

# Social Entrepreneurship, Language, and Funding: Evidence from Tech Startups in Sub-Saharan Africa

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## Abstract

Social ventures, characterized by the double bottom line of profitability and social impact, have become an increasingly recognized model of entrepreneurship. Particularly in developing economies, in which economic growth in itself is often characterized as a social good, the line between social entrepreneurship and more traditional commercial entrepreneurship can be unclear. We investigate this tension by employing computational methods of text analysis on a sample of over 800 startups in sub-Saharan Africa. Using both supervised classification and topic modeling, we create measures of the degree to which each firm is oriented towards social impact based on their marketing language. We then examine the relationship between this orientation and funding outcomes. This analysis is supported by structured interviews conducted with entrepreneurs in Lagos, Nigeria.

**Keywords:** Social Entrepreneurship, Africa, Venture Capital, Natural Language Processing, Latent Dirichlet Allocation

- 1 Introduction
- 2 Text Methods
- 3 Primary Research Question and Hypotheses
- 4 Results: mTurk Scores and Funding

**Table 1:** Words from LASSO model predicting mTurk score

| Feature           | Coefficient | Feature          | Coefficient |
|-------------------|-------------|------------------|-------------|
| fimmediately      | -0.03       | solving          | 0.01        |
| leading           | -0.02       | ‘start-up’       | 0.01        |
| provider          | -0.02       | entrepreneurs    | 0.01        |
| develops          | -0.02       | hub              | 0.01        |
| branches          | -0.01       | children         | 0.01        |
| nairobi           | -0.01       | directions       | 0.01        |
| email             | -0.01       | sustainability   | 0.02        |
| firm              | -0.01       | accessibility    | 0.02        |
| company           | -0.01       | programs         | 0.02        |
| securities        | -0.01       | patients         | 0.02        |
| delivery          | -0.01       | together         | 0.02        |
| management        | -0.01       | entrepreneurship | 0.02        |
| agency            | -0.01       | healthcare       | 0.02        |
| strong            | -0.01       | create           | 0.02        |
| exchange          | -0.01       | improve          | 0.02        |
| limited           | -0.01       | clean            | 0.02        |
| telecommunication | -0.00       | affordable       | 0.02        |
| eastern           | -0.00       | solve            | 0.02        |
| bank              | -0.00       | access           | 0.02        |
| solution          | -0.00       | women            | 0.02        |
| web               | -0.00       | farmers          | 0.03        |
| online            | -0.00       | urban            | 0.03        |
| subsidiary        | -0.00       | raise            | 0.03        |
| water             | 0.00        | health           | 0.03        |
| enough            | 0.00        | teach            | 0.03        |
| give              | 0.00        | ‘non-profit’     | 0.03        |
| mentoring         | 0.00        | enhancing        | 0.03        |
| job               | 0.00        | awareness        | 0.03        |
| solar             | 0.00        | social           | 0.03        |
| share             | 0.00        | scale            | 0.03        |
| foundation        | 0.00        | lives            | 0.03        |
| pool              | 0.01        | people           | 0.04        |
| materials         | 0.01        | community        | 0.04        |
| study             | 0.01        | educational      | 0.04        |
| better            | 0.01        | civil            | 0.04        |
| interact          | 0.01        | sustainable      | 0.05        |
| opportunity       | 0.01        | africans         | 0.05        |
| discover          | 0.01        | households       | 0.05        |
| incubator         | 0.01        | students         | 0.06        |
| education         | 0.01        | schools          | 0.06        |
| leveraging        | 0.01        | youth            | 0.07        |
| care              | 0.01        | communities      | 0.08        |
| supporting        | 0.01        | charity          | 0.10        |
| rural             | 0.01        | poverty          | 0.10        |
| forum             | 0.01        | (Intercept)      | 0.40        |

**Table 2:** Logistic Regression of Funding Dummy on mTurk Score

|                     | Funding Indicator  |                    |                    |
|---------------------|--------------------|--------------------|--------------------|
|                     | Model 1            | Model 2            | Model 3            |
|                     | (1)                | (2)                | (3)                |
| mTurk Score         | 4.37*<br>(2.55)    | 4.82*<br>(2.65)    | 7.46**<br>(3.74)   |
| mTurk Score*2       | -5.17*<br>(2.69)   | -5.27*<br>(2.78)   | -7.75*<br>(3.98)   |
| Kenya               | -0.03<br>(0.37)    | 0.14<br>(0.38)     | 0.49<br>(0.57)     |
| Nigeria             | 0.14<br>(0.36)     | 0.24<br>(0.37)     | 0.81<br>(0.56)     |
| Uganda              | 0.45<br>(0.44)     | 0.53<br>(0.45)     | 0.72<br>(0.69)     |
| Software            |                    | 1.01***<br>(0.34)  | 2.03***<br>(0.50)  |
| Mobile              |                    | 0.82**<br>(0.33)   | 0.30<br>(0.65)     |
| E-Commerce          |                    | 0.73*<br>(0.38)    | 1.28**<br>(0.56)   |
| Education           |                    | 0.59<br>(0.44)     | 1.85***<br>(0.62)  |
| Constant            | -2.84***<br>(0.64) | -3.40***<br>(0.69) | -5.66***<br>(1.05) |
| All 200+ Industries | No                 | No                 | Yes                |
| Observations        | 844                | 844                | 844                |

*Note:* \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

## 5 Results: Topics

## 6 References

## 7 Appendix Tables

**Table 3:** Regressions of Total Funding on mTurk Score

|                     | Funding Amount: Less than... |                     |                      |                      |                   |                   |
|---------------------|------------------------------|---------------------|----------------------|----------------------|-------------------|-------------------|
|                     | \$10m                        | \$1m                | \$400k               | \$200k               | \$50k             | \$25k             |
|                     | (1)                          | (2)                 | (3)                  | (4)                  | (5)               | (6)               |
| mTurk Score         | 188,883<br>(340,299)         | 21,205<br>(44,280)  | 43,249**<br>(20,577) | 24,880*<br>(13,101)  | 2,031<br>(3,169)  | 2,048<br>(1,908)  |
| mTurk Score*2       | -150,817<br>(354,938)        | -16,363<br>(46,167) | -39,834*<br>(21,436) | -26,372*<br>(13,642) | -1,459<br>(3,298) | -1,676<br>(1,984) |
| Kenya               | 61,072<br>(53,155)           | -5,430<br>(6,979)   | -4,817<br>(3,259)    | -1,573<br>(2,074)    | -72<br>(507)      | 310<br>(306)      |
| Nigeria             | 50,273<br>(52,802)           | -11,617*<br>(6,920) | -2,791<br>(3,228)    | -706<br>(2,056)      | 34<br>(501)       | 268<br>(304)      |
| Uganda              | 32,511<br>(69,215)           | -12,483<br>(9,075)  | -6,135<br>(4,236)    | -282<br>(2,697)      | 174<br>(658)      | 957**<br>(397)    |
| Constant            | -46,310<br>(88,906)          | 4,573<br>(11,558)   | -6,770<br>(5,393)    | -3,648<br>(3,429)    | -434<br>(831)     | -883*<br>(501)    |
| All 200+ Industries | Yes                          | Yes                 | Yes                  | Yes                  | Yes               | Yes               |
| Observations        | 835                          | 816                 | 808                  | 800                  | 782               | 770               |
| R <sup>2</sup>      | 0                            | 0                   | 0                    | 0                    | 1                 | 0                 |

*Note:*

\*p&lt;0.1; \*\*p&lt;0.05; \*\*\*p&lt;0.01

**Table 4:** Specific Types of Funding Outcomes

|                     | Funding Indicators  |                           |                    |                    |
|---------------------|---------------------|---------------------------|--------------------|--------------------|
|                     | First Funding Round | Subsequent Funding Rounds | Seed Funding       | Venture/PE Funding |
|                     | (1)                 | (2)                       | (3)                | (4)                |
| mTurk Score         | 8.58**<br>(3.98)    | -0.53<br>(7.40)           | 8.40*<br>(4.40)    | 0.18<br>(8.18)     |
| mTurk Score*2       | -8.67**<br>(4.20)   | 0.42<br>(7.75)            | -7.30<br>(4.48)    | -0.38<br>(9.24)    |
| Kenya               | 0.68<br>(0.64)      | 0.08<br>(0.92)            | 0.01<br>(0.56)     | 1.93<br>(1.46)     |
| Nigeria             | 1.14*<br>(0.61)     | -0.80<br>(0.95)           | -0.49<br>(0.58)    | 1.01<br>(1.46)     |
| Uganda              | 0.74<br>(0.77)      | 0.31<br>(1.03)            | -0.11<br>(0.70)    | 0.69<br>(1.96)     |
| Constant            | -6.33***<br>(1.14)  | -1.37<br>(1.79)           | -5.30***<br>(1.20) | -5.35**<br>(2.17)  |
| All 200+ Industries | Yes                 | Yes                       | Yes                | Yes                |
| Observations        | 824                 | 99                        | 844                | 844                |

*Note:*

\*p&lt;0.1; \*\*p&lt;0.05; \*\*\*p&lt;0.01

**Table 5:** Words that distinguish low from middle mTurk scores

| Feature       | Coefficient | Feature     | Coefficient |
|---------------|-------------|-------------|-------------|
| firm          | -0.64       | language    | 0.15        |
| price         | -0.58       | users       | 0.16        |
| (Intercept)   | -0.57       | africa      | 0.17        |
| ltd           | -0.42       | startups    | 0.17        |
| solution      | -0.41       | employers   | 0.18        |
| booking       | -0.40       | send        | 0.19        |
| analytics     | -0.38       | helps       | 0.20        |
| ‘africa’s’    | -0.36       | seed        | 0.20        |
| record        | -0.36       | whole       | 0.20        |
| brand         | -0.28       | promote     | 0.22        |
| turn          | -0.27       | ideal       | 0.23        |
| name          | -0.23       | major       | 0.23        |
| ‘nigeria’s’   | -0.23       | university  | 0.23        |
| within        | -0.21       | initiative  | 0.24        |
| post          | -0.19       | energy      | 0.24        |
| organisation  | -0.17       | small       | 0.25        |
| management    | -0.15       | model       | 0.26        |
| states        | -0.14       | public      | 0.27        |
| headquartered | -0.14       | free        | 0.28        |
| bank          | -0.11       | financing   | 0.32        |
| banking       | -0.10       | unlimited   | 0.33        |
| mobility      | -0.09       | african     | 0.33        |
| sale          | -0.08       | cook        | 0.34        |
| kingdom       | -0.07       | open        | 0.34        |
| goods         | -0.06       | founders    | 0.39        |
| provider      | -0.04       | take        | 0.39        |
| always        | -0.04       | realized    | 0.39        |
| using         | 0.02        | june        | 0.42        |
| school        | 0.03        | members     | 0.45        |
| potential     | 0.03        | used        | 0.45        |
| unlike        | 0.04        | text        | 0.45        |
| family        | 0.04        | activities  | 0.48        |
| government    | 0.04        | hot         | 0.50        |
| enhancing     | 0.05        | favorite    | 0.51        |
| sustainable   | 0.05        | platform    | 0.51        |
| investment    | 0.05        | social      | 0.53        |
| enable        | 0.05        | places      | 0.55        |
| source        | 0.06        | annually    | 0.57        |
| long          | 0.07        | export      | 0.58        |
| videos        | 0.09        | news        | 0.59        |
| lifestyle     | 0.09        | countries   | 0.63        |
| income        | 0.09        | b2b         | 0.63        |
| material      | 0.11        | improvement | 0.64        |
| manage        | 0.11        | people      | 0.68        |
| portal        | 0.12        | event       | 0.71        |
| provide       | 0.12        | established | 0.78        |
| formed        | 0.13        | spend       | 0.79        |
| extra         | 0.13        | around      | 0.80        |
| daily         | 0.13        | relevant    | 0.81        |
| local         | 0.14        | territory   | 0.82        |
| europe        | 0.15        | channels    | 1.37        |
| classes       | 0.15        |             |             |

**Table 6:** Words that distinguish middle from high mTurk scores

| Feature       | Coefficient | Feature          | Coefficient |
|---------------|-------------|------------------|-------------|
| engineering   | -0.67       | connect          | 0.03        |
| whole         | -0.57       | another          | 0.04        |
| app           | -0.45       | ideas            | 0.04        |
| user          | -0.45       | women            | 0.04        |
| investment    | -0.40       | solving          | 0.07        |
| software      | -0.39       | post             | 0.08        |
| ideal         | -0.39       | improved         | 0.08        |
| leading       | -0.39       | life             | 0.09        |
| enable        | -0.38       | africans         | 0.10        |
| seamless      | -0.36       | people           | 0.10        |
| customers     | -0.36       | organisation     | 0.10        |
| (Intercept)   | -0.35       | booking          | 0.11        |
| sell          | -0.35       | waste            | 0.11        |
| entertainment | -0.31       | awareness        | 0.12        |
| places        | -0.31       | economic         | 0.13        |
| manage        | -0.31       | ‘start-up’       | 0.13        |
| unlimited     | -0.31       | towards          | 0.13        |
| word          | -0.30       | urban            | 0.13        |
| fashion       | -0.30       | united           | 0.16        |
| capital       | -0.27       | farmers          | 0.16        |
| general       | -0.26       | feed             | 0.18        |
| product       | -0.25       | education        | 0.18        |
| google        | -0.24       | scale            | 0.18        |
| clients       | -0.24       | recruitment      | 0.20        |
| analysis      | -0.24       | households       | 0.22        |
| media         | -0.21       | mission          | 0.23        |
| magazine      | -0.20       | lives            | 0.23        |
| sellers       | -0.18       | price            | 0.24        |
| company       | -0.17       | social           | 0.24        |
| companies     | -0.17       | healthcare       | 0.24        |
| news          | -0.17       | pool             | 0.25        |
| investor      | -0.16       | patients         | 0.26        |
| generate      | -0.16       | health           | 0.26        |
| government    | -0.15       | study            | 0.27        |
| started       | -0.15       | share            | 0.28        |
| owned         | -0.15       | access           | 0.29        |
| regulatory    | -0.14       | sells            | 0.30        |
| territory     | -0.12       | improve          | 0.31        |
| transactions  | -0.10       | entrepreneurship | 0.31        |
| reviews       | -0.09       | networking       | 0.32        |
| nairobi       | -0.09       | supported        | 0.33        |
| money         | -0.09       | raise            | 0.34        |
| strategy      | -0.09       | interests        | 0.35        |
| wallet        | -0.07       | foundation       | 0.40        |
| base          | -0.07       | problems         | 0.46        |
| required      | -0.06       | enhance          | 0.46        |
| african       | -0.04       | affordable       | 0.51        |
| shopping      | -0.04       | students         | 0.52        |
| hot           | -0.02       | strive           | 0.53        |
| internet      | -0.02       | charity          | 0.64        |
| advertising   | -0.01       | educational      | 0.66        |
| stories       | -0.00       | youth            | 0.74        |
| service       | -0.00       | informal         | 0.79        |
| ‘non-profit’  | 0.01        | teach            | 0.85        |
| child         | 0.01        | poverty          | 0.90        |
| answers       | 0.02        | communities      | 0.96        |
| environment   | 0.03        |                  |             |