045)	0.805	0.620	0.659	0.193
Last month profits (30 days, '000 RWF)	127.540 (7.020)	127.381 (16.962)	137.656 (14.074)	132.124 (7.306)	0.993	0.520	0.751	0.238
Rely on “gut-feeling” instead of “data analytics”	2.876 (0.079)	3.040 (0.187)	2.988 (0.081)	2.942 (0.054)	0.402	0.322	0.794	0.652
Organizing customers into segments	4.008 (0.054)	3.840 (0.108)	4.048 (0.053)	4.011 (0.036)	0.196	0.596	0.104	1.293
Calculating profit margins	4.384 (0.044)	4.440 (0.091)	4.500 (0.039)	4.442 (0.028)	0.600	0.048**	0.530	1.967
Age of entrepreneur	36.955 (0.533)	35.304 (0.999)	37.341 (0.622)	36.980 (0.383)	0.196	0.637	0.165	1.071

Notes: ***, **, and * indicate significance at the 1, 5, and 10 percent level. The values displayed for the F-tests are the F-statistics. We also computed normalized differences (Imbens & Wooldridge 2009) for all baseline variables. For the primary treatment-versus-control comparison, all are below 0.18, well within the conventional 0.25 threshold. In comparisons between the treatment and the placebo, only two baseline variables slightly exceed this threshold (0.26 for “Organizing customers into segments” and 0.40 for the number of business partners), consistent with the lower precision of comparisons against the smaller size of the placebo arm.

Table A7: Balance checks on mental performance and business practices of the firms at baseline

Variable	(1) Control (N=250) Mean (SE)	(2) Placebo (N=50) Mean (SE)	(3) Treatment (N=250) Mean (SE)	(4) Total (N=550) Mean (SE)	(5) t-test (p-value) (1)-(2)	(6) t-test (p-value) (1)-(3)	(7) t-test (p-value) (2)-(3)	(8) F-test Joint orthogonality
Entrepreneur numeracy (Scale 1 to 5)	3.577 (0.032)	3.560 (0.076)	3.518 (0.032)	3.548 (0.022)	0.834	0.198	0.599	0.835
Entrepreneur literacy	3.565 (0.034)	3.560 (0.076)	3.538 (0.032)	3.552 (0.022)	0.957	0.574	0.784	0.164
Separate business & personal finances	0.111 (0.020)	0.180 (0.055)	0.134 (0.022)	0.128 (0.014)	0.174	0.439	0.392	0.970
Track business liabilities	0.184 (0.025)	0.245 (0.062)	0.199 (0.026)	0.196 (0.017)	0.324	0.665	0.473	0.495
Track business cash availability	0.049 (0.014)	0.020 (0.020)	0.040 (0.013)	0.042 (0.009)	0.369	0.656	0.489	0.438
Track product margins	0.089 (0.018)	0.140 (0.050)	0.150 (0.023)	0.122 (0.014)	0.274	0.039**	0.859	2.197
Create business budget	0.020 (0.009)	0.000 (0.000)	0.044 (0.013)	0.029 (0.007)	0.313	0.128	0.130	2.111
Create business income statement	0.016 (0.008)	0.020 (0.020)	0.020 (0.009)	0.018 (0.006)	0.846	0.742	0.997	0.058

The value displayed for F-tests are the F-statistics. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Numeracy and literacy is measured during firm recruitment on a scale of 1 (very poor) to 4 (excellent). The rest of the business-level variables are based on a Yes/No response on each of these activities, as recorded by the auditors' in-person review of each of the firms during sample recruitment.

Table A8: Balance Checks with the sample at Endline

Variable	(1) Control (N=239) Mean (SE)	(2) Placebo (N=50) Mean (SE)	(3) Treatment (N=238) Mean (SE)	(4) Total (N=527) Mean (SE)	(5) t-test (p-value) (1)-(2)	(6) t-test (p-value) (1)-(3)	(7) t-test (p-value) (2)-(3)	(8) F-test Joint orthogonality
Capital with which Business was started (RWFs)	3.81e+05 (37919.976)	3.27e+05 (47560.813)	4.75e+05 (56545.972)	4.19e+05 (31250.368)	0.526	0.168	0.240	1.480
Paid full-time employees working at the business	0.590 (0.134)	0.340 (0.109)	0.437 (0.067)	0.497 (0.069)	0.401	0.308	0.530	0.838
Number of Business Partners	0.092 (0.022)	0.260 (0.075)	0.071 (0.017)	0.099 (0.015)	0.005***	0.459	0.000***	6.796***
Total value of Assets of the Business (RWFs)	2.78e+06 (3.87e+05)	1.68e+06 (4.20e+05)	2.50e+06 (3.95e+05)	2.55e+06 (2.53e+05)	0.207	0.618	0.352	0.750
Number of different products sold at the shop	15.322 (0.977)	13.160 (1.916)	16.172 (1.034)	15.501 (0.669)	0.350	0.550	0.214	0.825
Number of loyal customers	31.494 (8.650)	24.160 (4.400)	19.496 (1.461)	25.380 (4.003)	0.700	0.173	0.217	1.022
Number of new customers	48.230 (13.241)	29.300 (5.056)	28.487 (1.984)	37.518 (6.098)	0.516	0.142	0.869	1.283
Basket-size of a loyal customer per visit (RWFs)	3927.568 (541.035)	3602.447 (855.380)	5454.054 (868.076)	4586.629 (470.340)	0.793	0.136	0.338	1.425
Basket-size of a new customer per visit (RWFs)	3229.915 (717.556)	6567.708 (4149.033)	3108.581 (436.671)	3483.439 (539.432)	0.174	0.885	0.100*	1.676
Last month sales (30 days, RWFs)	7.04e+05 (65675.656)	6.68e+05 (1.65e+05)	7.29e+05 (85010.302)	7.12e+05 (50959.931)	0.826	0.812	0.760	0.067
Last month profits (30 days, RWFs)	1.27e+05 (7162.005)	1.27e+05 (16961.824)	1.29e+05 (10559.747)	1.28e+05 (5979.965)	0.969	0.885	0.962	0.011
Rely on “gut-feeling” instead of “data analytics”	2.895 (0.080)	3.040 (0.187)	2.983 (0.083)	2.949 (0.055)	0.460	0.448	0.777	0.428
Organizing customers into segments	4.004 (0.056)	3.840 (0.108)	4.050 (0.054)	4.009 (0.037)	0.213	0.552	0.102	1.300
Calculating profit margins	4.372 (0.046)	4.440 (0.091)	4.492 (0.039)	4.433 (0.029)	0.531	0.048**	0.589	1.971
Age of entrepreneur	36.915 (0.538)	35.304 (0.999)	37.609 (0.644)	37.076 (0.392)	0.203	0.409	0.120	1.429

The value displayed for F-tests are the F-statistics. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Table A9: Sample Attrition and Survival Checks

	(1) Attrition	(2) Survival
Treatment	0.00400 (0.0188)	0.0417* (0.0222)
Placebo	-0.0440*** (0.0130)	0.0237 (0.0382)
Mean of DV: Control	0.044	0.916
SD of DV: Control	0.205	0.277
Effect Size in SD: Treatment	0.019	0.150
Effect Size in %: Treatment	9.09	4.55
Effect Size in SD: Placebo	-0.214	0.085
Effect Size in %: Placebo	-100	2.58
Obs.	550	527
$\beta_{treat} = \beta_{placebo}$	0.000	0.619

Notes: This table presents the Attrition and Survival checks for our sample of firms. Column (1) presents the attrition measure (it is 1 if the firm has attrited and 0 if not). Column (2) presents the survival measure which is 1 if firm is operating and 0 if it has shut-down (attrited firms are excluded from the survival checks). Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1^*$ $p < 0.05^{**}$ $p < 0.01^{***}$

Table A10: Intervention Checks on the use of Analytics Report

	(1) Data Analytics	(2) Customer Analytics	(3) Product Analytics	(4) Sales Analytics
Treatment	2.216*** (0.107)	2.575*** (0.101)	2.436*** (0.109)	2.412*** (0.0847)
Placebo	0.316 (0.218)	0.396** (0.199)	0.413* (0.223)	0.247 (0.150)
Mean of DV: Control	3.420	2.852	3.403	2.797
SD of DV: Control	1.290	1.069	1.349	0.867
Effect Size in SD: Treatment	1.718	2.409	1.806	2.782
Effect Size in %: Treatment	64.80	90.29	71.60	86.21
Effect Size in SD: Placebo	0.245	0.371	0.307	0.284
Effect Size in %: Placebo	9.237	13.89	12.15	8.812
Obs.	527	527	527	527
$\beta_{treat} = \beta_{placebo}$	0.00	0.00	0.00	0.00

Notes: This table summarizes the manipulation checks for our marketing analytics intervention on the firms. The analytics report that was presented to the entrepreneurs on a monthly level included each of these sections on customers, products and sales of the firm, hence these results aim to check if the treatment firms have indeed paid attention to these report, as we had intended as a part of our marketing analytics intervention. The results in each column represent the intention-to-treat effects (ITT) of the randomly assigned intervention to a treatment group entrepreneur. Column (1) presents a measure of whether the firms have started paying attention to overall data analytics. Column (2) presents a measure of whether the firms have started paying attention specifically to customer analytics. Column (3) presents a measure of whether the firms have started paying attention specifically to product analytics. Column (4) presents a measure of whether the firms have started paying attention specifically to sales analytics. All regressions include firms that failed as at endline (non-operational with zero monthly sales or profits). Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1^*$ $p < 0.05^{**}$ $p < 0.01^{***}$

Table A11: Impact of Marketing Analytics on Entrepreneurs' Mental Performance

	<i>Overall Index</i> (1) Mental Performance Index (Obj)	<i>Individual Dimensions</i>			
		(2) Cognitive Reasoning	(3) Numeric Memory	(4) Logical Reasoning	(5) Numerical Aptitude
Treatment	0.301*** (0.0562)	0.260*** (0.0531)	0.829*** (0.247)	0.464*** (0.177)	0.258** (0.105)
Placebo	0.049 (0.0938)	0.106 (0.087)	0.070 (0.435)	0.241 (0.301)	-0.144 (0.183)
Mean of DV: Control	0	0.774	5.410	3.519	3.444
SD of DV: Control	0.583	0.614	2.716	1.878	1.121
Effect Size in SD: Treatment	0.517	0.423	0.305	0.247	0.230
Effect Size in %: Treatment		33.53	15.33	13.20	7.49
Obs.	527	527	527	527	527
$\beta_{treat} = \beta_{placebo}$	0.008	0.074	0.080	0.463	0.030
$\beta_{treat} = \beta_{placebo}$ (q-value)		0.096	0.096	0.463	0.060

Notes: This table summarizes analysis for the effect of marketing analytics on entrepreneurs' analytical ability. The results in each column represent the intention-to-treat effects (ITT) of the randomly assigned intervention to a treatment group entrepreneur. Column (1) reports an index of entrepreneurs' analytical ability constructed by standardizing each of the four underlying objective measures (represented in Columns 2-5) and then averaging them. Column (2) presents a measure for the Cognitive Reflection Test score (it is measured on a scale of 0 to 3). Column (3) presents a measure for Digit Span Test score (it is on a scale of 0 - 10). Column (4) presents a measure for the Raven's Test score (it is on a scale of 0 - 8). Column (5) presents a measure of the Numerical Aptitude Test Score (it is on a scale of 0 - 5). All regressions include firms that failed as at endline (non-operational with zero monthly sales or profits) as we were able to run these tests with the owners of firms that were shut-down too. Robust standard errors are in parentheses. P-values are adjusted for multiple hypothesis testing by using sharpened FDR q-values, and are highlighted as: $q < 0.1^*$ $q < 0.05^{**}$ $q < 0.01^{***}$.

Table A12: Impact of Marketing Analytics on Entrepreneurs' Mental Performance

	<i>Overall Indices</i>			
	(1) Mental Performance Index (Obj)	(2) Normalized Index	(3) Above-median share	(4) Above-median count
Treatment	0.301*** (0.0562)	0.081*** (0.0143)	0.114*** (0.0209)	0.457*** (0.0836)
Placebo	0.049 (0.0938)	0.015 (0.0240)	0.022 (0.032)	0.091 (0.130)
Mean of DV: Control	0	0.514	0.207	0.828
SD of DV: Control	0.583	0.151	0.198	0.794
Effect Size in SD: Treatment	0.517	0.534	0.576	0.576
Effect Size in %: Treatment		15.68	55.07	55.19
Effect Size in SD: Placebo	0.085	0.100	0.111	0.115
Effect Size in %: Placebo		2.986	10.63	11.00
Obs.	527	527	527	527
$\beta_{treat} = \beta_{placebo}$	0.008	0.007	0.007	0.007

Notes: This table reports intention-to-treat (ITT) estimates of the effect of marketing analytics on entrepreneurs' mental performance. The Treatment coefficient captures the analytics bundle effect (Treatment vs. Control); the $\beta_{treat} = \beta_{placebo}$ test isolates the analytics-only effect (Treatment vs. Placebo). Column (1) reports an index constructed by standardizing each underlying objective measure and averaging them. Column (2) normalizes each measure to a [0,1] scale prior to averaging. Column (3) assigns a value of 1 if a measure exceeds the sample median and 0 otherwise, and averages across measures. Column (4) reports the count (0-4) of above-median measures. Robust standard errors are in parentheses. All regressions include firms that failed by endline. P-values are adjusted for multiple hypothesis testing using sharpened FDR procedures.

Table A13: Impact of Marketing Analytics on Entrepreneurs' Mental Performance

	(1) Mental Performance Index	(2) Mental Performance Index (Obj.)	(3) Cognitive Reasoning	(4) Numeric Memory	(5) Logical Reasoning	(6) Numerical Aptitude	(7) Mental Math Use	(8) Numerical Orientation
Treatment	0.763*** (0.061)	0.301*** (0.056)	0.260*** (0.053)	0.829*** (0.247)	0.464** (0.177)	0.258** (0.105)	1.782*** (0.129)	2.057*** (0.121)
Placebo	0.108 (0.092)	0.0496 (0.094)	0.106 (0.088)	0.070 (0.435)	0.241 (0.301)	-0.144 (0.183)	0.181 (0.215)	0.324 (0.192)
Mean of DV: Control	0	0	0.774	5.410	3.519	3.444	2.869	2.711
SD of DV: Control	0.595	0.583	0.614	2.716	1.878	1.121	1.254	1.053
Effect Size in SD: Treatment	1.284	0.517	0.423	0.305	0.247	0.230	1.422	1.952
Effect Size in %: Treatment			33.53	15.33	13.20	7.497	62.11	75.85
Effect Size in SD: Placebo	0.182	0.085	0.172	0.026	0.128	-0.128	0.144	0.307
Effect Size in %: Placebo			13.69	1.293	6.854	-4.168	6.300	11.94
Obs.	527	527	527	527	527	527	527	527
$\beta_{treat} = \beta_{placebo}$ (p-value)	0.000	0.009	0.074	0.080	0.463	0.030	0.000	0.000
$\beta_{treat} = \beta_{placebo}$ (q-value)			0.096	0.096	0.463	0.060	0.001	0.001

Notes: This table summarizes analysis for the effect of marketing analytics on entrepreneurs' mental performance (from baseline to endline). The results in each column represent the intention-to-treat effects (ITT) of the randomly assigned intervention to a treatment group entrepreneur. The Treatment coefficient captures the analytics bundle effect (Treatment vs. Control); the $\beta_{treat} = \beta_{placebo}$ test isolates the analytics-only effect (Treatment vs. Placebo). Column (1) presents an index measure for entrepreneurs' mental performance. Each of the six analytical measures was standardized and then the average of these values was computed to construct the overall 'mental performance' index. Column (2) presents an 'objective' index measure for entrepreneurs' mental performance. Each of the objective analytical measures, i.e., columns (3)-(6), was standardized and then the average of these values was computed to construct the overall 'objective mental performance' index. Column (3) presents a measure for the Cognitive Reflection Test score (it is measured on a scale of 0 to 3). Column (4) presents a measure for Digit Span Test score (it is on a scale of 0 - 10). Column (5) presents a measure for the Raven's Test score (it is on a scale of 0 - 8). Column (6) presents a measure of the Numerical Aptitude Test Score (it is on a scale of 0 - 5). Column (7) presents a measure of the Mental Math Use (it is self-reported on a scale of 1 to 7). Column (8) presents a measure of Numerical Orientation (it is self-reported on a scale of 1 to 7). The q-values reported for the $\beta_{treat} = \beta_{placebo}$ test are the sharpened False Discovery Rate (FDR) q-values (Anderson 2008). All regressions include firms that failed as at endline (non-operational with zero monthly sales or profits) as we were able to run these tests with the owners of firms that were shut-down too. Robust standard errors are in parentheses. P-values are adjusted for multiple hypothesis testing by using sharpened FDR q-values, and are highlighted as: q < 0.1* q < 0.05** q < 0.01***.

Table A14: Robustness to Conley (1999) Spatially Correlated Standard Errors - Impact of Marketing Analytics on Mental Performance)

	(1) Analytical Ability Index Obj.	(2) Analytical Ability Index Norm	(3) Analytical Ability Index M Avg	(4) Analytical Ability Index M Count	(5) CRT	(6) Digit Span Test	(7) Raven's Test	(8) Numerical Aptitude
Treatment	0.301*** (0.058)	0.081*** (0.014)	0.114*** (0.023)	0.457*** (0.093)	0.260*** (0.045)	0.829*** (0.261)	0.464*** (0.154)	0.258* (0.138)
Placebo	0.049 (0.111)	0.015 (0.027)	0.022 (0.038)	0.091 (0.153)	0.106 (0.084)	0.070 (0.319)	0.241 (0.293)	-0.144 (0.234)
Mean of DV: Control	0	0.514	0.207	0.828	0.774	5.410	3.519	3.444
SD of DV: Control	0.583	0.151	0.198	0.794	0.614	2.716	1.878	1.121
Effect Size in SD: Treatment	0.517	0.534	0.576	0.576	0.423	0.305	0.247	0.230
Effect Size in %: Treatment		15.68	55.07	55.19	33.53	15.33	13.20	7.49
Effect Size in SD: Placebo	0.085	0.100	0.111	0.115	0.172	0.026	0.128	-0.128
Effect Size in %: Placebo		2.986	10.63	11.00	13.69	1.293	6.854	-4.168
Obs.	527	527	527	527	527	527	527	527
$\beta_{treat} = \beta_{placebo}$	0.012	0.011	0.023	0.023	0.031	0.066	0.451	0.021

Notes: This table reproduces the analysis for the effect of marketing analytics on entrepreneurs' analytical ability (from baseline to endline) using Conley (1999) spatially correlated standard errors. Standard errors are computed using a Bartlett kernel with a 5 km cutoff. P-values are highlighted as: $p < 0.1$ $p < 0.05^{**}$ $p < 0.01^{***}$

Table A15: Difference in Interview Duration across Experimental Groups

	(1) Interview Duration Analysis
Treatment	0.118 (0.178)
Placebo	0.413 (0.346)
Mean of DV: Control	2.512
SD of DV: Control	1.773
Effect Size in SD: Treatment	0.0665
Effect Size in %: Treatment	4.695
Effect Size in SD: Placebo	0.233
Effect Size in %: Placebo	16.46
Obs.	527
$\beta_{treat} = \beta_{placebo}$	0.404

Notes: This table summarizes analysis for the interview duration for the Endline Survey. Column (1) presents the winsorized measure for time taken from the start to the end of the Endline survey : estimates after winsorizing each 1% on both tails. Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1^*$ $p < 0.05^{**}$ $p < 0.01^{***}$

Table A16: Average Treatment Effect on the Treated - Impact of Marketing Analytics on Entrepreneurs' Analytical Ability

	(1) Mental Performance Index Obj.	(2) Cognitive Reasoning	(3) Numeric Memory	(4) Logical Reasoning	(5) Numerical Aptitude
Treatment	0.380*** (0.0656)	0.308*** (0.0642)	1.048*** (0.294)	0.600*** (0.210)	0.349*** (0.123)
Mean of DV: Control	0	0.774	5.410	3.519	3.444
SD of DV: Control	0.583	0.614	2.716	1.878	1.121
Effect Size in SD: Treatment	0.651	0.502	0.386	0.320	0.311
Effect Size in %: Treatment		39.80	19.38	17.06	10.14
Obs.	475	475	475	475	475

Notes: This table summarizes analysis for the effect of marketing analytics on entrepreneurs' analytical ability. The results in each column represent the average treatment-on-the-treated (ToT) effects, estimated via 2SLS. Treatment adoption (defined as signing up on the analytics app) and compliance (measured as the ratio of actual to expected data entries per half-month) are instrumented using random treatment assignment. All 5 ToT specifications pass the standard weak-instrument threshold (F-statistic > 10; F-statistic = 5423.2). Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1^*$, $p < 0.05^{**}$, $p < 0.01^{***}$.

Table A17: Correlational Analysis: Mental Performance by App Data Entry Compliance

	(1) Analytical Ability Index Obj.	(2) CRT	(3) Digit Span Test	(4) Raven's Test	(5) Numerical Aptitude
Compliance	1.330*** (0.247)	-0.183 (0.208)	4.260*** (0.810)	3.617*** (0.694)	2.379*** (0.576)
Obs.	236	236	236	236	236
$\beta_{\text{Compliance}} = 0$ (p-value)	0.000	0.380	0.000	0.000	0.000

Notes: This table summarizes the correlation of the marketing analytics intervention compliance with the treatment entrepreneur's analytical ability. Treatment compliance is defined as the data entry compliance (calculated as the ratio of the number of data entries recorded by a treated firm in a given half-month to the expected 51 entries, measured over 14 half-months from Jul 2019 - Jan 2020). Column (1)-(5) represent the same metrics as in Table 1. Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1$ $p < 0.05^{**}$ $p < 0.01^{***}$

Table A18: Heterogeneity in Treatment Effects: Entrepreneur's Mental Performance

Covariate	Estimate	Std. Error	p-value
(Intercept)	0.459	0.282	0.104
Start-up capital	0.026	0.140	0.851
Paid full-time employees	0.190	0.145	0.190
Number of Business Partners	-0.202	0.144	0.160
Total Asset Value	-0.136	0.147	0.356
Number of products sold	-0.147	0.148	0.321
Average margin of popular products sold	0.053	0.143	0.713
Number of loyal customers	-0.233*	0.130	0.074
Number of new customers	-0.063	0.125	0.617
Basket size for loyal customers	-0.033	0.146	0.823
Basket size for new customers	-0.200	0.143	0.163
Baseline Sales	0.316	0.212	0.136
Baseline Profits	-0.161	0.193	0.407
Rely on intuition instead of data	0.205	0.128	0.108
Use of market tracking/segmentation	-0.129	0.128	0.317
Went to School (Yes = 1, No = 0)	0.033	0.197	0.866
Went to College (Yes = 1, No = 0)	0.500**	0.244	0.041
Prior Business Ownership	-0.145	0.138	0.293
Business Training	-0.146	0.158	0.357
Entrepreneur Age	0.207*	0.125	0.100
Gender (Female = 1, Male = 0)	-0.055	0.129	0.672
Obs.	477	477	477

Notes: This table summarizes the best linear projection of the conditional average treatment effect on the entrepreneur's mental performance. The outcome variable is same as the overall mental performance index as reported in Table 1. The number of observations for the analysis includes all the treatment and control firms, post attrition. We exclude placebo firms from the HTE analysis, as the goal is to characterize heterogeneity in the effect of the full marketing analytics solution relative to no intervention. The covariates are measured pre-intervention, as per the baseline survey. The covariates above the dashed line are firm-level variables and the ones below the line are entrepreneur-level variables. All covariates, except dummy variables, are discretized using median splits (high = 1, low = 0). The standard errors are heteroskedasticity-robust. P-values are highlighted as: $p < 0.1^*$ $p < 0.05^{**}$ $p < 0.01^{***}$

Table A19: Impact of Marketing Analytics on Business Practices

	(1) Business Practices Index	(2) Product-related practices	(3) Accounting-related practices
Treatment	0.359*** (0.024)	0.340*** (0.027)	0.377*** (0.027)
Placebo	0.087** (0.041)	0.094* (0.045)	0.079 (0.048)
Mean of DV: Control	0.413	0.451	0.376
SD of DV: Control	0.270	0.312	0.304
Effect Size in SD: Treatment	1.329	1.092	1.241
Effect Size in %: Treatment	86.74	75.44	100.3
Obs.	527	527	527
$\beta_{treat} = \beta_{placebo}$	0.00	0.00	0.00
$\beta_{treat} = \beta_{placebo}(q - value)$		0.001	0.001

Notes: This table summarizes analysis for the effect of marketing analytics on activities that the business performs. The results in each column represent the intention-to-treat effects (ITT) of the randomly assigned intervention to a treatment group entrepreneur. These results are based on a Yes/No response on each of the business activities, as recorded by independent auditors during in-store visits at each firm's physical location, enabling direct observation of operations and verification through physical evidence. Column (1) presents an overall index for the business practices performed by taking an average of the product and accounting-related practices (columns 2-3). Column (2) presents a measure constructed by averaging four binary variables on product-related activities: changing prices of products/services to increase total sales, introducing new products/services or improving existing products/services to provide more benefits to customers, inspecting products to ensure they are of the highest quality, and monitoring stocks or supplies to prevent overflow or stock-outs. Column (3) presents a measure constructed by averaging accounting-related activities: separating personal finances from business finances, creating an income statement to track all the money that comes 'in' (sales) and goes 'out' (purchases, expenditures) from the business, creating a budget that states how much is expected in sales and costs for a future period, and monitoring the cash-flow of the business to ensure there is enough money for daily operations to continue. All regressions include firms that failed as at endline (non-operational with zero monthly sales or profits) and their business practices response is considered to be 'no'. All regressions exclude the firms that attrited during the Endline survey round. Robust standard errors are in parentheses. P-values are adjusted for multiple hypothesis testing by using sharpened FDR q-values, and are highlighted as: $q < 0.1$ $q < 0.05^{**}$ $q < 0.01^{***}$

Table A20: Impact of Marketing Analytics on Business Practices

	Overall	Product Related				Accounting Related			
	(1) Business Practice Index	(2) Change Prices	(3) Improve/Add Products	(4) Inspect Products	(5) Monitor Product Inventory	(6) Separate Business Finances	(7) Create Income Statement	(8) Create Future Budget	(9) Monitor Cash Flow
Treatment	0.359*** (0.0235)	0.489*** (0.0399)	0.492*** (0.0396)	0.238*** (0.0367)	0.141*** (0.0404)	0.376*** (0.0417)	0.421*** (0.0398)	0.433*** (0.0414)	0.276*** (0.0357)
Placebo	0.0866** (0.0411)	0.163** (0.0766)	0.168** (0.0727)	0.00310 (0.0739)	0.0431 (0.0719)	0.0983 (0.0777)	0.129* (0.0678)	0.0533 (0.0744)	0.0356 (0.0731)
Mean of DV: Control	0.413	0.297	0.192	0.657	0.657	0.402	0.151	0.307	0.644
SD of DV: Control	0.270	0.458	0.395	0.476	0.476	0.491	0.358	0.462	0.480
Effect Size in SD: Treatment	1.329	1.067	1.246	0.500	0.297	0.765	1.176	0.937	0.575
Effect Size in %: Treatment	86.74	164.5	255.8	36.24	21.53	93.52	279.8	141.1	42.81
Effect Size in SD: Placebo	0.321	0.356	0.424	0.00651	0.0906	0.200	0.361	0.115	0.0743
Effect Size in %: Placebo	20.96	54.85	87.04	0.471	6.561	24.48	85.89	17.37	5.532
Obs.	527	527	527	527	527	527	525	526	527
$\beta_{treat} = \beta_{placebo}$ (p-value)	0.000	0.000	0.000	0.001	0.161	0.000	0.000	0.000	0.001
$\beta_{treat} = \beta_{placebo}(q - value)$		0.001	0.001	0.002	0.161	0.001	0.001	0.001	0.002

Notes: This table summarizes analysis for the effect of marketing analytics on activities that the business performs (from baseline to endline). The results in each column represent the intention-to-treat effects (ITT) of the randomly assigned intervention to a treatment group entrepreneur. The Treatment coefficient captures the analytics bundle effect (Treatment vs. Control); the $\beta_{treat} = \beta_{placebo}$ test isolates the analytics-only effect (Treatment vs. Placebo). These results are based on a Yes/No response on each of these activities, as recorded by the independent auditors' in-person review of each of the firms in our sample. All audits were conducted in-store at firm premises, allowing auditors to observe business operations and verify practices. Column (1) presents an index for the business practices performed at the organization-level. This overall index is calculated by taking an average of each of the eight business measures (columns 2-9). Column (2) presents a measure for changing the prices of products/services to increase total sales. Column (3) presents a measure for introducing new products/services, or improving your existing products/services, to provide more benefits to customers. Column (4) presents a measure for inspection of products to ensure they are of the highest quality. Column (5) presents a measure of monitoring stocks of supplies to prevent stock overflow or stock-outs. Column (6) presents a measure of keeping business finances separate from personal finances. Column (7) presents a measure of creating an income statement to track all the money that comes 'in' (sales) and goes 'out' (purchases, expenditures) from the business. Column (8) presents a measure for creating a budget that states how much is expected in sales and costs for a future period (e.g. next month). Column (9) presents a measure for tracking how much cash is available in the business to ensure there is enough money for daily operations to continue. The q-values reported for the $\beta_{treat} = \beta_{placebo}$ test are the sharpened False Discovery Rate (FDR) q-values (Anderson 2008). All regressions include firms that failed as at endline (non-operational with zero monthly sales or profits, and their business practices response is considered to be 'no'). All regressions exclude the firms that attrited during the Endline survey round. Robust standard errors are in parentheses. P-values are adjusted for multiple hypothesis testing by using sharpened FDR q-values, and are highlighted as: q < 0.1* q < 0.05** q < 0.01***

Table A21: Robustness to Conley (1999) Spatially Correlated Standard Errors - Impact of Marketing Analytics on Business Activities

	Overall	Product Related	Accounting Related
	(1)	(2)	(3)
	Overall Index	Product related	Accounting related
Treatment	0.359*** (0.0390)	0.340*** (0.0392)	0.377*** (0.0447)
Placebo	0.0866** (0.0422)	0.0942** (0.0383)	0.0791 (0.0560)
Mean of DV: Control	0.413	0.451	0.376
SD of DV: Control	0.270	0.312	0.304
Effect Size in SD: Treatment	1.329	1.092	1.241
Effect Size in %: Treatment	86.74	75.44	100.3
Effect Size in SD: Placebo	0.321	0.302	0.260
Effect Size in %: Placebo	20.96	20.89	21.05
Obs.	527	527	527
$\beta_{treat} = \beta_{placebo}$	0.00	0.00	0.00

Notes: This table reproduces the analysis for the effect of marketing analytics on activities that the business performs (from baseline to endline) using Conley (1999) spatially correlated standard errors. Standard errors are computed using a Bartlett kernel with a 5 km cutoff. P-values are highlighted as: $p < 0.1$ $p < 0.05$ $p < 0.01$ ***

Table A22: Business Practices Undertaken by the Firms

Activity Type	Examples of activities undertaken by the entrepreneurs
Product-related	- Monitoring stock, supplies or materials, and then ordering in advance to avoid shortages (i.e. always ensured the availability of the required quantity and quality for daily operations to continue). - Inspecting the products or/and getting feedback on the provided services to ensure they are of the highest quality. - Changing the prices of products/services to increase total sales. - Introducing new products/services, or improving the existing products/services, to provide more benefits to customers.
Accounting-related	- Keeping business finances separate from personal finances. - Creating an income statement to track all money that comes 'in' (sales) and goes 'out' (purchases, expenditures) of the business. - Creating a budget that states how much is expected in sales and costs for a future period (e.g. next month), and then adjusting the planned budget based on changes in the business or performance. - Analyzing how much cash is available in the business (e.g. all the money in the entrepreneur's hands and business bank account) to ensure there is enough money for daily operations to continue.

Table A23: Impact of Marketing Analytics on Operations Related Business Activities

	(1)	(2)	(3)	(4)	(5)
	Machine Maintenance	Process Efficiency	Competition Research	Receipts or Invoices	Operations Related Activities Index
Treatment	-0.00840 (0.0417)	0.0221 (0.0412)	0.0189 (0.0459)	0.000141 (0.0165)	0.00850 (0.0218)
Placebo	0.0659 (0.0742)	0.0722 (0.0731)	0.0463 (0.0778)	-0.0135 (0.0230)	0.0430 (0.0413)
Mean of DV: Control	0.294	0.268	0.494	0.0335	0.272
SD of DV: Control	0.457	0.444	0.501	0.180	0.247
Effect Size in SD: Treatment	-0.0184	0.0499	0.0377	0.000780	0.0343
Effect Size in %: Treatment	-2.857	8.265	3.824	0.420	3.124
Effect Size in SD: Placebo	0.144	0.163	0.0924	-0.0747	0.174
Effect Size in %: Placebo	22.40	26.97	9.373	-40.25	15.82
Obs.	526	527	527	527	527
$\beta_{treat} = \beta_{placebo}$	0.317	0.495	0.725	0.555	0.398

Notes: This table summarizes analysis for the effect of marketing analytics on activities that the business performs (from baseline to endline). The results in each column represent the intention-to-treat effects (ITT) of the randomly assigned intervention to a treatment group entrepreneur. The Treatment coefficient captures the analytics bundle effect (Treatment vs. Control); the $\beta_{treat} = \beta_{placebo}$ test isolates the analytics-only effect (Treatment vs. Placebo). These results are based on a Yes/No response on each of these activities, as recorded by the auditors in-person review of each of the firms in our sample. Column (1) presents a measure for conducting preventative maintenance on the machines, equipments or tools used by the business. Column (2) presents a measure for replacing any processes, procedures, techniques or methods used in the business with new approaches that are more efficient. Column (3) presents a measure for conducting market research on competition and suppliers. Column (4) presents a measure of provision of receipts or invoices to customers once they have made a purchase. Column (5) presents an index for these 'operations-related' activities performed by the business. This overall index is calculated by taking an average of each of the four business measures. All regressions include firms that failed as at endline (non-operational with zero monthly sales or profits, and their business activity response is considered to be 'no'). All regression exclude the firms that attrited during the Endline survey round. Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1$ * $p < 0.05$ ** $p < 0.01$ ***

Table A24: Average Treatment Effect on the Treated - Impact of Marketing Analytics on Entrepreneurs' Analytical Ability

	(1)	(2)	(3)
	Business Practices Index	Product-related practices	Accounting-related practices
Treatment	0.440*** (0.026)	0.418*** (0.031)	0.462*** (0.030)
Mean of DV: Control	0.413	0.451	0.376
SD of DV: Control	0.270	0.312	0.304
Effect Size in SD: Treatment	1.631	1.342	1.521
Effect Size in %: Treatment	106.5	92.73	122.9
Obs.	475	475	475

Notes: This table summarizes analysis for the effect of marketing analytics on entrepreneur's analytical ability. The results in each column represent the average treatment-on-treated effects (ToT) of the randomly assigned intervention to a treatment group entrepreneur, computed via 2SLS, with treatment adoption (defined as signing-up on the analytics app) and compliance (calculated as the ratio of the number of data entries recorded by a treated firm in a given half-month to the expected 51 entries, measured over 14 half-months from Jul 2019 - Jan 2020) instrumented by the random treatment assignment. All three of the ToT regression specifications in the table above pass the minimum threshold with an F-statistic greater than 10.0 (F-statistic value is 5423.2, which is as expected given the treatment offer is highly correlated with treatment compliance). Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1$ * $p < 0.05$ ** $p < 0.01$ ***

Table A25: Correlational Analysis: Business Changes by App Data Entry Compliance

	(1) Business Practices Index	(2) Product-related practices	(3) Accounting-related practices
Compliance	0.813*** (0.0887)	0.785*** (0.103)	0.841*** (0.0908)
Obs.	236	236	236
$\beta_{\text{Compliance}=0}$ (p-value)	0.00	0.00	0.00

Notes: This table summarizes the correlation of the marketing analytics intervention compliance with the business activities that the treated firms perform. Treatment compliance is defined as the data entry compliance (calculated as the ratio of the number of data entries recorded by a treated firm in a given half-month to the expected 51 entries, measured over 14 half-months from Jul 2019 - Jan 2020). Column (1)-(3) represent the same metrics as in Table 2. Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1$ $p < 0.05^{**}$ $p < 0.01^{***}$

Table A26: Heterogeneity in Treatment Effects: Business Practices

Covariate	Estimate	Std. Error	p-value
(Intercept)	0.464	0.106	0.000
Start-up capital	0.051	0.062	0.412
Paid full-time employees	-0.001	0.064	0.991
Number of business Partners	-0.044	0.063	0.489
Total Asset Value	-0.145**	0.061	0.018
Number of products sold	0.010	0.064	0.873
Average margin of popular products	0.044	0.060	0.468
Number of loyal customers	0.032	0.057	0.576
Number of new customers	-0.045	0.054	0.408
Basket size for loyal customers	0.016	0.067	0.806
Basket size for new customers	-0.103	0.063	0.103
Baseline Sales	0.085	0.083	0.307
Baseline Profits	-0.078	0.071	0.278
Rely on intuition instead of data	0.132**	0.056	0.019
Use of market tracking/segmentation	-0.035	0.053	0.516
Went to School (Yes = 1, No=0)	-0.060	0.077	0.437
Went to College (Yes = 1, No = 0)	0.069	0.087	0.426
Prior Business Ownership	-0.023	0.064	0.719
Business Training	-0.045	0.064	0.476
Entrepreneur Age	0.080	0.053	0.131
Gender (Female = 1, Male = 0)	-0.107*	0.056	0.057
Obs.	477	477	477

Notes: This table summarizes the best linear projection of the conditional average treatment effect on the organization-level business practices. The outcome variable is same as the overall business practices index as reported in Table 2. The number of observations for the analysis includes all the treatment and control firms, post attrition. We exclude placebo firms from the HTE analysis, as the goal is to characterize heterogeneity in the effect of the full marketing analytics solution relative to no intervention. The covariates are measured pre-intervention, as per the baseline survey. The covariates above the dashed line are firm-level variables and the ones below the line are entrepreneur-level variables. All covariates, except dummy variables, are discretized using median splits (high = 1, low = 0). The standard errors are heteroskedasticity-robust. P-values are highlighted as: $p < 0.1$ $p < 0.05^{**}$ $p < 0.01^{***}$

Table A27: Impact of Marketing Analytics on Firm Sales and Profits

	Overall	DV: Monthly Sales		DV: Monthly Profits	
	(1) Performance Index	(2) Average	(3) IHS	(4) Average	(5) IHS
Treatment	0.250*** (0.0703)	165.3*** (58.60)	0.795*** (0.293)	24.98*** (7.939)	0.621** (0.263)
Placebo	0.082 (0.097)	-35.20 (81.65)	0.255 (0.499)	11.88 (12.03)	0.475 (0.398)
Mean of DV: Control	0	454.9	12.28	85.60	10.94
SD of DV: Control	0.814	706.5	3.633	79.29	3.217
Effect Size in SD: Treatment	0.307	0.234	0.219	0.315	0.193
Effect Size in %: Treatment		36.35	79.5	29.18	62.1
Obs.	527	527	527	527	527
$\beta_{treat} = \beta_{placebo}$ (p-value)	0.086	0.019	0.257	0.304	0.698
$\beta_{treat} = \beta_{placebo}$ (q-value)		0.076	0.405	0.405	0.698

Notes: This table summarizes analysis for the main effect of marketing analytics on firm performance outcomes (from baseline to endline). The results in each column represent the intention-to-treat effects (ITT) of the randomly assigned intervention to a treatment group entrepreneur. Column (1) presents an index measure for Firm Performance (using average monthly sales; IHS monthly sales; average monthly profits; IHS monthly profits): each of the four measures was standardized and then the average of these values was computed to construct the overall 'performance' index. Column (2) presents a winsorized measure for Average Monthly Sales (it refers to the average sales for the last full calendar month for the firm, which for our sample was January 2020) and the sales for a typical month (average for the months Oct 2019 to Dec 2019) : estimates after winsorizing each 1% on both tails. Column (3) presents an IHS transformed measure for Average Monthly Sales: estimates after transforming the average monthly sales with the inverse hyperbolic sine function. Column (4) presents a winsorized measure for Average Monthly Profits (it refers to the average profits for the last full calendar month for the firm, which for our sample was January 2020) and the profits for a typical month (average for the months Oct 2019 to Dec 2019) : estimates after winsorizing each 1% on both tails. Column (5) presents an IHS transformed measure for Average Monthly Profits: estimates after transforming the average monthly profits using the inverse hyperbolic sine function. All regressions include firms that failed as at endline (non-operational with zero monthly sales or profits). Any firm growth values in levels (sales; profits) are listed as Rwandan Francs (RWF) in 1000s. The regressions also include: the baseline value of the dependent variable. The IHS results are robust to the scaling of the profits/sales numbers. Robust standard errors are in parentheses. P-values are adjusted for multiple hypothesis testing by using sharpened FDR q-values, and are highlighted as: $q < 0.1^*$ $q < 0.05^{**}$ $q < 0.01^{***}$.

Table A28: Impact of Marketing Analytics on Firm Sales and Profits for firms surviving till Endline

	Overall	DV: Monthly Sales		DV: Monthly Profits	
	(1)	(2)	(3)	(4)	(5)
	Performance Index	Average	IHS	Average	IHS
Treatment	0.268*** (0.0740)	166.5*** (61.32)	0.281*** (0.0737)	23.60*** (8.029)	0.190*** (0.0698)
Placebo	0.0253 (0.119)	-63.92 (91.27)	0.0280 (0.115)	8.439 (12.41)	0.0455 (0.122)
Mean of DV: Control	0	501.8	13.29	93.13	11.84
SD of DV: Control	0.897	763.8	0.955	78.57	0.776
Effect Size in SD: Treatment	0.299	0.218	0.294	0.300	0.246
Effect Size in %: Treatment		33.19	28.1	25.34	19.0
Effect Size in SD: Placebo	0.0282	-0.0837	0.0294	0.107	0.0587
Effect Size in %: Placebo		-12.74	2.8	9.061	4.55
Obs.	494	494	494	494	494
$\beta_{treat} = \beta_{placebo}$	0.0465	0.0128	0.0300	0.247	0.240

Notes: This table summarizes analysis for the main effect of marketing analytics on firm performance outcomes (from baseline to endline). The results in each column represent the effects of the randomly assigned intervention to a treatment group entrepreneur conditional on the firms being operation at the time the Endline Survey was run. The Treatment coefficient captures the analytics bundle effect (Treatment vs. Control); the $\beta_{treat} = \beta_{placebo}$ test isolates the analytics-only effect (Treatment vs. Placebo). Column (1) presents an index measure for Firm Performance (using average last month's sales; IHS last month's sales; average last month's profits; IHS last month's profits): each of the four measures was standardized and then the average of these values was computed to construct the overall 'performance' index. Column (2) presents a winsorized measure for Average Monthly Sales (it refers to the average sales for the last full calendar month for the firm, which for our sample was January 2020) and the sales for a typical month (average for the months Oct 2019 to Dec 2019) : estimates after winsorizing each 1% on both tails. Column (3) presents an IHS transformed measure for Average Monthly Sales: estimates after transforming the average monthly sales with the inverse hyperbolic sine function. Column (4) presents a winsorized measure for Average Monthly Profits (it refers to the average profits for the last full calendar month for the firm, which for our sample was January 2020) and the profits for a typical month (average for the months Oct 2019 to Dec 2019) : estimates after winsorizing each 1% on both tails. Column (5) presents an IHS transformed measure for Average Monthly Profits: estimates after transforming the average monthly profits using the inverse hyperbolic sine function. All regressions exclude firms that failed as at endline (non-operational with zero monthly sales or profits). Any firm growth values in levels (sales; profits) are listed as Rwandan Francs (RWF) in 1000s. The regressions also include: the baseline value of the dependent variable. Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1$ $p < 0.05^{**}$ $p < 0.01^{***}$

Table A29: Impact of Marketing Analytics on Firm Sales and Profits - LASSO Regressions

	Overall	DV: Monthly Sales		DV: Monthly Profits	
	(1)	(2)	(3)	(4)	(5)
	Performance Index	Average	IHS	Average	IHS
Treatment	0.266*** (0.0657)	175.0*** (55.03)	0.801*** (0.287)	25.87*** (6.840)	0.610** (0.255)
Placebo	0.107 (0.111)	-3.202 (93.55)	0.184 (0.488)	11.12 (11.74)	0.417 (0.432)
Mean of DV: Control	0	454.9	12.28	85.60	10.94
SD of DV: Control	0.814	706.5	3.633	79.29	3.217
Effect Size in SD: Treatment	0.326	0.248	0.220	0.326	0.189
Effect Size in %: Treatment		38.47	6.522	30.22	5.573
Effect Size in SD: Placebo	0.132	-0.004	0.050	0.140	0.130
Effect Size in %: Placebo		-0.704	1.495	13.00	3.812
Obs.	527	527	527	527	527
$\beta_{treat} = \beta_{placebo}$	0.154	0.056	0.206	0.211	0.656

Notes: This table summarizes analysis for the main effect of marketing analytics on firm performance outcomes (from baseline to endline). The results in each column represent the intention-to-treat effects (ITT) of the randomly assigned intervention to a treatment group entrepreneur. The Treatment coefficient captures the analytics bundle effect (Treatment vs. Control); the $\beta_{treat} = \beta_{placebo}$ test isolates the analytics-only effect (Treatment vs. Placebo). Column (1) presents an index measure for Firm Performance (using average last month's sales; IHS last month's sales; average last month's profits; IHS last month's profits): each of the four measures was standardized and then the average of these values was computed to construct the overall 'performance' index. Column (2) presents a winsorized measure for Average Monthly Sales (it refers to the average sales for the last full calendar month for the firm, which for our sample was January 2020) and the sales for a typical month (average for the months Oct 2019 to Dec 2019) : estimates after winsorizing each 1% on both tails. Column (3) presents an IHS transformed measure for Average Monthly Sales: estimates after transforming the average monthly sales with the inverse hyperbolic sine function. Column (4) presents a winsorized measure for Average Monthly Profits (it refers to the average profits for the last full calendar month for the firm, which for our sample was January 2020) and the profits for a typical month (average for the months Oct 2019 to Dec 2019) : estimates after winsorizing each 1% on both tails. Column (5) presents an IHS transformed measure for Average Monthly Profits: estimates after transforming the average monthly profits using the inverse hyperbolic sine function. All regressions include firms that failed as at endline (non-operational with zero monthly sales or profits). Any firm growth values in levels (sales; profits) are listed as Rwandan Francs (RWF) in 1000s. The LASSO regressions include the baseline value of the dependent variable and: 20 controls for entrepreneur characteristics at baseline (these include - use of market tracking/segmentation practices, use of data vs. intuition, education, prior business ownership, prior training/consulting/mentorship in business, entrepreneur's age); and 19 controls for business characteristics at baseline (provision of goods vs. services, start-up capital, number of employees, asset value, number of products offered, margin of products, number of customers - new and loyal, basket size of customers - new and loyal, firm's sales and profits at baseline). The IHS results are robust to the scaling of the profits/sales numbers. Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1$ $p < 0.05^{**}$ $p < 0.01^{***}$

Table A30: Robustness Checks for Main Effects - Including Controls

	Overall	DV: Monthly Sales		DV: Monthly Profits	
	(1)	(2)	(3)	(4)	(5)
	Performance Index	Average	IHS	Average	IHS
Treatment	0.256*** (0.0719)	177.6*** (60.37)	0.833** (0.324)	27.51*** (7.319)	0.641** (0.287)
Placebo	0.0575 (0.108)	-11.42 (76.09)	0.0544 (0.569)	12.63 (10.99)	0.279 (0.465)
Mean of DV: Control	0	454.9	12.28	85.60	10.94
SD of DV: Control	0.814	706.5	3.633	79.29	3.217
Effect Size in SD: Treatment	0.314	0.251	0.229	0.347	0.199
Effect Size in %: Treatment		39.04	6.785	32.14	5.859
Effect Size in SD: Placebo	0.0706	-0.0162	0.0150	0.159	0.0868
Effect Size in %: Placebo		-2.510	0.443	14.76	2.554
Obs.	527	527	527	527	527
$\beta_{treat} = \beta_{placebo}$	0.0722	0.0126	0.172	0.191	0.431

Notes: This table summarizes analysis for the main effect of marketing analytics on firm performance outcomes (from baseline to endline). The results in each column represent the intention-to-treat effects (ITT) of the randomly assigned intervention to a treatment group entrepreneur. The Treatment coefficient captures the analytics bundle effect (Treatment vs. Control); the $\beta_{treat} = \beta_{placebo}$ test isolates the analytics-only effect (Treatment vs. Placebo). Column (1) presents an index measure for Firm Performance (using average last month's sales; IHS last month's sales; average last month's profits; IHS last month's profits): each of the four measures was standardized and then the average of these values was computed to construct the overall 'performance' index. Column (2) presents a winsorized measure for Average Monthly Sales (it refers to the average sales for the last full calendar month for the firm, which for our sample was January 2020) and the sales for a typical month (average for the months Oct 2019 to Dec 2019) : estimates after winsorizing each 1% on both tails. Column (3) presents an IHS transformed measure for Average Monthly Sales: estimates after transforming the average monthly sales with the inverse hyperbolic sine function. Column (4) presents a winsorized measure for Average Monthly Profits (it refers to the average profits for the last full calendar month for the firm, which for our sample was January 2020) and the profits for a typical month (average for the months Oct 2019 to Dec 2019) : estimates after winsorizing each 1% on both tails. Column (5) presents an IHS transformed measure for Average Monthly Profits: estimates after transforming the average monthly profits using the inverse hyperbolic sine function. All regressions include firms that failed as at endline (non-operational with zero monthly sales or profits). Any firm growth values in levels (sales; profits) are listed as Rwandan Francs (RWF) in 1000s. The regressions include: the baseline value of the dependent variable. In addition, we also include 20 controls for entrepreneur characteristics at baseline (these include - use of market tracking/segmentation practices, use of data vs. intuition, education, prior business ownership, prior training/consulting/mentorship in business, entrepreneur's age); and 19 controls for business characteristics at baseline (provision of goods vs. services, start-up capital, number of employees, asset value, number of products offered, margin of products, number of customers - new and loyal, basket size of customers - new and loyal, firm's sales and profits at baseline). The IHS results are robust to the scaling of the profits/sales numbers. Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1$ $p < 0.05^{**}$ $p < 0.01^{***}$

Table A31: Robustness Checks for Main Effects - Conditional on Firms Recording Data at Baseline

	Overall	DV: Monthly Sales		DV: Monthly Profits	
	(1)	(2)	(3)	(4)	(5)
	Performance Index	Average	IHS	Average	IHS
Treatment	0.370** (0.152)	177.8 (108.0)	0.950 (0.662)	47.78** (19.24)	0.941 (0.631)
Mean of DV: Control	0.0685	523.1	12.30	98.65	10.96
SD of DV: Control	0.916	800.0	3.865	90.71	3.442
Effect Size in SD: Treatment	0.403	0.222	0.246	0.527	0.273
Effect Size in %: Treatment		34.00	95.0	48.44	94.1
Obs.	104	104	104	104	104

Notes: This table summarizes analysis for the main effect of marketing analytics on firm performance outcomes (from baseline to endline) for those firms that recorded their business finances at the baseline. Of the total 104 firms which recorded data at baseline, 56 are treatment firms and 48 are control firms. The results in each column represent the intention-to-treat effects (ITT) of the randomly assigned intervention to a treatment group entrepreneur. Column (1) presents an index measure for Firm Performance (using average last month's sales; IHS last month's sales; average last month's profits; IHS last month's profits): each of the four measures was standardized and then the average of these values was computed to construct the overall 'performance' index. Column (2) presents a winsorized measure for Average Monthly Sales (it refers to the average sales for the last full calendar month for the firm, which for our sample was January 2020) and the sales for a typical month (average for the months Oct 2019 to Dec 2019): estimates after winsorizing each 1% on both tails. Column (3) presents an IHS transformed measure for Average Monthly Sales: estimates after transforming the average monthly sales with the inverse hyperbolic sine function. Column (4) presents a winsorized measure for Average Monthly Profits (it refers to the average profits for the last full calendar month for the firm, which for our sample was January 2020) and the profits for a typical month (average for the months Oct 2019 to Dec 2019): estimates after winsorizing each 1% on both tails. Column (5) presents an IHS transformed measure for Average Monthly Profits: estimates after transforming the average monthly profits using the inverse hyperbolic sine function. All regressions include firms that failed at at endline (non-operational with zero monthly sales or profits). Any firm growth values in levels (sales; profits) are listed as Rwandan Francs (RWF) in 1000s. The regressions include: the baseline value of the dependent variable. Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1$ $p < 0.05^{**}$ $p < 0.01^{***}$

Table A32: Robustness to Conley (1999) Spatially Correlated Standard Errors - Impact of Marketing Analytics on Firm Sales and Profits

	DV: Monthly Sales		DV: Monthly Profits		Overall
	(1)	(2)	(3)	(4)	(5)
	Average	IHS	Average	IHS	Performance Index
Treatment	165.3*** (59.17)	0.795*** (0.293)	24.98** (10.44)	0.621** (0.286)	0.250*** (0.0653)
Placebo	-35.20 (60.06)	0.255 (0.409)	11.88 (9.835)	0.475 (0.424)	0.0823 (0.0811)
Mean of DV: Control	454.9	12.28	85.60	10.94	0
SD of DV: Control	706.5	3.633	79.29	3.217	0.814
Effect Size in SD: Treatment	0.234	0.219	0.315	0.193	0.307
Effect Size in %: Treatment	36.35	6.475	29.18	5.681	
Effect Size in SD: Placebo	-0.0498	0.0703	0.150	0.148	0.101
Effect Size in %: Placebo	-7.739	2.080	13.88	4.344	
Obs.	527	527	527	527	527
$\beta_{treat} = \beta_{placebo}$	0.000816	0.183	0.283	0.695	0.0344

Notes: This table reproduces the main effect regressions of marketing analytics on firm performance outcomes (from baseline to endline), using Conley (1999) spatially correlated standard errors. All regressions include the baseline value of the dependent variable. Standard errors are computed using a Bartlett kernel with a 5 km cutoff. P-values are highlighted as: $p < 0.1$ $p < 0.05^{**}$ $p < 0.01^{***}$

Table A33: Average Treatment Effect on the Treated - Impact of Marketing Analytics on Firm Sales and Profits

	Overall	DV: Sales		DV: Profits	
	(1) Performance Index	(2) Average	(3) IHS	(4) Average	(5) IHS
Treatment	0.328*** (0.0813)	210.6*** (69.34)	1.103*** (0.333)	31.18*** (9.458)	0.865*** (0.302)
Mean of DV: Control	0	454.9	12.28	85.60	10.94
SD of DV: Control	0.814	706.5	3.633	79.29	3.217
Effect Size in SD: Treatment	0.403	0.298	0.304	0.393	0.269
Effect Size in %: Treatment		46.31	110.3	36.42	86.5
Obs.	475	475	475	475	475

Notes: This table summarizes analysis for the main effect of marketing analytics on firm performance outcomes (from baseline to endline). The results in each column represent the average treatment-on-treated effects (ToT) of the randomly assigned intervention to a treatment group entrepreneur, computed via 2SLS, with treatment adoption (defined as signing-up on the analytics app) and compliance (calculated as the ratio of the number of data entries recorded by a treated firm in a given half-month to the expected 51 entries, measured over 14 half-months Jul 2019 - Jan 2020) instrumented by the random treatment assignment. The regressions also include: the baseline value of the dependent variable. All five of the ToT regression specifications in the table above pass the minimum threshold with an F-statistic greater than 10.0 (e.g., the smallest F-statistic value across these models is 5239.7, which is as expected given the treatment offer is highly correlated with treatment compliance). Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1$ $p < 0.05^{**}$ $p < 0.01^{***}$

Table A34: Correlational Analysis: Financial Changes by App Data Entry Compliance

	(1) Performance Index	(2) Average	(3) IHS	(4) Average	(5) IHS
Compliance	2.107*** (0.376)	1037.7*** (261.6)	8.688*** (1.925)	167.2*** (32.83)	7.901*** (1.656)
Obs.	236	236	236	236	236
$\beta_{compliance} = 0$ (p-value)	0.00	0.00	0.00	0.00	0.00

Notes: This table summarizes the correlation of the marketing analytics intervention compliance with firm performance outcomes (from baseline to endline). Treatment compliance is defined as the data entry compliance (calculated as the ratio of the number of data entries recorded by a treated firm in a given half-month to the expected 51 entries, measured over 14 half-months from Jul 2019 - Jan 2020). Column (1)-(5) represent the same metrics as in Table 3. The regressions also include: the baseline value of the dependent variable. Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1$ $p < 0.05^{**}$ $p < 0.01^{***}$

Table A35: Correlation between Firm Performance and Days of Analytics App Engagement

	Overall	DV: Monthly Sales		DV: Monthly Profits	
	(1)	(2)	(3)	(4)	(5)
	Average Performance Index	Average	IHS	Average	IHS
Treatment	0.0331 (0.108)	31.89 (74.63)	0.185 (0.447)	-1.671 (10.62)	-0.0644 (0.409)
Treat * Days Engaged	0.002*** (0.001)	1.295*** (0.497)	0.007*** (0.002)	0.249*** (0.072)	0.007*** (0.002)
Placebo	0.083 (0.096)	-34.82 (82.66)	0.267 (0.497)	11.88 (12.02)	0.477 (0.398)
Mean of DV: Control	0	454.9	12.28	85.60	10.94
SD of DV: Control	0.814	706.5	3.633	79.29	3.217
Effect Size in SD: Treatment	0.041	0.045	0.051	-0.021	-0.0200
Effect Size in %: Treatment		7.011	1.507	-1.952	-0.589
Effect Size in SD: Placebo	0.102	-0.049	0.073	0.150	0.148
Effect Size in %: Placebo		-7.656	2.173	13.87	4.357
Obs.	525	525	525	525	525
$\beta_{treat} = \beta_{placebo}$	0.692	0.499	0.888	0.352	0.269

Notes: This table reports heterogeneous treatment effects of marketing analytics on firm performance, interacted with the number of days entrepreneurs engaged with the app during the 7 month intervention period (July 2019 - Jan 2020). Days Engaged is set to zero for placebo and control firms as they did not have access to the app. All other specifications are the same as Table 3. Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1$ $p < 0.05^{**}$ $p < 0.01^{***}$

Table A36: Correlation between Tech-support Visit Duration and Treated Firms' Financial Performance

	Overall	DV: Monthly Sales		DV: Monthly Profits	
	(1)	(2)	(3)	(4)	(5)
	Performance Index	Average	IHS	Average	IHS
Visit Duration	0.0786 (0.0993)	19.10 (75.80)	0.0463 (0.301)	10.29 (8.818)	0.0911 (0.263)
Obs.	211	211	211	211	211
$\beta_{VisitDuration} = 0$ (p-value)	0.430	0.801	0.878	0.245	0.730

Notes: This table summarizes analysis for the correlation between tech-support visit duration and the treatment firms' financial performance outcomes (from baseline to endline). Visit Duration is defined as the mean length of on-site visits (in hours) by members of the technology support team to treatment firms over the intervention period (i.e., July 2019 - Jan 2020). Columns (1)-(5) are the same as Table 3. Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1$ $p < 0.05^{**}$ $p < 0.01^{***}$

Table A37: Correlation between Tech-support Visit Duration and Entrepreneur Mental Performance

	(1) Analytical Ability Index Obj.	(2) CRT	(3) Digit Span Test	(4) Raven's Test	(5) Numerical Aptitude
Visit Duration	0.0400 (0.0588)	-0.00689 (0.0429)	0.00644 (0.245)	0.263 (0.171)	0.0318 (0.105)
Obs.	211	211	211	211	211
$\beta_{Visit\ Duration} = 0$ (p-value)	0.497	0.873	0.979	0.125	0.762

Notes: This table summarizes analysis for the correlation between tech-support visit duration and the treatment firms' mental performance outcomes. Visit Duration is defined as the mean length of on-site visits (in hours) by members of the technology support team to treatment firms over the intervention period (i.e., July 2019 - Jan 2020). Columns (1)-(5) are the same as Table 1. Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1$ * $p < 0.05$ ** $p < 0.01$ ***

Table A38: Correlation between Tech-support Visit Duration and Business Practices

	(1) Overall Index	(2) Product related	(3) Accounting related
Visit Duration	0.018 (0.021)	-0.007 (0.024)	0.043* (0.024)
Obs.	211	211	211
$\beta_{VisitDuration} = 0$ (p-value)	0.391	0.766	0.071

Notes: This table summarizes analysis for the correlation between tech-support visit duration and the treatment firms' business practice outcomes. Visit Duration is defined as the mean length of on-site visits (in hours) by members of the technology support team to treatment firms over the intervention period (i.e., July 2019 - Jan 2020). Columns (1)-(3) are the same as Table 2. Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1$ * $p < 0.05$ ** $p < 0.01$ ***

Table A39: Correlation between sales submitted in the Analytics App and reported in the Endline Survey

	(1) Endline Survey Sales
App Sales	1.014*** (0.0626)
Obs.	154
$\beta_{AppSales} = 1$	0.829
$= 0$	0.798

Notes: This table summarizes analysis for the comparison between the last month sales reported in the Endline Survey and the Analytics Application. The treatment entrepreneurs entered daily sales in the analytics application which was used to calculate the total "App" sales for the last full month (Jan 2020). The analysis is conducted for 154 of the 238 treatment entrepreneurs from the endline survey, as the remaining did not enter sales data in the analytics application for the month of interest. Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1$ * $p < 0.05$ ** $p < 0.01$ ***

Table A40: Robustness Checks for Main Effects - Including Local Competition

	Overall	DV: Monthly Sales		DV: Monthly Profits	
	(1) Average Performance Index	(2)	(3)	(4)	(5)
		Average	IHS	Average	IHS
Treatment	0.249*** (0.0703)	165.0*** (58.63)	0.795*** (0.292)	24.96*** (7.924)	0.622** (0.263)
Local Competition	-0.0412 (0.0364)	-24.19 (32.16)	-0.192 (0.161)	1.091 (3.955)	-0.126 (0.149)
Treat * Competition	0.012 (0.074)	-2.374 (58.72)	-0.001 (0.318)	6.851 (8.405)	0.0301 (0.276)
Placebo	0.077 (0.096)	-38.41 (82.67)	0.232 (0.497)	12.03 (12.03)	0.459 (0.395)
Mean of DV: Control	0	454.9	12.28	85.60	10.94
SD of DV: Control	0.814	706.5	3.633	79.29	3.217
Effect Size in SD: Treatment	0.306	0.234	0.219	0.315	0.193
Effect Size in %: Treatment		36.28	79.5	29.16	62.2
Effect Size in SD: Placebo	0.094	-0.054	0.063	0.152	0.143
Effect Size in %: Placebo		-8.445	23.2	14.06	45.9
Obs.	527	527	527	527	527
$\beta_{treat} = \beta_{placebo}$	0.077	0.019	0.238	0.311	0.666
Treat * Competition = 0 (p-val)	0.875	0.968	0.998	0.415	0.913

Notes: This table summarizes analysis for the main effect of marketing analytics on firm performance outcomes (from baseline to endline), including local competition effects. The results in each column represent the intention-to-treat effects (ITT) of the randomly assigned intervention to a treatment group entrepreneur. Competition is measured as the standardized VIIRS nightlight radiance in the 500m × 500m satellite pixel corresponding to the firm's GPS coordinates. The results are robust to alternative definitions of geographic proximity: estimating the spillover specifications using radii of 0.5 km, 1.5 km, and 2 km yields similarly statistically insignificant estimates across all outcomes. All regressions include firms that failed as at endline (non-operational with zero monthly sales or profits). Any firm growth values in levels (sales; profits) are listed as Rwandan Francs (RWF) in 1000s. The regressions also include: the baseline value of the dependent variable. Robust standard errors are in parentheses. P-values are highlighted as: p < 0.1 p < 0.05** p < 0.01***

Table A41: Robustness Checks for Main Effects - Including Local Competition (Firm-specific Radii)

	Overall	DV: Monthly Sales		DV: Monthly Profits	
	(1)	(2)	(3)	(4)	(5)
	Average Performance Index	Average	IHS	Average	IHS
Treatment	0.251*** (0.0706)	166.2*** (58.86)	0.804*** (0.292)	24.80*** (7.928)	0.628** (0.264)
Local Competition	-0.0582 (0.0416)	-18.93 (36.64)	-0.306 (0.190)	1.593 (4.041)	-0.226 (0.176)
Treat * Competition	0.0258 (0.0754)	-16.34 (60.08)	0.138 (0.329)	5.578 (7.832)	0.167 (0.285)
Placebo	0.0776 (0.0960)	-36.81 (82.30)	0.233 (0.499)	12.03 (12.03)	0.457 (0.397)
Mean of DV: Control	0	454.9	12.28	85.60	10.94
SD of DV: Control	0.814	706.5	3.633	79.29	3.217
Effect Size in SD: Treatment	0.308	0.235	0.221	0.313	0.195
Effect Size in %: Treatment		36.55	80.4	28.98	62.8
Effect Size in SD: Placebo	0.095	-0.0521	0.0640	0.152	0.142
Effect Size in %: Placebo		-8.092	23.3	14.05	45.7
Obs.	527	527	527	527	527
$\beta_{treat} = \beta_{placebo}$	0.076	0.0194	0.233	0.317	0.653
Treat * Competition = 0 (p-val)	0.732	0.786	0.675	0.477	0.559

Notes: This table summarizes analysis for the main effect of marketing analytics on firm performance outcomes (from baseline to endline), including local competition effects. The results in each column represent the intention-to-treat effects (ITT) of the randomly assigned intervention to a treatment group entrepreneur. Competition is measured as the standardized mean VIIRS nightlight radiance within a specified radius of the firm's GPS coordinates. The radii are microfounded on typical travel-to-purchase distances, which vary by firm type. We use 500 m for micro-retail to reflect high-frequency, proximity-based shopping for daily staples, and expand to 1 km for service-based firms (e.g., repairs, salons) where consumers travel further for quality or trust. For other industrial and B2B firms, a broader 2 km radius is used as their competition is regional and driven by supply chains rather than local foot traffic, consistent with foundational work on trading areas and spatial competition (e.g., World Bank 2017; Rossi-Hansberg & Wright 2007). All regressions include firms that failed as at endline (non-operational with zero monthly sales or profits). Any firm growth values in levels (sales; profits) are listed as Rwandan Francs (RWF) in 1000s. The regressions also include: the baseline value of the dependent variable. Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1$ $p < 0.05^{**}$ $p < 0.01^{***}$

Table A42: Robustness Checks for Main Effects - Impact on Control Firms if There is a Competing Treatment Firm Nearby

	Overall	DV: Monthly Sales		DV: Monthly Profits	
	(1)	(2)	(3)	(4)	(5)
	Performance Index	Average	IHS	Average	IHS
Close Treatment Competitor	0.096 (0.117)	97.31 (68.65)	0.283 (0.614)	12.39 (10.05)	0.252 (0.576)
Mean of DV: Control	-0.134	330.6	11.95	70.76	10.66
SD of DV: Control	0.700	303.1	3.880	56.95	3.442
Effect Size in SD: Competitor	0.138	0.321	0.0729	0.218	0.0731
Effect Size in %: Competitor		29.43	28.3	17.51	25.2
Obs.	239	239	239	239	239

Notes: This table summarizes analysis for the spillover effect on the control firms of having a treatment firm nearby. The regression is run on the sample of control firms, and provide effect on the control firm of having at least one treatment firm nearby (within 1 km of Haversine distance from the focal firm) which belongs to the same sector (pre coded industry variable) as the focal firm. The results are robust to alternative definitions of geographic proximity: re-estimating the spillover specifications using radii of 0.5 km, 1.5 km, and 2 km yields similar statistically insignificant estimates across all outcomes. Column (1) presents an index measure for Firm Performance (using average last month's sales; IHS last month's sales; average last month's profits; IHS last month's profits): each of the four measures were standardized and then the average of these values was computed to construct the overall 'performance' index. Column (2) presents a winsorized measure for Average Monthly Sales (it refers to the average sales for the last full calendar month for the firm, which for our sample was January 2020) and the sales for a typical month (average for the months Oct 2019 to Dec 2019) : estimates after winsorizing each 1% on both tails. Column (3) presents an IHS transformed measure for Average Monthly Sales: estimates after transforming the average monthly sales with the inverse hyperbolic sine function. Column (4) presents a winsorized measure for Average Monthly Profits (it refers to the average profits for the last full calendar month for the firm, which for our sample was January 2020) and the profits for a typical month (average for the months Oct 2019 to Dec 2019) : estimates after winsorizing each 1% on both tails. Column (5) presents an IHS transformed measure for Average Monthly Profits: estimates after transforming the average monthly profits using the inverse hyperbolic sine function. All regressions include firms that failed as at endline (non-operational with zero monthly sales or profits). Any firm growth values in levels (sales; profits) are listed as Rwandan Francs (RWF) in 1000s. The regressions also include: the baseline value of the dependent variable. Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1$ $p < 0.05^{**}$ $p < 0.01^{***}$

Table A43: Robustness Checks for Main Effects - Effects on Control Firms of the Number of Nearby Treated Competitors

	Overall	DV: Monthly Sales		DV: Monthly Profits	
	(1)	(2)	(3)	(4)	(5)
	Performance Index	Average	IHS	Average	IHS
Close Treatment Competitors	-0.001 (0.004)	0.542 (2.761)	0.005 (0.019)	-0.588 (0.534)	-0.002 (0.016)
Mean of DV: Control	-0.134	330.6	11.95	70.76	10.66
SD of DV: Control	0.700	303.1	3.880	56.95	3.442
Effect Size in SD: Competitor	-0.002	0.001	0.001	-0.010	-0.001
Effect Size in %: Competitor		0.164	0.5	-0.830	-0.2
Obs.	239	239	239	239	239

Notes: This table summarizes analysis for the spillover effect on the control firms of having a treatment firm nearby. The regression is run on the sample of control firms, and provide effect on the control firm of the number of treatment firms nearby (within 1 km of Haversine distance from the focal firm) which belongs to the same sector (pre coded industry variable) as the focal firm. Column (1)-(5) represent the same metrics as Appendix Table A42. All regressions include firms that failed as at endline (non-operational with zero monthly sales or profits). Any firm growth values in levels (sales; profits) are listed as Rwandan Francs (RWF) in 1000s. The regressions also include: the baseline value of the dependent variable. Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1$ $p < 0.05^{**}$ $p < 0.01^{***}$

Table A44: Robustness of Main Effects to Local Treatment Competition: Binary Specification

	Overall	DV: Monthly Sales		DV: Monthly Profits	
	(1)	(2)	(3)	(4)	(5)
	Average Performance Index	Average	IHS	Average	IHS
Treatment	0.250*** (0.070)	165.2*** (58.45)	0.797*** (0.293)	24.96*** (7.935)	0.622** (0.263)
Placebo	0.081 (0.097)	-34.19 (82.17)	0.242 (0.498)	12.01 (12.15)	0.467 (0.398)
Close Competitor	0.015 (0.086)	-14.65 (73.69)	0.188 (0.364)	-1.807 (9.806)	0.117 (0.330)
Mean of DV: Control	0	454.9	12.28	85.60	10.94
SD of DV: Control	0.814	706.5	3.633	79.29	3.217
Effect Size in SD: Treatment	0.307	0.234	0.219	0.315	0.193
Effect Size in %: Treatment		36.32	79.7	29.16	62.2
Effect Size in SD: Placebo	0.099	-0.048	0.066	0.151	0.145
Effect Size in %: Placebo		-7.517	24.2	14.02	46.7
Obs.	527	527	527	527	527
$\beta_{treat} = \beta_{placebo}$	0.083	0.019	0.243	0.312	0.680

Notes: This table summarizes robustness checks for the main effect of marketing analytics on firm performance outcomes (from baseline to endline) in the presence of local treated competitors. The Close Competitor variable measures whether there is a treated firm within 1 km of Haversine distance from the focal firm operating in the same sector. P-values are highlighted as: $p < 0.1$ $p < 0.05^{**}$ $p < 0.01^{***}$

Table A45: Robustness of Main Effects to Local Treatment Competition: Continuous Distance Specification

	Overall	DV: Monthly Sales		DV: Monthly Profits	
	(1)	(2)	(3)	(4)	(5)
	Average Performance Index	Average	IHS	Average	IHS
Treatment	0.256*** (0.0700)	165.0*** (58.84)	0.825*** (0.290)	25.43*** (7.967)	0.653** (0.260)
Placebo	0.0801 (0.0966)	-35.08 (81.76)	0.245 (0.499)	11.73 (12.04)	0.466 (0.399)
Min Distance to Competitor	-0.001 (0.001)	0.025 (0.218)	-0.002 (0.002)	-0.033 (0.036)	-0.002 (0.002)
Mean of DV: Control	0	454.9	12.28	85.60	10.94
SD of DV: Control	0.814	706.5	3.633	79.29	3.217
Effect Size in SD: Treatment	0.315	0.234	0.227	0.321	0.203
Effect Size in %: Treatment		36.28	82.5	29.70	65.3
Effect Size in SD: Placebo	0.098	-0.049	0.067	0.148	0.145
Effect Size in %: Placebo		-7.713	24.5	13.70	46.6
Obs.	527	527	527	527	527
$\beta_{treat} = \beta_{placebo}$	0.070	0.020	0.221	0.284	0.617

Notes: This table summarizes robustness checks for the main effect of marketing analytics on firm performance outcomes (from baseline to endline) in the presence of local treated competitors. The Min. Distance to Competitor measures the Haversine distance in kilometers from the focal firm to the closest treated firm operating in the same sector. P-values are highlighted as: $p < 0.1$ $p < 0.05^{**}$ $p < 0.01^{***}$

Table A46: Heterogeneity in Treatment Effects: Overall Financial Performance of Firms

Covariate	Estimate	Std. Error	p-value
(Intercept)	0.474	0.315	0.133
Start-up capital	0.472**	0.193	0.015
Paid full-time employees	-0.004	0.203	0.984
Number of business partners	-0.146	0.201	0.467
Total Asset Value	-0.294*	0.156	0.061
Number of products sold	-0.222	0.187	0.236
Average margin of popular products sold	-0.207	0.178	0.244
Number of loyal customers	-0.180	0.164	0.274
Number of new customers	-0.119	0.166	0.475
Basket size for loyal customers	0.243	0.188	0.196
Basket size for new customers	-0.025	0.196	0.899
Baseline Sales	0.203	0.223	0.364
Baseline Profits	0.115	0.201	0.568
Rely on intuition instead of data	0.143	0.156	0.363
Use market tracking/segmentation	-0.120	0.155	0.440
Went to school (Yes = 1, No = 0)	-0.135	0.329	0.682
Went to college (Yes = 1, No = 0)	0.042	0.277	0.880
Prior business ownership (Yes = 1, No = 0)	-0.010	0.199	0.960
Business training (Yes = 1, No = 0)	-0.276	0.181	0.128
Entrepreneur age	0.213	0.160	0.183
Gender (Female = 1, Male = 0)	-0.228	0.156	0.144
Obs.	477	477	477

Notes: This table summarizes the best linear projection of the conditional average treatment effect on the overall performance index of the firms. The outcome variable is same as the overall performance index as reported in Table 3. The number of observations for the analysis includes all the treatment and control firms, post attrition. We exclude placebo firms from the HTE analysis, as the goal is to characterize heterogeneity in the effect of the full marketing analytics solution relative to no intervention. The covariates are measured pre-intervention, as per the baseline survey. The covariates above the dashed line are firm-level variables and the ones below the line are entrepreneur-level variables. All covariates, except dummy variables, are discretized using median splits (high = 1, low = 0). The standard errors are heteroskedasticity-robust. P-values are highlighted as: $p < 0.1^*$ $p < 0.05^{**}$ $p < 0.01^{***}$

Table A47: Mediation Analysis - Financial Performance of the Firm

	Estimate	p-value
ACME	0.175	0.000***
ADE	0.043	0.557
Total Effect	0.218	0.001***

This table summarizes the mediation analysis to test if the mental performance of the entrepreneur (measured as the mental performance index, refer to Table 1 notes)

mediates the financial performance index for the firm (refer to Table 3 notes).

Non parametric bootstrap confidence intervals with the BCa Method (Tingley et al. 2014)

ACME = Average Causal Mediation Effect and ADE = Average Direct Effect

Sample size = 527, simulations = 5000

P-values are highlighted as: $p < 0.1^$ $p < 0.05^{**}$ $p < 0.01^{***}$*

Table A48: Mediation Analysis - Business Practices

	Estimate	p-value
ACME	0.118	0.000***
ADE	0.226	0.004***
Total Effect	0.344	0.001***

This table summarizes the mediation analysis to test if the mental performance of the entrepreneur (measured as the mental performance index, refer to Table 1 notes) mediates the business practices index for the firm (refer to Table 3 notes). Non parametric bootstrap confidence intervals with the BCa Method (Tingley et al. 2014) ACME = Average Causal Mediation Effect and ADE = Average Direct Effect Sample size = 527 (Placebo group excluded), simulations = 5000 P-values are highlighted as: $p < 0.1^$ $p < 0.05^{**}$ $p < 0.01^{***}$*

Table A49: Mechanism Decomposition of the Treatment Effect on Financial Performance

	Estimate	p-value
Serial Indirect Effect ($a \times b \times c$)	0.217	0.000***
<i>Path a:</i> Treatment → Mental Ability	0.745	0.000***
<i>Path b:</i> Mental Ability → Business Practices	0.231	0.000***
<i>Path c:</i> Business Practices → Financial Performance	1.263	0.000***

This table presents the serial mediation analysis testing whether the mental performance of the entrepreneur (measured as the mental performance index; see Table 1 notes) sequentially mediates firm financial performance (see Table 3 notes) through improved business practices. The serial indirect effect captures the full chain: Treatment → Mental Ability (a) → Business Practices (b) → Financial Performance (c), estimated as the product $a \times b \times c$. Bootstrap confidence intervals are estimated using the BCa method with 5,000 simulations. Sample size = 527.

Notes: $*p < 0.1$, $**p < 0.05$, $***p < 0.01$.

Table A50: Cost per Firm (in USD) for the Marketing Analytics Treatment

	Low-Cost Scenario	High-Cost Scenario
1. One-time mobile phone cost	50	70
2. Personnel cost to train firms	120	140
3. Monthly analytics cost	4	6
Total one-time cost	170	210
Total variable cost	4	6
Net profit gain per month	26.29	26.29
Time (in months) to realize positive ROI	7.63	10.35

Notes: In this table we chart out costs of running a marketing analytics treatment under two scenarios: a low-cost scenario that corresponds to the intervention we implemented getting benefits of bulk purchases and partnerships with organizations, and a high-cost scenario where the entrepreneurs have to arrange for all the necessary resources themselves on a retail price while having limited access to labor markets, such as college graduates whom we trained for this intervention. One-time costs represent fixed initial investments that do not recur with continued firm operations. Personnel costs are classified as one-time because trained staff deliver standardized training to firms during the initial 7-month period and can train multiple firms sequentially; after this training period, firms use the analytics application independently. Variable costs represent ongoing monthly expenses that scale with continued analytics usage. For the personnel cost in the high-cost scenario we use the hourly wages of enumerators employed in Rwanda with NGOs, working on small firm development (to be engaged to train the entrepreneur on the analytics application for one hour per week for 7 months). Monthly analytics cost includes the server cost for hosting/running the analytics application, internet connectivity and report printing expenses. We conclude the table with an estimate of the time required to recuperate program costs, given the \$26.29 gain in monthly profits (1USD $\approx$ 950 RWFs) that operational firm owners experience at least 7 months post-intervention.

Figures

Figure A1: Intervention Set-up

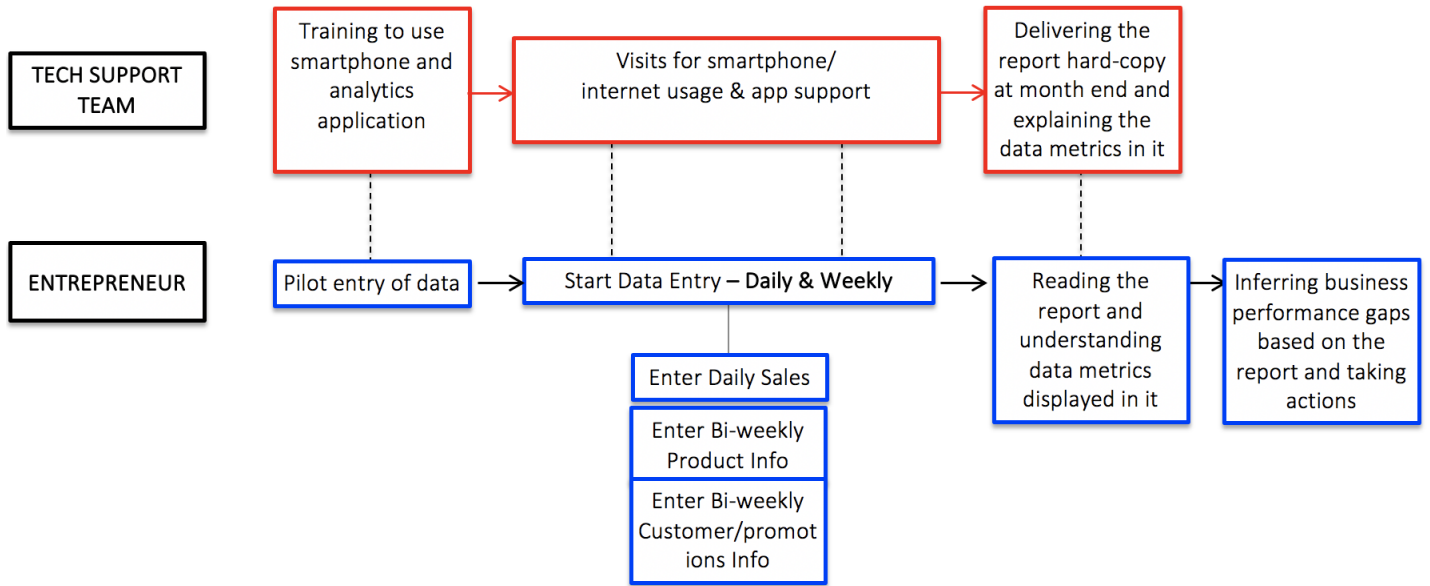


Figure A2: Snapshots from the app depicting the data entry process

LOGIN

3:45 AM



IMPRESA
INSIGHTS

User Name

Password

LOGIN

SELECT LANGUAGE

3:45 AM

Welcome!

Welcome to Impresa Insights

Choose language

English Kinyarwanda

Participate

Be a Part of Impresa Insights Survey



Go to my survey

ENTREPRENEUR INFO

3:45 AM

← MY PROFILE



← ENTREPRENEUR OVERVIEW

My background as a business owner

Data as of: 2018-07-02

Demographics	
My gender	Female
My birth year	1977

Education	
The highest level of education I have completed	Master's Degree (graduate, post-undergraduate)
Training: a business course taken inside a classroom with an instructor who taught me and other students	Yes
Consulting: a professional service firm worked with my business and provided advice to improve performance	Do not know
Mentoring: a one-on-one relationship with a coach/mentor who listened to my business problems and gave me guidance	Yes

BUSINESS INFO

3:45 AM

← DASHBOARD

Market Manager: Analytics Report

Month Year

Main Sections

Products

Customers

Activities

Sales

Figure A3: Snapshots from the app depicting the analytics output accessible to the entrepreneur

Change in product margin or volume sold across time



Current month analytics



Product-wise analytics (for top 3 selling products)

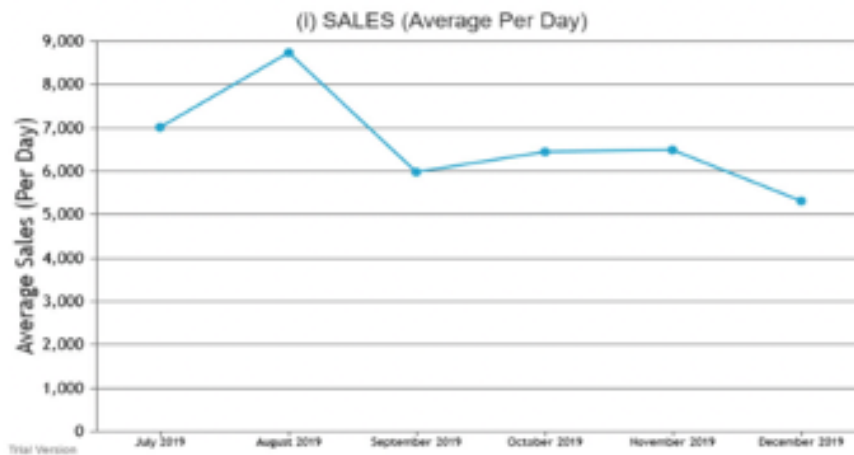


Figure A4: Snapshots from the report depicting the analytics output accessible to the entrepreneur

Sales Related Information – Overall and week-wise

MONTHLY SALES (Total Per Month)

Steps to Calculate	Estimated Values
DAYS OPEN (based on question replies)	23
MONTHLY SALES SUB-TOTAL (actual sales entered)	122,300
AVERAGE SALES PER DAY	5,317
MISSING RESPONSES	0
IMPUTED DAILY SALES	0
MONTHLY SALES TOTAL	122,300



Total Version

Product, Customer and Activity Based Analytics

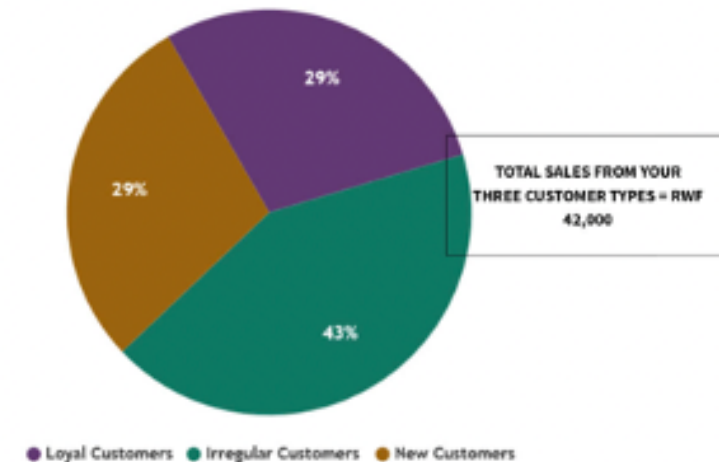
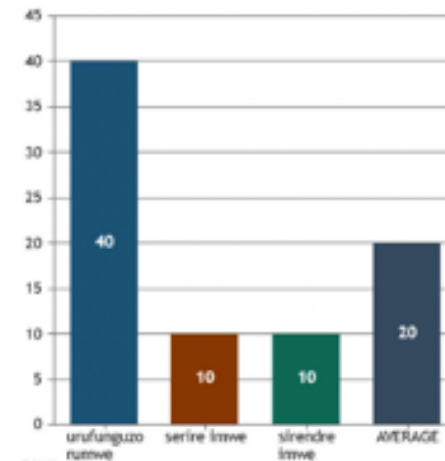


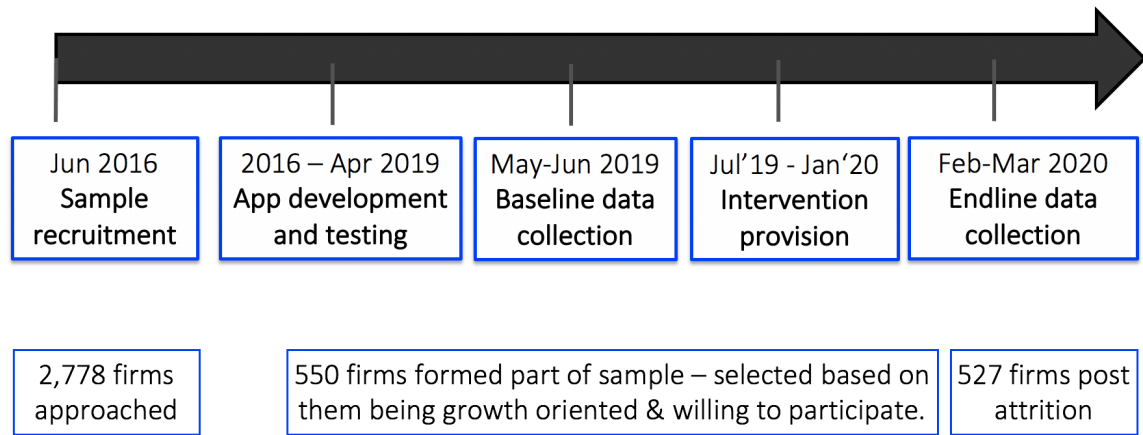
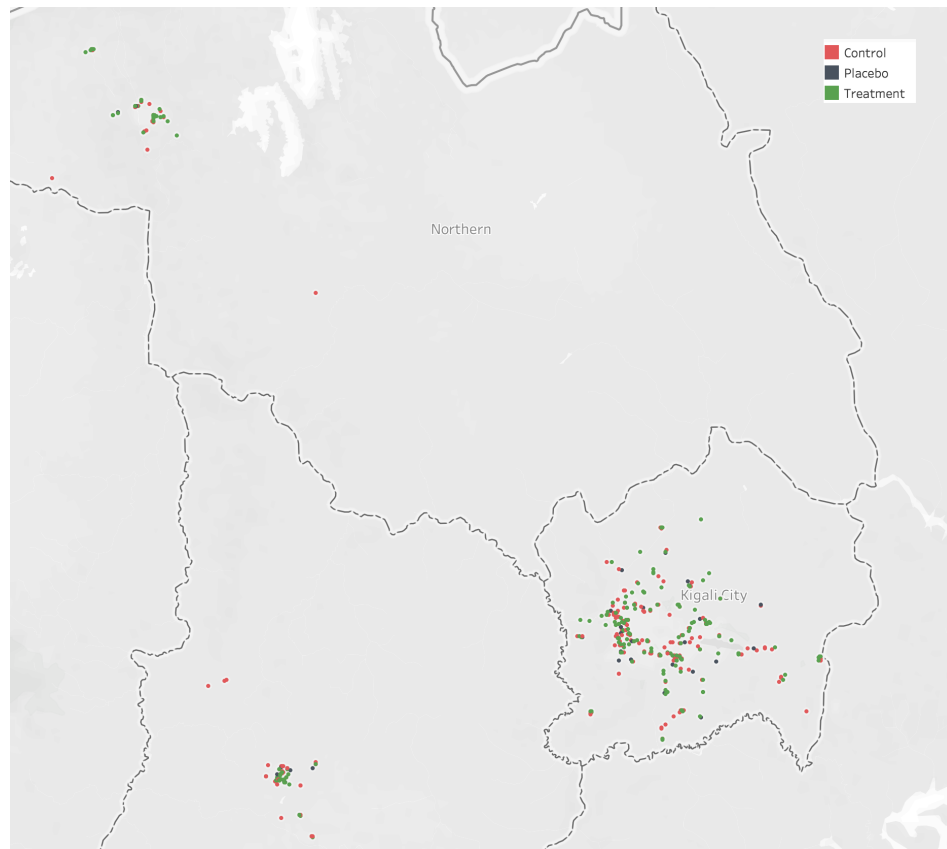
Figure A5: Experimental Timeline

Figure A6: Map of 274 firms in the sample, by experimental group



Notes: The average inter-firm distance is 35.41 km in our sample, or 7.58 km among firms in the same town (Kigali: 8.60 km, Muhanga: 3.84 km, Musanze: 8.12 km).

Figure A7: Industry details of the firms in the sample (N = 550)

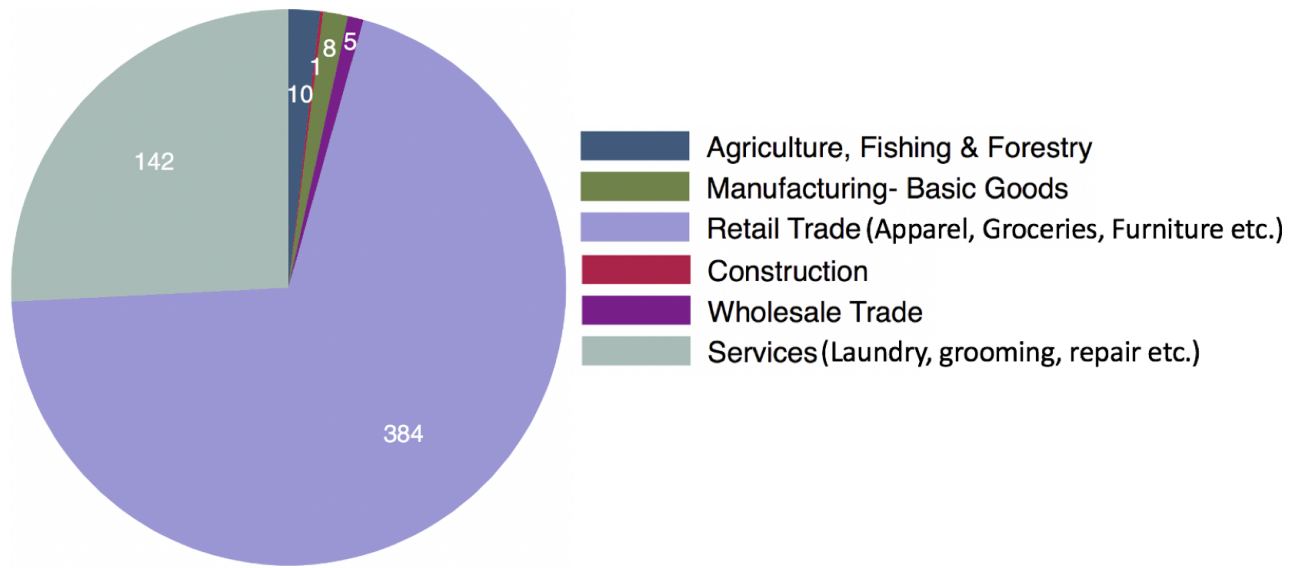


Figure A8: Daily Sales Data Entry Compliance

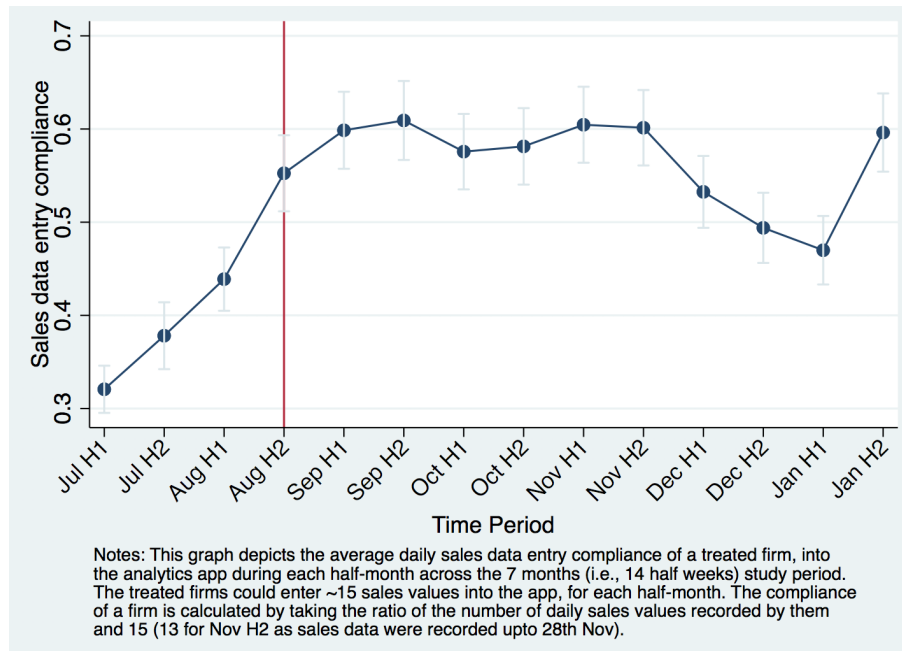


Figure A9: Overall Data Entry Compliance by the entrepreneurs

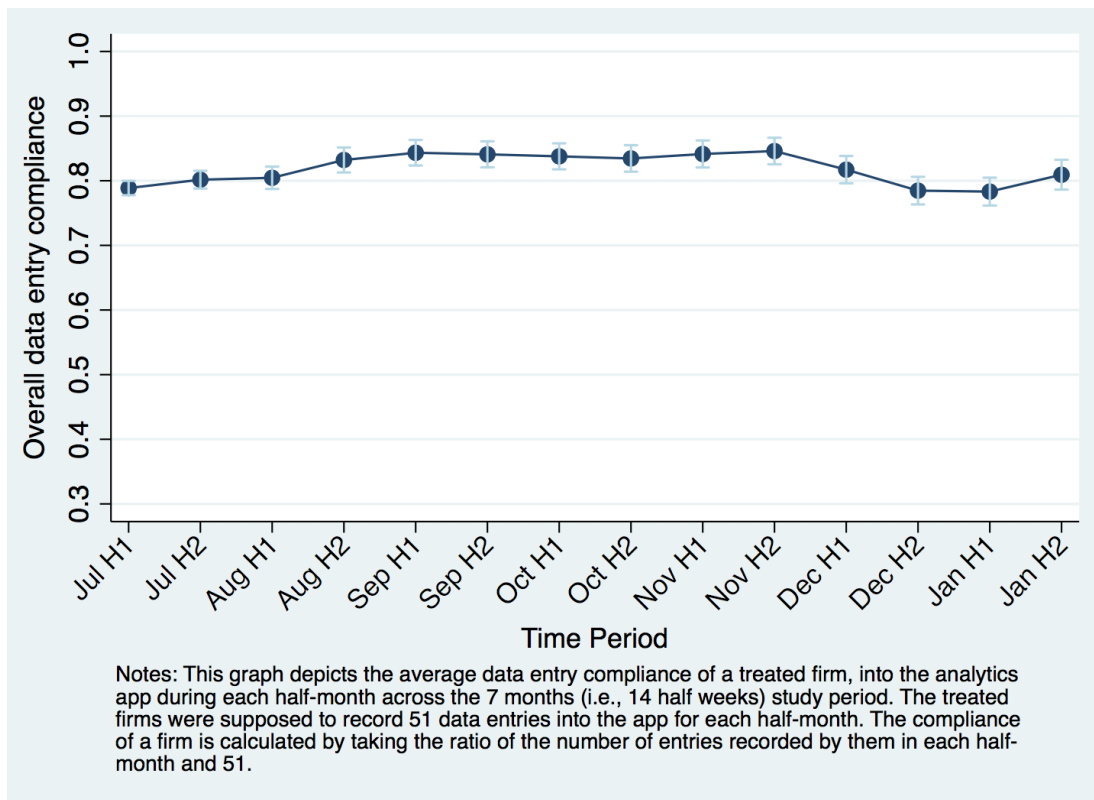


Figure A10: Product-related changes with time

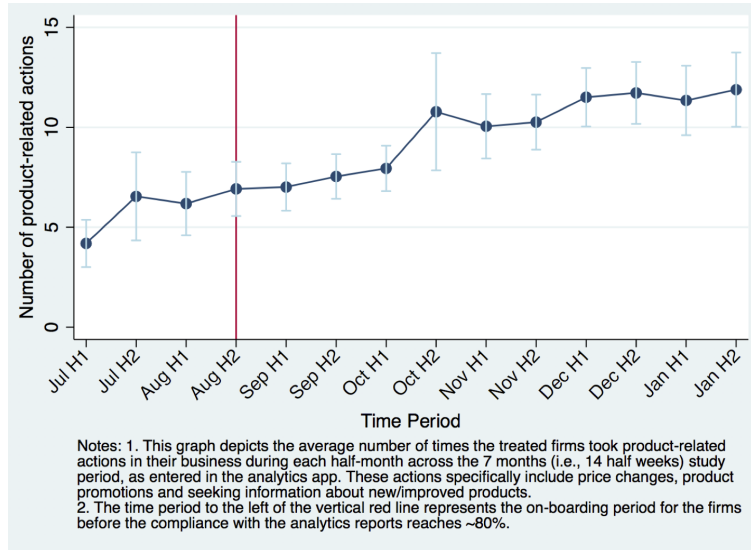


Figure A11: Customer-related changes with time

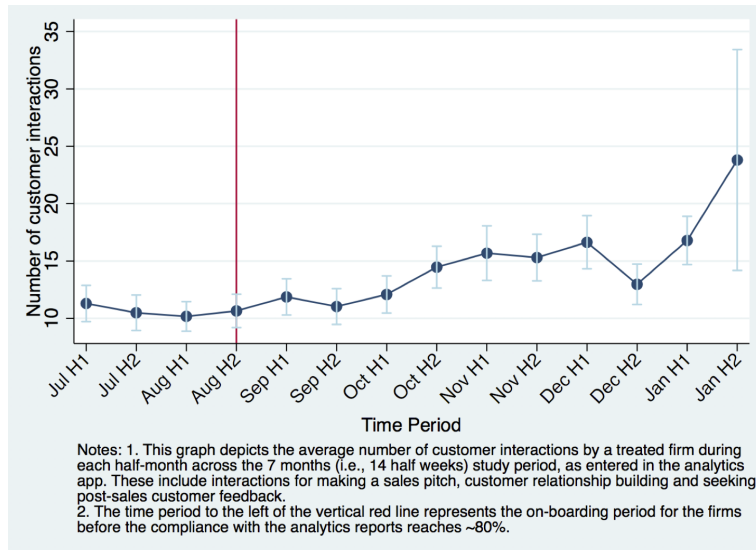


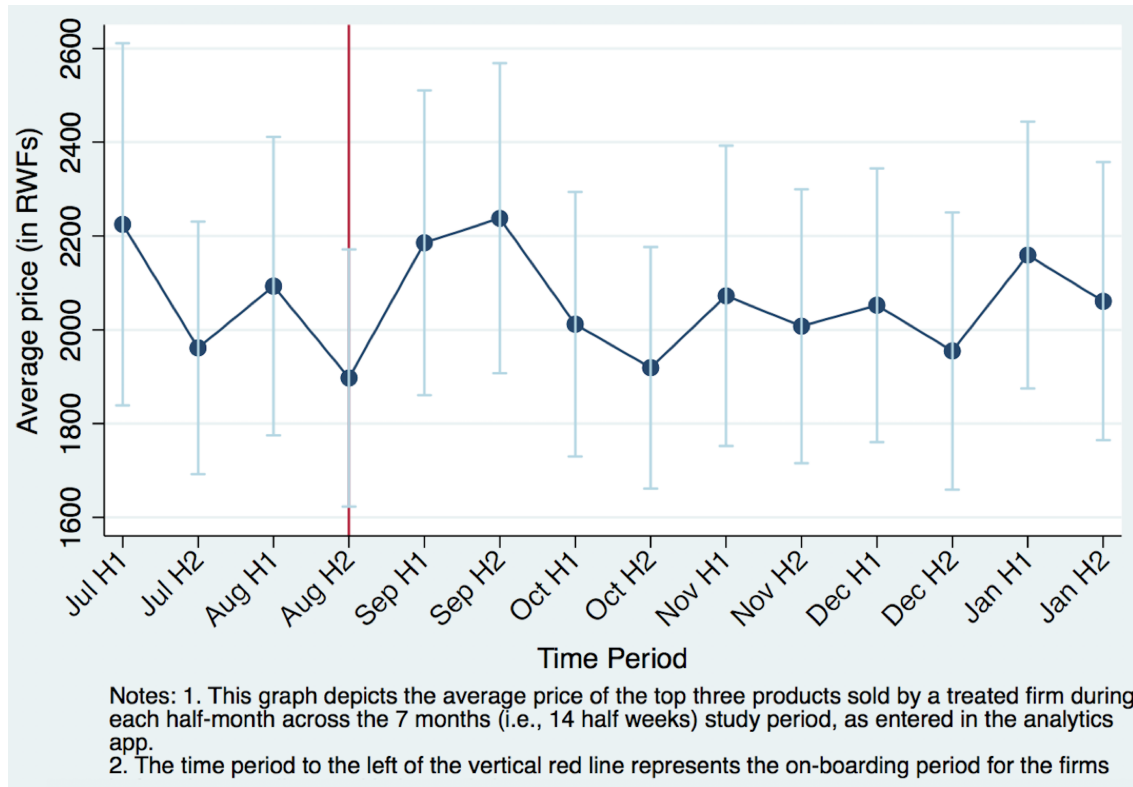
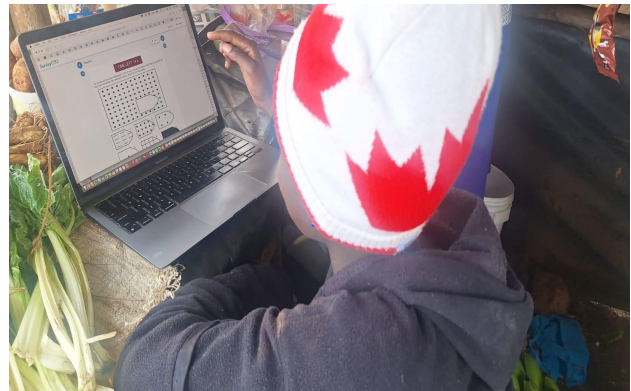
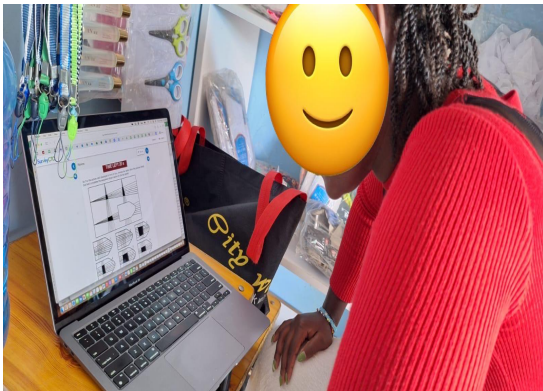
Figure A12: Pricing changes with timeFigure A13: Entrepreneurs Taking Psychological Tests

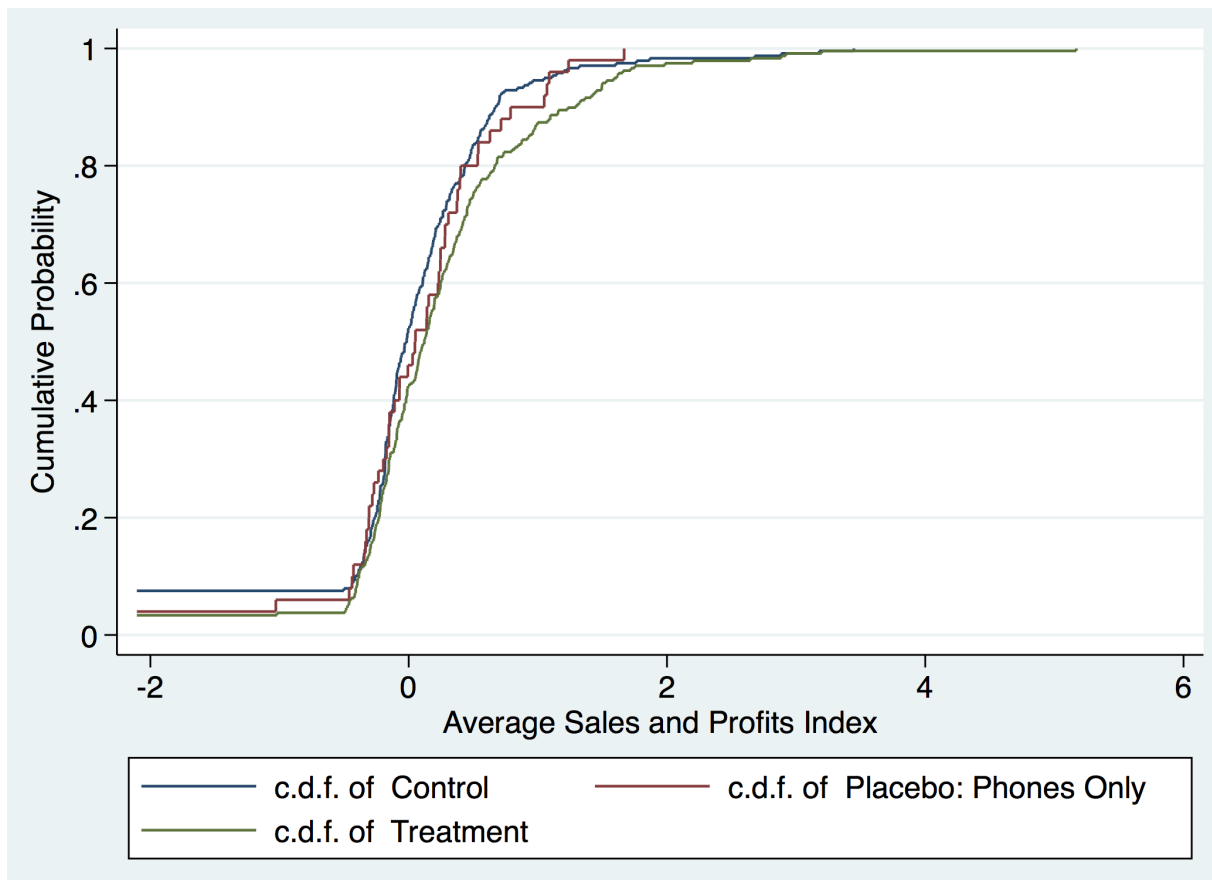
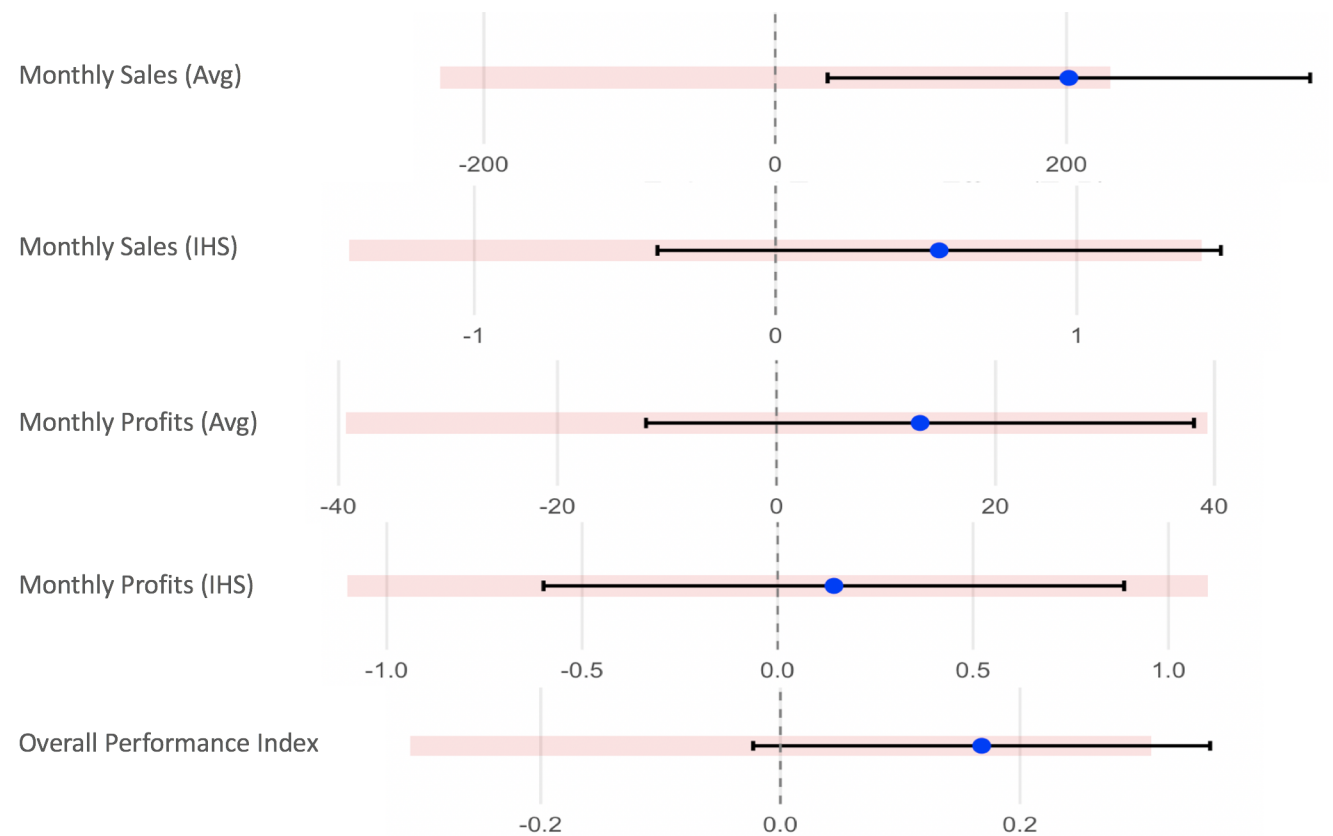
Figure A15: CDF of the Overall Performance Index

Figure A16: Treatment Effect and Minimum Detectable Effect bands



Notes: This figure shows treatment effect (Treatment vs. Placebo) estimates across five financial performance metrics. Blue dots indicate point estimates, black bars show 95% confidence intervals, and red shaded regions represent the minimum detectable effect (MDE) – effects within the red zone of MDE bounds cannot be statistically distinguished from zero given the sample size and power.

Measurement of Key Variables

Figure B1: Baseline Survey: Intuition Vs. Data-based Mindset

<i>Survey Questions and Steps Description</i>	<i>Responses</i>
WE WILL BEGIN WITH SOME QUESTIONS ABOUT HOW YOU VIEW DIFFERENT SITUATIONS. PLEASE ANSWER AS HONESTLY AS POSSIBLE. THERE ARE NO RIGHT OR WRONG ANSWERS. WE JUST WANT TO LEARN MORE ABOUT YOU.	
MINDSET: INTUITION VS INFORMATION	
For each of the following questions, please indicate whether you agree or disagree with the statement.	
I follow my intuition when running my business instead of investing time in analyzing data. By intuition we mean going with a hunch based on your thought or ideas, instead of reviewing the relevant data.	1 = Strongly Disagree 2 = Disagree 3 = Neither agree nor disagree 4 = Agree 5 = Strongly Agree
My first impression of a new business situation is almost always right. It is not necessary for me to systematically examine information and data related to my business.	1 = Strongly Disagree 2 = Disagree 3 = Neither agree nor disagree 4 = Agree 5 = Strongly Agree
I believe in trusting my instincts when making business decisions instead of looking for insights based on data.	1 = Strongly Disagree 2 = Disagree 3 = Neither agree nor disagree 4 = Agree 5 = Strongly Agree
When it comes to managing my business, I rely on my "gut feelings" instead of "data analytics".	1 = Strongly Disagree 2 = Disagree 3 = Neither agree nor disagree 4 = Agree 5 = Strongly Agree
I can usually 'feel' when a business action is right or wrong even if I can't explain how I know.	1 = Strongly Disagree 2 = Disagree 3 = Neither agree nor disagree 4 = Agree 5 = Strongly Agree

Figure B2: Baseline Survey: Market Tracking and Segmentation (1/2)

Tracking and Segmentation	
I am now going to ask you some questions on how you think about your business. Before you give your answer to a question, look back at how you have been managing your business over the last month (past 30 days). For each statement, please indicate how often you focus on the topic described.	
I pay attention to how much a typical customer buys per visit (i.e. the total amount spent during one shopping trip or on a single order).	1 = Not at all (0 times per week) 2 = Rarely (1 time per week) 3 = Sometimes (2-3 times per week) 4 = Often (4-5 times per week) 5 = Always (More than 5 times per week)
I tend to organize my customers into segments (e.g. regular, irregular, new).	1 = Not at all (0 times per week) 2 = Rarely (1 time per week) 3 = Sometimes (2-3 times per week) 4 = Often (4-5 times per week) 5 = Always (More than 5 times per week)
I spend time distinguishing between "business customers" (e.g. firms, organizations) and "individual customers" (e.g. people, friends).	1 = Not at all (0 times per week) 2 = Rarely (1 time per week) 3 = Sometimes (2-3 times per week) 4 = Often (4-5 times per week) 5 = Always (More than 5 times per week)
I keep a mental list of the different markets where my customers are located (e.g. geographic regions, industry sectors).	1 = Not at all (0 times per week) 2 = Rarely (1 time per week) 3 = Sometimes (2-3 times per week) 4 = Often (4-5 times per week) 5 = Always (More than 5 times per week)

Figure B3: Baseline Survey: Market Tracking and Segmentation (2/2)

I pay attention to the total quantity demanded by the market for each of my products/services (i.e. the volume or number of units sold).	1 = Not at all (0 times per week) 2 = Rarely (1 time per week) 3 = Sometimes (2-3 times per week) 4 = Often (4-5 times per week) 5 = Always (More than 5 times per week)
I tend to categorize suppliers into different groups so I can better manage inputs (i.e. increase the quality or decrease the cost of my products/services).	1 = Not at all (0 times per week) 2 = Rarely (1 time per week) 3 = Sometimes (2-3 times per week) 4 = Often (4-5 times per week) 5 = Always (More than 5 times per week)
I spend time dividing my products/services into those that are "more popular" (high number of units sold) and those that are "less popular" (low number of units sold).	1 = Not at all (0 times per week) 2 = Rarely (1 time per week) 3 = Sometimes (2-3 times per week) 4 = Often (4-5 times per week) 5 = Always (More than 5 times per week)
In my mind, I separate Price from the Cost of Goods Sold (COGS) to calculate the Profit Margin for each product/service sold by my business.	1 = Not at all (0 times per week) 2 = Rarely (1 time per week) 3 = Sometimes (2-3 times per week) 4 = Often (4-5 times per week) 5 = Always (More than 5 times per week)
I am aware of potential competitors and classify them according to how similar (or different) their products/services are to those offered by my business.	1 = Not at all (0 times per week) 2 = Rarely (1 time per week) 3 = Sometimes (2-3 times per week) 4 = Often (4-5 times per week) 5 = Always (More than 5 times per week)
I think about how my current Market performance (e.g., my daily sales) compares against a previously set target or benchmark.	1 = Not at all (0 times per week) 2 = Rarely (1 time per week) 3 = Sometimes (2-3 times per week) 4 = Often (4-5 times per week) 5 = Always (More than 5 times per week)

Figure B4: Baseline Survey: Total Business Assets

Survey Questions and Steps Description	Responses
WE ARE NOW GOING TO ASK YOU ABOUT ANY PHYSICAL ASSETS THAT YOU OWN IN YOUR BUSINESS, SUCH AS BUILDINGS, VEHICLES OR EQUIPMENT.	
ASSETS: Land and Buildings	
1A. What is the current value of all LAND and BUILDINGS that you own and use for your business? <i>By land, we mean land that you have formally purchased and have an official ownership document to show you own the rights/title to it.</i> <i>By building, we mean a business premises (or physical structure) that you have purchased and formally own. Do not include buildings that are owned or held by the family. The buildings must be owned and used solely by the business.</i>	<numeric>
ASSETS: Other Tangible Assets	
1B. What is the current value of all the VEHICLES, MACHINES, TOOLS, IT EQUIPMENT, FURNITURE and ELECTRONICS that you own and use for your business?	<numeric>
ASSETS: Working Capital	
1C. What is the current value of all the WORKING CAPITAL that you own and use in your business, including all STOCK, MATERIALS, and MONEY that you have for business purposes?	<numeric>
1D. From what you have told us about your assets, we can calculate your TOTAL ASSETS as: [asset_building_value + asset_tangible_value+ asset_working_capital_value]. THIS TOTAL ASSET AMOUNT IS OBTAINED BY SUMMING UP YOUR ASSET CATEGORIES LISTED BELOW: <Numeric> Is this information correct?	Yes = 1 No = 0

Figure B5: Baseline Survey: Business Overview (1/2)

Questions and Steps	Responses
BUSINESS OVERVIEW: START-UP CAPITAL	
1. How much money or capital did you need to start this business? This refers to the total amount of money you spent to begin the business and start selling your products/services.	<numeric>
BUSINESS OVERVIEW: Primary Industry	
2. What is the <u>Sector</u> of the primary part of your business? Think about the main industry where the business is focused.	A = Agriculture, Forestry, Fishing B = Mining C = Construction D = Manufacturing – Basic Goods E = Manufacturing – Complex Goods F = Transportation & Public Utilities G = Wholesale Trade (business-to-business) H = Retail Trade (business-to-consumer) I = Finance, Insurance, Real Estate J = Services
EMPLOYEES: Full-time	
3. How many FULL-TIME employees do you have working in your business today? These are employees whom you <u>pay money</u> to work more than 30 hours per week.	<numeric>
EMPLOYEES: Business Partners	
4. How many BUSINESS PARTNERS do you have working in your business today? Your business partners are people who own the business with you and share in the profits.	<numeric>

Figure B6: Baseline Survey: Business Overview (2/2)

PRODUCTS: Total Today	
5. How many <u>different</u> PRODUCTS/SERVICES do you sell in your business today? <i>ENUMERATOR: Select the best range for the total number of products/services that the business currently sells.</i>	0 = 0 (I am currently not selling any products/services) 1 = Between 1 and 5 2 = Between 6 and 10 3 = Between 11 and 15 4 = Between 16 and 20 5 = Between 21 and 25 6 = Between 26 and 30 7 = Between 31 and 35 8 = Between 36 and 40 9 = Between 41 and 45 10 = Between 46 and 50 11 = More than 50
CUSTOMERS: Loyal	
TOTAL 6. How many REGULAR customers typically buy something from your business EACH WEEK? By regular, we mean people who are loyal and visit frequently (more than once per month). Or these could be customers who have bought from you recently and you expect that they'll buy from you again soon (in the next three months). Please give your best guess for the total number of REGULAR customers you sell to EACH WEEK (i.e. in a 7 day period).	<numeric>
SALES BASKET 7. How much does ONE Regular customer typically spend at your business? We mean the total money spent (on all products/services) during a single shopping trip or on a single order. Please estimate the average SALES BASKET (i.e. total sales per trip/order) for one Regular customer.	<numeric>
CUSTOMERS: New	
TOTAL 8. How many NEW customers typically buy something from your business EACH WEEK? By new, we mean unfamiliar people who came for the first time. These new customers are typically people you do not know already. You met them only after they visited your business to buy something for the first time. Please give your best guess for the total number of NEW customers you sell to EACH WEEK (i.e. in a 7 day period).	<numeric>
SALES BASKET 9. How much does ONE New customer typically spend at your business? We mean the total money spent (on all products/services) during a single shopping trip or on a single order. Please estimate the average SALES BASKET (i.e. total sales per trip/order) for one New customer.	<numeric>

Figure B7: Baseline Survey: Firm Sales

Measure	Questions and Steps	Responses
Aided-Recall Estimate	Q1: How much did you sell in the LAST MONTH (past 30 days)? This is the total amount of money that you got in sales. It includes all the money you bring IN to your business BEFORE you pay any bills, expenses, or salaries. Please give your first guess.	<numeric>
Averaged estimate (based on a typical week)	Q2A: Think of the BEST WEEK in your business last month. This is the week where you sold the most. How much money came into your business that week?	<numeric>
	Q2B: Think of the WORST WEEK in your business last month. This is the week where you sold the least. How much money came into your business that week?	<numeric>
	Q2C: Based on what you just told me about the total sales in your best week and in your worst week, we can estimate your sales to be approximately: $[\text{average}(2A, 2B) * 4.25]$ for LAST MONTH (the past 30 days).	
	WE GOT THIS SECOND GUESS FOR YOUR MONTHLY SALES BY TAKING THE AVERAGE OF YOUR BEST AND WORST WEEKS, THEN MULTIPLYING IT BY THE NUMBER OF WEEKS IN A MONTH. Does this amount seem correct to you?	0 = No 1 = Yes
Averaged estimate (based on a typical day)	Q3A: In a typical week, how many DAYS is your business OPEN?	<numeric>
	Q3B: What were your total sales YESTERDAY? Remember to include all the money you brought IN to your business yesterday before you paid any bills, expenses, or salaries.	<numeric>
	Q3C: Think of the BEST DAY in your business last month. This is the day where you sold the most. How much were your sales on your best day last month?	<numeric>
	Q3D: Think of the WORST DAY in your business last month. This is the day where you sold the least. How much were your sales on your worst day last month?	<numeric>
	Q3E: Let me confirm what you have told me about your DAILY SALES during the last month: Sales on your Best Day (highest daily sales) = [3C]; Sales total for Yesterday = [3B]; Sales on your Worst Day (lowest daily sales) = [3D] Now think about a typical day for your business last month. Using these three numbers to guide you, what is your best guess of how much money you usually get from selling your products or services to customers on an average or typical day?	<numeric>
	Q3F: Based on what you just told me about the total sales on your Typical Day, we can estimate your sales to be approximately: $[(3A) * (3E) * 4.25]$ for LAST MONTH (the past 30 days).	
	WE GOT THIS THIRD GUESS FOR YOUR MONTHLY SALES BY TAKING YOUR TYPICAL DAY AND MULTIPLYING IT BY THE NUMBER OF DAYS YOU'RE OPEN PER WEEK, THEN MULTIPLYING IT BY 4 WEEKS IN A MONTH. Does this amount seem correct to you?	0 = No 1 = Yes
Anchor-Adjusted Estimate (based on all previous estimates and/or official accounting records)	Q4A: HERE'S WHAT YOU TOLD ME ABOUT YOUR SALES FOR THE PAST 30 DAYS: Guess #3 (Based on Typical Daily Sales) = [3E]; Guess #2 (Based on Best and Worst Weeks) = [2C]; Guess #1 (Based on First Guess) = [1]	
	USING THESE NUMBERS TO GUIDE YOU, WHAT IS YOUR FINAL 'BEST GUESS' FOR THE TOTAL SALES LAST MONTH (past 30 days) before you paid any bills, expenses, or salaries?	<numeric>
	Q4B: So your TOTAL SALES LAST MONTH (the past 30 days) is: [4A]? Does this amount seem correct to you?	0 = No 1 = Yes

Figure B8: Baseline Survey: Firm Profits

Questions and Steps	Responses
<i>PROFITS: GUESS #1</i> - LET'S GET STARTED WITH YOUR FIRST GUESS, WHICH WILL BE ABOUT YOUR PROFITS ON A MONTHLY BASIS.	
1A. First, what do you think your PROFIT was for the last month (the past 30 days)? This is the total amount of money remaining in your business after all of your costs (bills, expenses, salaries) are deducted from your sales (money collected from customers). Please give your first guess.	<numeric>
<i>PROFITS: FINAL 'BEST' GUESS</i> WE WILL CONFIRM MONEY IN, MONEY OUT AND MONEY LEFTOVER OR PROFITS ONE BY ONE. YOU CAN MAKE ANY CHANGES YOU WOULD LIKE TO THESE NUMBERS. OUR GOAL IS TO OBTAIN A FINAL 'BEST' GUESS FOR YOUR PROFITS.	
SUMMARY: Profits -- FINAL GUESS	
TOTAL SALES (MONEY IN):	<numeric>
Stock and Inventory	<numeric>
Materials and Supplies	<numeric>
Employees	<numeric>
Location: Rent/Lease	<numeric>
Loans	<numeric>
Energy and Electricity	<numeric>
Transport and Travel	<numeric>
Equipment and Machines	<numeric>
Food and Water	<numeric>
Phone and Communication	<numeric>
Services	<numeric>
Extra Fees	<numeric>
Other Costs	<numeric>
TOTAL COSTS (MONEY OUT):	<numeric>
TOTAL PROFITS (MONEY LEFTOVER):	<numeric>
Please confirm that your TOTAL PROFITS for last month are correct.	0 = No 1 = Yes

Figure B9: Endline Audit of Product Related Business Activities

ANALYTICAL ACTIVITIES	
Survey Questions and Steps Description	Responses
IN THE FOLLOWING SET OF QUESTIONS, WE WILL ASK YOU ABOUT CERTAIN BUSINESS PRACTICES THAT YOU MAY OR MAY NOT BE IMPLEMENTING IN YOUR BUSINESS. PLEASE ONLY RESPOND "YES" IF YOU HAVE IMPLEMENTED THIS BUSINESS PRACTICE <u>AT LEAST ONE TIME IN THE LAST THREE MONTHS (PAST 90 DAYS)</u>. IT IS OKAY IF YOU ARE NOT DOING EVERY ACTIVITY WE DESCRIBE; DIFFERENT OWNERS DO DIFFERENT THINGS IN THEIR BUSINESS. WE ARE SIMPLY TRYING TO LEARN MORE ABOUT WHAT YOU DO IN YOUR BUSINESS.	
BUSINESS PRACTICES: Product Activities	
1. Did you MONITOR your stock, supplies or materials, and then order more in advance to avoid shortages (i.e. always ensured you had the quantity and quality needed for daily operations to continue)? In order to select "YES" you must have conducted this check of inventory at least once during the past three months. Even if it was only a list of items, you should be able to provide proof that this 'inventory monitoring' was performed (i.e. items and numbers written down in a book or on a computer). This must be a systematic review that you conducted to determine both the current quantity and quality of these physical items. Also, you must be able to describe how you used this information to determine if your business can keep running day-to-day.	1 = Yes 0 = No -999 = Don't Know (Does not apply)
2. Did you INSPECT your products (or get feedback on your services) to ensure they are of the highest quality? In order to select "YES" you must have done this for at least one product/service during the past three months. There must have been a system in place, which includes record keeping (i.e. written or electronic), in order to ensure that regular 'quality checks' were conducted on products (e.g. stock for resale, final goods from production) or services (e.g. post-purchase survey or customer feedback call). You should be able to describe how quality was monitored, and explain what happened when defects were found or customers were not satisfied.	1 = Yes 0 = No -999 = Don't Know (Does not apply)
3. Do you use marketing tactics such as changing the prices of products/services to increase total sales? In order to select "YES" you must have done this for at least one price change during the past three months, with a focus on the "most popular products/services". You should be able to describe which product/service was targeted, the pricing change implemented, and if it resulted in more sales. Only choose the "Yes" answer if you can provide evidence or examples that demonstrate you used pricing as a marketing tactic.	1 = Yes 0 = No -999 = Don't Know (Does not apply)
4. Do you use marketing tactics such as introducing new products/services, or improving your existing products/services, to provide more benefits to customers? In order to select "YES" you must have done this for at least one product/service during the past three months, with a focus on the "most popular products/services". You should be able to describe how your marketing efforts focused on enhancing the products/services offered by the business – including the name of the product/service of interest, details on how it was introduced or improved, and the benefits or value-add this provided to customers. Only choose the "Yes" answer if you can provide evidence or examples that demonstrate his marketing tactics focused on products/services.	1 = Yes 0 = No -999 = Don't Know (Does not apply)

Figure B10: Endline Audit of Accounting Related Business Activities

BUSINESS PRACTICES: Accounting Activities	
5. Did you keep business FINANCES SEPARATE from your personal finances? In order to select "YES" you must have distinguished money for business purposes (versus money for non-business purposes) for the past three months. In addition, the business finances and personal finances must actually be separated (physically or electronically).	1 = Yes 0 = No -999 = Don't Know (Does not apply)
6. Did you CREATE AN INCOME STATEMENT TO TRACK ALL MONEY that comes 'in' (sales) and goes 'out' (purchases, expenditures) of your business? In order to select "YES" you must have done this for ALL money in/out transactions during the past three months. The figures need to actually be recorded somewhere (i.e. written down in a book or on a computer). Also, the information should be organized in such a way that you can easily access and use the records when needed.	1 = Yes 0 = No -999 = Don't Know (Does not apply)
7. Did you create a BUDGET that states how much is expected in sales and costs for a future period (e.g. next month), and then adjust your planned budget based on changes in your business or performance? In order to select "YES" you must have a budget that was created (previously) to estimate sales and costs in the past three months, with the figures recorded in a book or on a computer. Also, you should be able to describe a situation when the current month's performance differed from the figures estimated in your original budget, as well as how you updated the budget to improve planning for the future.	1 = Yes 0 = No -999 = Don't Know (Does not apply)
8. Do you analyze how much cash is available in your business (e.g. all the money in your hands and business bank account) to ensure there is enough money for daily operations to continue? In order to select "YES" you must have conducted this assessment of cash-flow at least once during the past three months. Even if it was just a basic calculation, you should be able to provide proof that this 'cash analysis' was performed (i.e. numbers written down in a book or on a computer). Also, you must be able to describe how you used this information to determine if your business can keep running day-to-day.	1 = Yes 0 = No -999 = Don't Know (Does not apply)

Figure B11: Endline Audit of Operations Related Business Activities

BUSINESS PRACTICES: Other Activities	
9. Did you carry out preventative MAINTENANCE on your machines, equipment or tools (i.e. regularly checking and repairing them if not working properly)? In order to select "YES" you must have done this for at least one of these physical items during the past three months. When describing this 'maintenance check', you should be able to: point out the machine/equipment/tool; describe an issue or potential problem that was discovered because of this check (i.e. disruption or reason for it not functioning properly); and explain how it was addressed (i.e. what was done to repair or fix it). Only choose the "Yes" answer if you can provide evidence or examples that demonstrate you conducted preventative maintenance (checked for problems and pro-actively made repairs).	1 = Yes 0 = No -999 = Don't Know (Does not apply)
10. Did you replace any procedures, techniques or methods used in your business with new approaches that are more efficient? We mean did you implement NEW PROCESSES to: complete the same business task but in less time; or produce the same product/service but with less waste and fewer supplies? In order to select "YES" you must have done this at least one time during the past three months. You must be able to describe the 'old' business process and the constraints it placed on your business or how it wasted resources. You should be able to explain the 'new' process and why it is better – i.e. how it made the business more efficient, improved operations, allowed employees to complete the same tasks in less time, or produced the same quantity and quality of products/services but using fewer inputs, supplies or materials. Also, you must have made this change in process (e.g. procedures, techniques, methods) because you were motivated to improve how business operations were conducted or to decrease the waste in your operations.	1 = Yes 0 = No -999 = Don't Know (Does not apply)
11. Did you collect information on competitors (by visiting businesses similar to yours to see what products/services they are selling) or on suppliers (by checking different sources to ensure you are getting the right stock/materials and at a good price)? In order to select "YES" you must have done this with at least one competitor or at least one supplier during the past three months. You should be able to describe how you learned about a competitor's product/service and its selling price. Or you should be able to describe how you learned about the stock/materials available from different suppliers – including the names of these potential sources, details on the stock/materials of interest, and information on the prices (and possibly the quality) of these items. Only choose the "Yes" answer if you can provide evidence or examples that demonstrate you personally conducted market research on a competitor or supplier.	1 = Yes 0 = No -999 = Don't Know (Does not apply)
12. Did you provide RECEIPTS OR INVOICES to customers once they have made a purchase? In order to select "YES" you must have done this with the majority of your customers during the past three months. Only choose the "Yes" answer if you can provide evidence or examples that demonstrate you gave receipts or invoices to your customers when they made a purchase.	1 = Yes 0 = No -999 = Don't Know (Does not apply)

Figure B12: Endline Firm Sales

<i>Survey Questions and Steps Description</i>	<i>Responses</i>
WE ARE NOW GOING TO TALK ABOUT ALL THE MONEY THAT CAME 'IN' TO YOUR BUSINESS DURING THE LAST MONTH (PAST 30 DAYS).	
SALES: Last Month	
1. What were your total <u>sales</u> for the LAST MONTH (Please answer for the month of January 2020)? This is the total amount of money that you got in sales. It includes all the money you bring IN to your business BEFORE you pay any bills, expenses, or salaries. Please give your best guess.	<numeric>
2. Is the last month's (January 2020) sales figure above zero? <i>ENUMERATOR: If the answer is 'No,' please go back and revise the response to 1</i>	0 = No 1 = Yes
ENUMERATOR: For verification, please take a photo of the system used by the SME to maintain this sales record.	
3. ENUMERATOR: One Picture	
SALES: Typical Month	
4. Now think about the last 3 months (Please answer for the month of October, November and December 2019). During this time, what were your total <u>sales</u> in a TYPICAL MONTH (i.e., a normal 30-day period)? It includes all the money you bring IN to your business (from all sources) BEFORE you pay any bills, expenses, or salaries. Please choose the closest Monthly Sales range from the options listed.	1 = 0 - 100,000 RWF per month 2 = 100,001 - 200,000 RWF per month 3 = 200,001 - 300,000 RWF per month 4 = 300,001 - 400,000 RWF per month 5 = 400,001 - 500,000 RWF per month 6 = 500,001 - 600,000 RWF per month 7 = 600,001 - 700,000 RWF per month 8 = 700,001 - 800,000 RWF per month 9 = 800,001 - 900,000 RWF per month 10 = 900,001 - 1,000,000 RWF per month 11 = Above 1,000,000 RWF per month

Figure B13: Endline Firm Profits

NOW THAT WE HAVE ALL THE INFORMATION ON YOUR MONEY IN (SALES), WE ARE GOING TO TALK ABOUT ALL THE MONEY THAT IS LEFTOVER -- OR YOUR PROFITS.	
PROFITS: Last Month	
5. What were your total profits for the LAST MONTH (past 30 days). Please answer for the month of January 2020. This is the total amount of money remaining in your business. It includes all the money LEFT-OVER in your business AFTER all of your costs (bills, expenses, salaries) are deducted from your sales (money collected from customers). Please give your best guess.	<numeric>
ENUMERATOR: For verification, please take a photo of the system used by the SME to maintain this Profits record.	
6. ENUMERATOR: One Picture	
PROFITS: Typical Month	
7. Now think about the last 3 months (Please answer for the months of October, November and December 2019). During this time, what were your total profits in a TYPICAL MONTH (i.e., a normal 30-day period)? It includes all the money LEFT-OVER in your business AFTER you pay any bills, expenses, or salaries. Please choose the closest Monthly Profits range from the options listed.	1 = 0 - 25,000 RWF per month 2 = 25,001 - 50,000 RWF per month 3 = 50,001 - 75,000 RWF per month 4 = 75,001 - 100,000 RWF per month 5 = 100,001 - 125,000 RWF per month 6 = 125,001 - 150,000 RWF per month 7 = 150,001 - 175,000 RWF per month 8 = 175,001 - 200,000 RWF per month 9 = 200,001 - 225,000 RWF per month 10 = 225,001 - 250,000 RWF per month 11 = 250,001 - 275,000 RWF per month 12 = 275,001 - 300,000 RWF per month 13 = 300,001 - 325,000 RWF per month 14 = 325,001 - 350,000 RWF per month 15 = Above 350,000 RWF per month

Figure B14: Sample Questions on the Cognitive Reflection Test

12.a A bat and a ball cost 110.

The bat costs 100 more than the ball.

How much does the ball cost?

- ☐ 5
- ☐ 10
- ☐ 20
- ☐ 100

12.b If it takes 5 machines a total of 5 minutes to make 5 widgets...

(A “widget” is a small product.)

How long would it take 100 machines to make 100 widgets?

- ☐ 1 minute
- ☐ 5 minutes
- ☐ 10 minutes
- ☐ 100 minutes

12.c In a lake, there is a patch of lily pads. Every day, the patch doubles in size.

If it takes 48 days for the patch to cover the entire lake...

How long would it take for the patch to cover half of the lake?

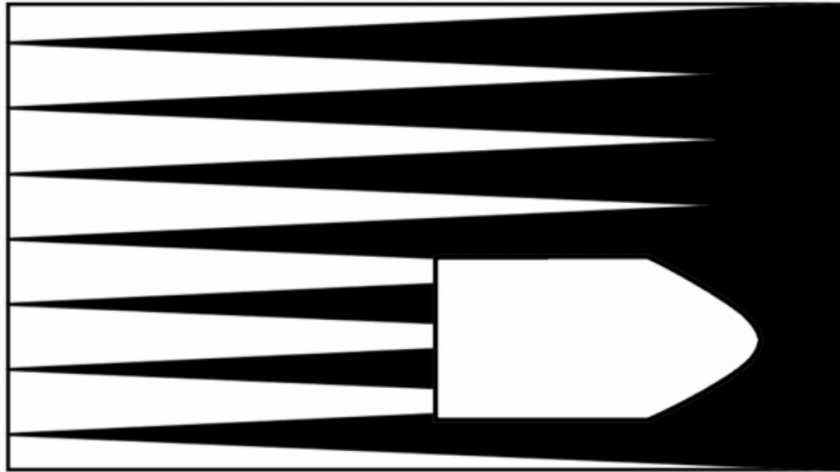
- ☐ 12 days
- ☐ 24 days
- ☐ 45 days
- ☐ 47 days

Figure B15: Sample Questions on the Digit Span Test

12A. Read Aloud: 9, 7, 2, 7, 5
12B. For the number you read on the previous page, please list all of the digits (in the same order as they appeared) Your answer here...
13A. Read Aloud: 3, 2, 3, 3, 7, 7
13B. For the number you read on the previous page, please list all of the digits (in the same order as they appeared). Your answer here...
14A. Read Aloud: 8, 0, 0, 3, 3, 4, 5
14B. For the number you read on the previous page, please list all of the digits (in the same order as they appeared) Your answer here...
15A. Read Aloud: 4, 0, 8, 4, 0, 1, 5, 9
15B. For the number you read on the previous page, please list all of the digits (in the same order as they appeared). Your answer here...

Figure B16: Sample Questions on the Raven's Test

2A. For the picture card displayed in front of you, choose the option (from the pictures listed) that best completes the sequence shown above (in the top panel).



1



2



3



4



5



6

2B. Number for the chosen option:

ENUMERATOR: If the respondent cannot answer enter zero "0"

Your answer here...

Figure B17: Sample Questions on Numerical Aptitude

1. How much is $35 + 82$?

- ☐ 105
- ☐ 117
- ☐ 122
- ☐ 127
- ☐ do not know

2. Suppose that you had an investment opportunity that paid a return of 25% per year and you also had an opportunity to take a bank loan that required paying 16% interest.

How would you respond in this situation?

- ☐ It makes sense to take the loan and invest, and therefore I will do it.
- ☐ It makes sense to take the loan and invest, but I will not do it because of other reasons.
- ☐ It does not make sense to take the loan and invest, and therefore I will not do it.
- ☐ Do not know

3. Suppose you need to borrow 2000. Two banks offer you a loan.

The first loan requires that you pay back in one month: 2500.

The second loan requires that you pay back in one month: 2000 plus 15% interest.

Which loan is better for your business so you prefer to take it?

- ☐ 2500, in one month
- ☐ 2000 + 15% interest, in one month
- ☐ Do not know

Figure B18: Sample Questions on Mental Math Use

10.a How good are you at working with fractions?

- ☐ Not at all (does not describe me in any way)
- ☐ Not much
- ☐ A little
- ☐ Somewhat
- ☐ A lot
- ☐ Very much
- ☐ Extremely Good

10.b How good are you at working with percentages?

- ☐ Not at all (does not describe me in any way)
- ☐ Not much
- ☐ A little
- ☐ Somewhat
- ☐ A lot
- ☐ Very much
- ☐ Extremely Good

10.c How good are you at calculating a 15% increase in your sales?

- ☐ Not at all (does not describe me in any way)
- ☐ Not much
- ☐ A little
- ☐ Somewhat
- ☐ A lot
- ☐ Very much
- ☐ Extremely Good

Figure B19: Sample Questions on Numerical Orientation

11.a When reading the newspaper, how helpful do you find tables and graphs that are parts of a story?

- ☐ Not at all (does not describe me in any way)
- ☐ Not much
- ☐ A little
- ☐ Somewhat
- ☐ A lot
- ☐ Very much
- ☐ Extremely Good

11.b When people tell you the chance of something happening, do you prefer that they use words ("it rarely happens") or numbers ("there's a 1% chance")?

- ☐ Not at all (does not describe me in any way)
- ☐ Not much
- ☐ A little
- ☐ Somewhat
- ☐ A lot
- ☐ Very much
- ☐ Extremely Good

11.c When you hear a weather forecast, do you prefer predictions using percentages (e.g., "there will be a 20% chance of rain today") or predictions using only words (e.g., "there is a small chance of rain today")?

- ☐ Not at all (does not describe me in any way)
- ☐ Not much
- ☐ A little
- ☐ Somewhat
- ☐ A lot
- ☐ Very much
- ☐ Extremely Good

Use of marketing analytics in the aftermath of COVID-19

On 14 March 2020, Rwanda recorded its first case of COVID-19. About a week later, the government declared its first country-wide lockdown to contain the spread of COVID-19, becoming the first country in Africa to declare a lockdown. Borders were closed, as was inter-city travel, and all non-essential businesses were shut-down while essential businesses (medicines, groceries etc.) were allowed to open under restrictions, for about a month. Then, by mid-January 2021 the country saw a renewed surge in COVID cases, thus leading to another lockdown for about 40 days, where businesses were completely shut-down (as was inter-city travel) except for essential businesses which were allowed to open with strict restrictions. The businesses started opening again from 1st March 2021, post this second lock-down.

In March 2021, we conducted a follow-up qualitative survey with a set of randomly selected 14 treatment firms from our sample to check for the use of marketing analytics by the firms and to see if the treatment firms are still sticking to the learnings they received during the experiment. We had not kept in touch with these firms for about a year (since our Endline survey concluded in March 2020). 13 of the 14 entrepreneurs that we surveyed kept some sort of data record for their business. In addition, 11 of the 14 entrepreneurs analyzed the data they recorded and used it to make business decisions. Finally, 9 of the 14 entrepreneurs claimed that the use of data analytics helped them through the COVID-related disruption caused to their business. Some of the benefits from the use of data analytics reported by these 9 firms, which helped develop resilience in their business to COVID-related shocks, include being able to identify and stock popular products, target loyal customers and being able to promptly adjust expenses to cope with lockdown-induced sales reductions.

While this evidence is descriptive in nature, it does suggest the role technology - and specifically marketing analytics solutions - can play in building resilience in firms, to adverse shocks with important implications for not just marketing researchers but also entrepreneurs/managers and policy-makers.

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