

Making digitisation more inclusive for job matching

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Final Report

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Abstract

High unemployment is often a signal for lack of jobs or low economic growth but in many developing countries labour market inefficiencies account for non-trivial part of the unemployment problem. Several recent labour market studies in developing countries have highlighted the issue of Information frictions as an important driver of unemployment, particularly of youths in urban areas. Information frictions, characterised by poor information accessibility and the prevalence of informal recruitment practices, make it difficult for employers to find suitable workers or for jobseekers to efficiently find the appropriate vacant positions. A recent study in Ghana showed that the promise of using online job portals to tackle information frictions may be limited by the contextual issues of informality, predominance of low-skilled jobs and internet access issues. This study therefore designs, develops and deploys a contextually appropriate and more inclusive digital labour market information solution as a proof of concept. The solution, Text4Jobs Ghana, is an AI-enabled system accessible via a USSD code which automatically searches a databased and matches jobseekers to their preferred vacancies and notifies them about the vacancy for them to apply. Text4Jobs Ghana was launched and operated in Accra for 10 weeks on a pilot basis. The results, based on a descriptive analysis of administrative and survey data, show that the solution is feasible, accessible, useful and scalable. Text4job Ghana directly helped about 152 jobseekers to find suitable work in two months and also contributed to filling nearly 100 vacancies. User feedback was generally positive. The study is a proof of concept, demonstrating that the power of digital technology can be harnessed to address the issue of matching inefficiencies in a way that does not exclude many potential workers and employers.

Key words: Job matching, information frictions, labour market efficiency, inclusive digitization, unemployment, Text4Jobs Ghana.

1. Introduction

Unemployment, especially of youths in urban areas, is a major problem in most Sub-Saharan African (SSA) countries. In Ghana, youth unemployment is worsening even as economic performance has generally improved over the last two decades. According to Ghana's recent Population and Housing Census (GSS PHC, 2021), more than a third (35%) of Ghanaian urban youth are unemployed, as compared with the youth unemployment rate of 12.9% in 2010 (GSS, 2010). But lack of jobs is the only cause of unemployment in these contexts. Indeed several recent studies have shown that matching inefficiencies are an important contributor to the growing unemployment problem in developing countries. These studies (Chiplunkar and Banerjee, (2023); Bandiera et al, 2022; Fernando et al, 2022; Hensel et al.,2021; Kelly et al., 2020; Abebe et al., 2018) have demonstrated that employers (who are looking for workers) and jobseekers are not able to efficiently find each other quickly due to information frictions.

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In a forthcoming IGC Working Paper Lambon-Quayefio et al (2023) show that, while online job portals are useful and promising in reducing such information frictions in the labour market, such portals may exclude several people who may have accessibility issues. Their randomized control evaluation of the national online jobs portal revealed three important results. First, their study demonstrated that amidst the high rate of unemployment in Accra, there were several job vacancies albeit with limited visibility (i.e. not widely advertised or circulated on any formal job portal). Each of their 20 fieldworkers was able to find an average of 3 (not so visible) job vacancies each day for about a month. Secondly, their experimental results showed that the online portal yielded moderate improvements in matching efficiencies. Thirdly, in spite of these improvements, about 30 percent of the employers had extreme difficulty in finding suitable workers to fill their vacancies. This may be because in a context of high informality, low access to computers/the internet and low ICT-literacy, online (internet based) portals may impose additional barriers to accessing information about vacancies.

Statistics from the 2021 Population and Housing Census in Ghana show that about 17 percent of persons 12 years and older do not own any functional ICT device. Only 7 percent owned a functional computer/laptop and 73 percent owned smart mobile phones (GSS PHC, 2021). Only 1 percent owned a functional tablet and about a third (31.4%) did not access the internet in the three-month period from April to June 2021. The overwhelming majority of businesses in Ghana are either micro or small-sized (98 percent), employing not more than 30 persons and are mostly informal (90 percent) in the way they operate (even when they are fully registered businesses) according the 2013 business census (GSS, 2014). One of the ways in which their operations are informal is in their recruitment practices. They tend not to write detailed job descriptions and person specifications for their vacant job positions. They do not often take applicants through a competitive selection/interview process. They also tend to rely more on personal networks, localised job vacancy adverts (on site banners/posters etc) and less on formal channels (job websites, newspaper adverts). Within this context, job vacancy platforms that rely entirely on the internet may exclude a large segment of the labour force. This may reinforce information frictions that make it harder for employers and the appropriate jobseekers to find each other.

To help address this problem, we embarked on an action research project which builds on Lambon-Quayefio et al (2023) to design, develop and pilot a more inclusive digital labour market information service as a proof of concept. Primarily, we sought to: (i) demonstrate that it is feasible to implement a technologically enhanced digital labour market intervention that does not impose barriers to people who lack access to internet devices or have low ICT skills); (ii) show that jobseekers and employers in general would be interested in such an intervention; (iii) find out what type of users will be attracted to and will benefit from such a system; (iv) gather user feedback and experiences which may inform scale-up of the intervention.

The research project resulted in the creation of Text4Jobs Ghana – a free artificial intelligence (AI)-aided job matching and information service that is accessible through a mobile phone USSD code.

There are three core aspects of the Text4Job Ghana service that makes it highly useful and puts it at the frontier of innovation, yet making it fully accessible – i.e. not excluding anyone whether or not they are literate, have internet or are IT literate. The first aspect is about access: both jobseekers and employers can engage/initiate the service through a simple USSD short code that can be dialled from any mobile phone device (smart or analog). When they do, they will then be contacted by a call centre agent to assist them (in English or the local language of their choice) to complete and submit their job preferences or vacancy details if they do not have access to internet or cannot complete the online form themselves. The second aspect is the dynamic AI database that powers Text4Jobs Ghana. The database receives the information on job vacancies as well as jobseekers' preferences and automatically matches jobseekers to their desired types of positions which are vacant. This is done continuously and instantly such that any time a new job vacancy is submitted to the database, all the appropriate jobseekers are immediately matched to it and notified. The third aspect is how jobseekers are notified. Whenever the jobseeker is matched to any job vacancy, the vacancy information along with how to apply is sent to them by a text message (SMS). That way, the work of actively searching for workers or jobs is constantly being done on behalf of employers/jobseekers. And jobseekers are able to receive the most relevant information in the basic form through an SMS which does not require a smartphone. In addition, real-time data of vacancies and jobseekers (labour demand and supply) is made available administratively through the database in a way that can facilitate richer labour market studies including labour market experiments.

The Text4Jobs Ghana service was designed, built and piloted as a prototype low-cost solution which can be improved based on the lessons learnt and possibly scaled-up across the country and ultimately in other African countries. Text4Jobs Ghana transforms the work of the Labour Department Offices (under the Ministry of Employment and Labour Relations) at the local government level in Ghana through the use of ICT and digitization. Based on how the Labour Department operates currently, employers looking for works or jobseekers are required to visit a local office of the Department to register their vacancy or job preferences. The registers at the local offices are either paper based or simply kept on personal computers rather than in a central database. The Labour Department officers go through the registers to manually match jobseekers to vacancies and provide the information to the jobseekers and employers. According to the Labour Department's own website, they exist (among other things) "to provide, for the benefit of workers and employers, employment-related services such as job-matching, job counselling and mediation; and to generate reliable labour market information for employment policy and national development planning"¹. The Text4Jobs Ghana solution automates all these processes through digitization and data science. The lessons from this prototype/proof of concept will service as inputs to the Labour Market Information System (LMIS) being developed by the Ministry of Employment with support from the World Bank. The World Bank LMIS initiative is being developed across several developing countries and will benefit greatly from the findings and lesson of this research project.

¹ <https://www.govgh.org/mdas/e659791996/>

Text4Jobs Ghana was successfully developed, launched and operated in Accra on a pilot basis for about 10 weeks. In that brief period, it attracted and registered about 1,312 jobseekers. It also registered about 249 employers who were looking for 1,467 workers to fill 507 job positions. In that period Text4Jobs Ghana was able to successfully match 456 jobseekers to 251 vacancies. Our follow-up survey data also showed that 30 percent of the registered vacant job positions had been fully filled in that period. Thus, almost 100 vacancies were filled in that period. About 25 percent of the registered jobseekers reported that they received several notification text messages of different positions they had been matched to. About 54 percent of those who were matched and notified confirmed that the positions they received fairly matched the kinds of jobs they were looking for and about 50 percent of them applied for the positions they had been matched to. About 18 percent of the surveyed jobseekers reported that a job offer had been made to them within the two month period of registering on Text4Jobs Ghana and about 18 percent of those surveyed reported that they were successfully employed in the two month period. Thus, Text4Jobs Ghana directly helped about 152 jobseekers to find suitable work in two months. It may also have helped others who were not registered but may have received forwarded message from their registered friends and family members.

The results clearly demonstrate that the intervention is feasible and generally attractive to the employers from mostly micro and small businesses who were looking to fill vacancies in categories of Hair & Beauty; Sales & Marketing; Kitchen & Catering; Administrative; Teaching (Pre-University); Clothing & Fashion; Domestic Worker; and Hospitality. The results also show that the solution offered by Text4Jobs Ghana was attractive to jobseekers who were mostly looking for low-medium skilled positions. The jobseekers were mostly 18-24 years old males (57 percent) and females (43 percent) who had completed either secondary education (47 percent) or only basic level of education (11 percent). They were mostly single/never married (85 percent) with about 0-3 years working experience (57 percent). The feedback from the employers and jobseekers was generally positive. They mostly considered the service useful and helpful and were mostly satisfied with it. Our findings reveal that more than half of the employers who engaged the platform found Text4Jobs better than their previous methods of finding their workers.

The rest of the paper is organised as follows. The next section provides a detailed description of the Text4Jobs Ghana solution followed by a brief description of how it was deployed in section 3. In section 4, we discuss the data, outcomes and results from our pilot. Section 5 concludes by discussing the lessons learnt with emphasis on what worked well and what can be improved.

2. Text4Jobs Ghana: The Solution/Action

Based on the insights from Lambon-Quayefio et al (2023), we conceptualised and christened Text4Jobs Ghana as a labour market information intervention which could improve on the labour market efficiency gains derived from job websites in a way that better fits the SSA context. Text4Jobs Ghana is an attempt to make access to labour market information services (such as online portals) more inclusive. The aim is to make it possible for employers (micro and small-sized business who mostly operate in an informal manner with low use of ICT) and jobseekers (who may have low literacy) to find each other in a more efficient manner.

Design and Development

We designed a solution that can be accessed by both jobseekers and employers simply by dialling a USSD short code (*899*47#). USSD stands for Unstructured Supplementary Service Data. It is a Global System for Mobile Communications (GSM) protocol that is used to establish a real-time communication session between the phone and another device, typically, a network or server. USSD is similar to Short Message Service (SMS). However unlike SMS, it is interactive in real-time (enables two-way communication of information, as long as the communication line stays open) similar to a call hence messages are not stored on the user's phone. The user is also not charged for the messages exchange on a USSD and it does not require a mobile phone app to use. USSD can be used for Wireless Application Protocol (WAP) browsing, mobile money services, prepaid call-back service, menu-based information services and location-based content services.

When a user dials the USSD code to engage Text4Jobs Ghana, they are asked to select 1 (I am looking for workers) or 2 (I am looking for a job). After they indicate whether they are employers or jobseekers, they again select between two options – whether they prefer self-service or assistance (offered through a call centre) to complete and submit their information. The form that is completed (whether by them directly or for them through the call centre) takes the details of the vacancy (if they are employers) or details of their job preferences (if they are jobseekers). For employers, the form covers: information on the vacant positions they are looking to fill, the location of the work/business, salary and other benefits, the number and basic characteristics (education, sex, age range, experience, etc) of the workers they need, the deadlines for receiving applications as well as how to apply. For Jobseekers, the form covers: their personal information (name, contact details, sex, marital status etc), their level of education, experience, skills, training, residential location, preferred locations of work, preferred job categories (administrative, teaching, hospitality, domestic work, kitchen and catering, etc), salary expectations, and other preferences (part time/full time etc.).

Once the forms are submitted to the AI-powered database, the AI matches the vacancies to the appropriate jobseekers based on Education, Job Category, Location and Sex (sex was added a matching criteria 6 weeks into the pilot). The Education, Job Category and Sex criteria are driven by the employers' requirements for the vacant position. However, we also added the location of the business criteria for match, driven by the jobseekers' preferences. This is because given the salary ranges for most low skilled jobs, long commutes makes them less lucrative/desirable. It may not be useful to a jobseeker who is looking for a waiter position to know that there is vacant waiter position which requires him to commute long a distance and incur high transport costs. Other matching criteria such as salary range could be added but was not added in the pilot. The matching is instant, continuous and multiple. One vacancy can be matched to several jobseekers and one jobseeker can also be matched to several vacancies instantly or overtime as the new vacancies are submitted. Whenever a jobseeker is matched, they receive an SMS with the detail of the position and how to apply. The SMS provides the basic information about the position. E.g. “*Papa's Pizza, North Legon Branch, has vacancy for 2 Cooks. Apply by calling 050XXX XXXX or by emailing your CV to hr@ppizza.com.gh.*” The jobseeker is free to then decide to apply for the position or not to apply.

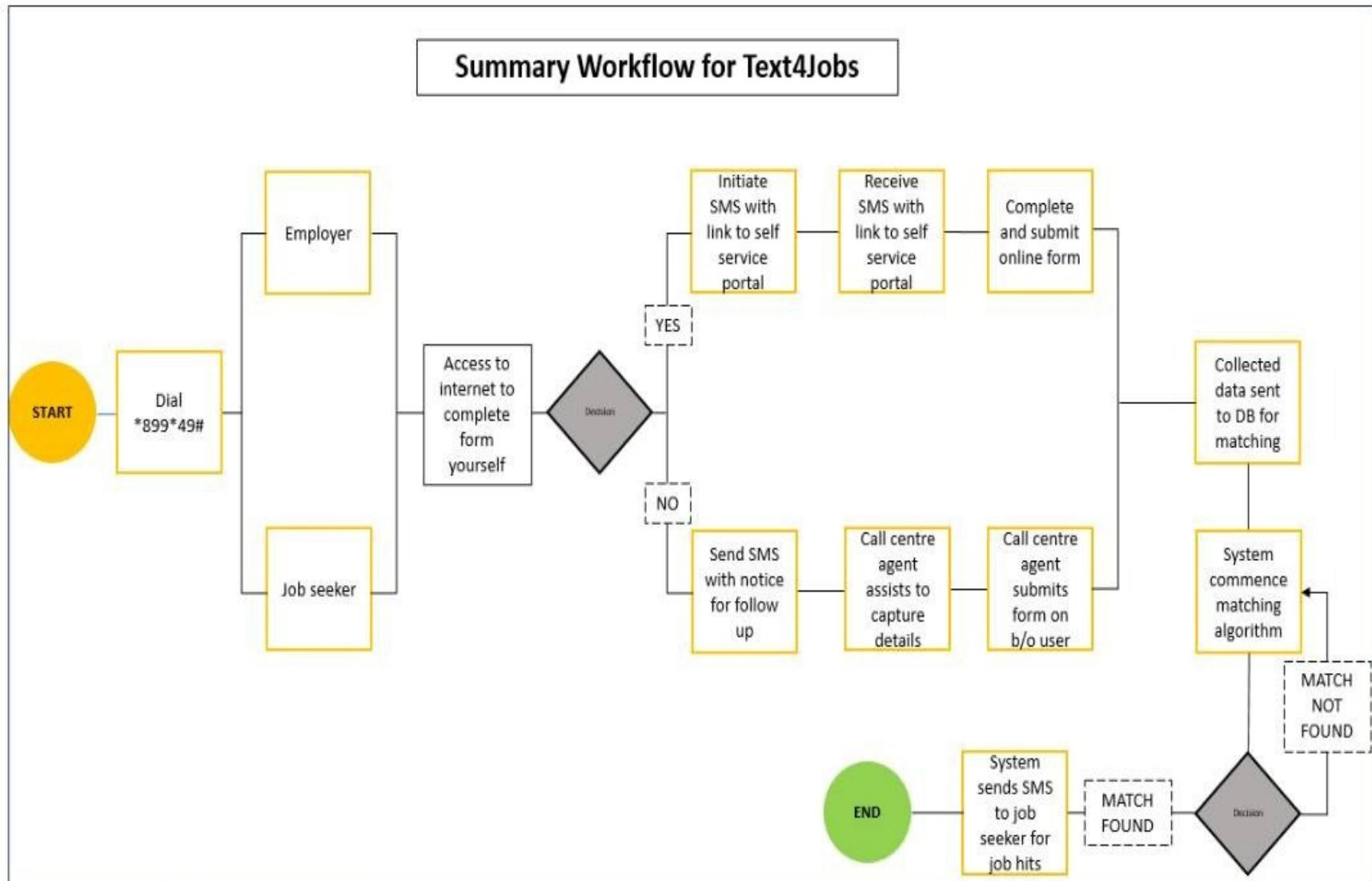
With this conceptual design, we worked with a local technology firm, Npontu Technologies Ltd, to build the system and hosted it on their server powered by their databases and AI. Npontu Technologies Ltd was selected through an invited tender process which involved two other firms. The selection process took over 6 months followed by another 6 months period of development and about two months of branding. The Intellectual Property for the design and development of Text4Job Ghana is, therefore, jointly owned by the Researchers (UG&IGC and Npontu Technologies Ltd). The following diagram summarises the workflow of how the solution is designed to work.

3. Pilot Implementation/Deployment

Text4Jobs Ghana was launched on Monday 17th April 2023 after the system was tested for a few weeks during the development stage. Prior to the launch, we engaged the services of Zuzo Company Limited to provide the Call Centre Services that is required as part of the solution (particularly for people who require assistance to fully engage with the Text4Jobs service platform). We also engaged and trained 15 temporary Text4Jobs Ghana staff to publicise and help enrol jobseekers and employers/vacancies. Given the limited funds available for the entire project, we crafted a modest publicity plan to ensure that the staff are not quickly overwhelmed by the volume of jobseekers and employers registering on the platform. This approach gave us the opportunity to learn in real time as users gradually engaged the system and to make corrections/fix problems before more people got on the system.

As part of the launch, the team of 15 staff undertook 5 days of outreach activities in the markets and streets in parts of Madina, Haatso, North Legon, West Legon, Okponglo-America House, and Lapaz (which are all suburbs of Accra). These areas were selected because of their proximity to the University of Ghana, Legon campus where the researchers are based. The team publicised the service through jingles and announcements on an information van. To facilitate the dissemination, the staff also distributed flyers and T-shirts, posters and banners. They also engaged directly by talking to business owners and jobseekers. Publicity bulk text messages (SMS) were also sent to about 200 businesses and electronic flyers were also shared via social media.

Figure 1: Summary Workflow of Text4Jobs Portal



Source: Author's Construction

4. Data, Outcomes and Results

In this paper, we present descriptive analysis from two main data sources to address the objectives of the study and to serve as evidence of what the project achieved. Firstly, we draw on administrative data from the Text4Jobs Ghana database to provide usage and performance statistics as well to describe the users and the kinds of workers or jobs they were looking for. For the vacancies, the administrative data includes the title/name of the position, the number of workers needed for the position, educational qualification required, experience required, preferred gender/sex, job category, employment type (permanent or temporary), job location, salary and benefits, as well as other skills and attributes required for the position. For the jobseekers, the data covers their personal details (age, sex, marital status, number of children) their educational attainment, skills, work experience, job preferences, job location preferences, salary expectations, and preferred contract type (part-time/full time; permanent or temporary). The administrative data is obtained from the backend (or live database) of Text4Jobs Ghana. If implemented at scale, the Text4Jobs Ghana database can be a useful source of important labour market information such as data on monthly (or periodic) labour demand and supply. The detailed data can be used for rich analyses including duration analysis etc. It can also serve as a good sampling frame for further labour market surveys and experiments. Secondly, we complement our analysis with data from a survey administered to a random sample of 820 jobseekers and 181 employers who registered and used the Text4Jobs Ghana service. The short survey covered questions on user experiences, outcomes and their feedback.

In the period of 10 weeks, the administrative data shows that the Text4Jobs Ghana attracted and registered 249 employers who were looking for 1,467 workers to fill 507 positions. As shown in figure 2, most of the vacancies were in the categories of: Hair & Beauty; Sales & Marketing; Kitchen & Catering; Administrative; Teaching (Pre-University); Clothing & Fashion; Domestic Worker; and Hospitality. Table 1 shows that employers were mostly looking to fill full-time (81 percent) Temporary positions (58 percent) with either males or female (82 percent) or in some cases just females (9 percent) or males (9 percent). They were mostly looking for 1-3 workers (81 percent) who have secondary education or below (83 percent) with just 0-1 years working experience (73 percent). Majority of the jobs (about 78 percent) paid a monthly salary of less than GH¢1,000 (~\$91) on average. Only a small proportion of the vacant job positions (6.8 percent) were offering a performance-based commission as salary. Thus, employers were looking to employ young people with little or no experience for low-medium-skilled jobs in micro and medium-sized firms. About half of the vacancies were matched to an average of 3 different jobseekers. The survey data (Table 6) also showed that about 30 percent of the vacancies were filled within the period of the study.

Table 1: Vacancy Detail from Administrative Data

Description	No.	Percent	Cum. Percent
Minimum Level of Education Required for the Position	507		
No formal education	129	25.4	25.4
JSS/JHS/Middle	62	12.2	37.6
Secondary/SSS/SHS	229	45.2	82.8
Post-Secondary - Non-Tertiary	60	11.9	94.7
Professional	8	1.6	96.3
University (bachelor)	19	3.7	100
Required Gender/Sex for the Vacant Position			
Either Male or Female	418	82.4	82.4
Female Only	44	8.7	91.1
Male Only	45	8.9	100
Number of Workers needed for the Position			
1	291	57.4	57.4
2	95	18.7	76.1
3	26	5.1	81.2
Greater than 3 Workers Wanted	95	18.8	100
Minimum Years of Work Experience Required			
0	96	18.9	18.9
1	272	53.6	72.5
2	67	13.2	85.7
3	43	8.5	94.2
Greater Than 3 Years	29	5.8	100
Working Hours	507		
Full-time	410	80.9	80.9
Part-time	97	19.1	100
Tenure of Position	507		
Permanent	214	42.2	42.2
Temporal	293	57.8	100
Mode of Application (How Jobseekers can Apply)	507		
Call Employer	370	73	73
Email Employers	7	1.4	74.4
Send Application in Other Ways	130	25.6	100
Matched Status (has the position been matched to any Jobseeker)	507		
Unmatched	256	50.5	50.5
Matched	251	49.5	100
Average Number of Different Jobseekers the position was matched to	3		
Job Salary Range			
Less than GHc 1000		77.9	77.9
GHc 1000 - GHc 3000		15.3	93.2
Commission based		6.8	100

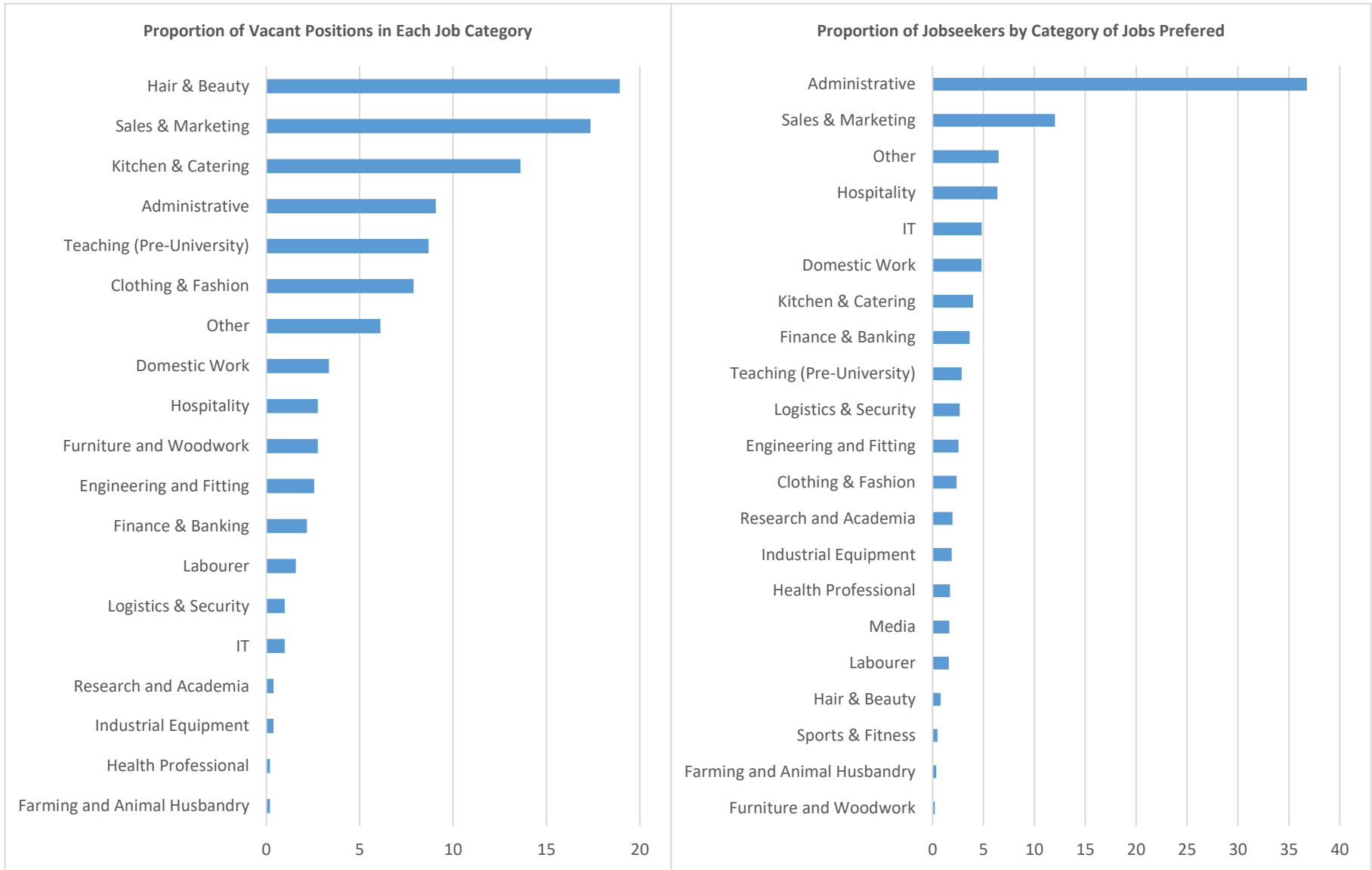


Figure 2 Job Categories

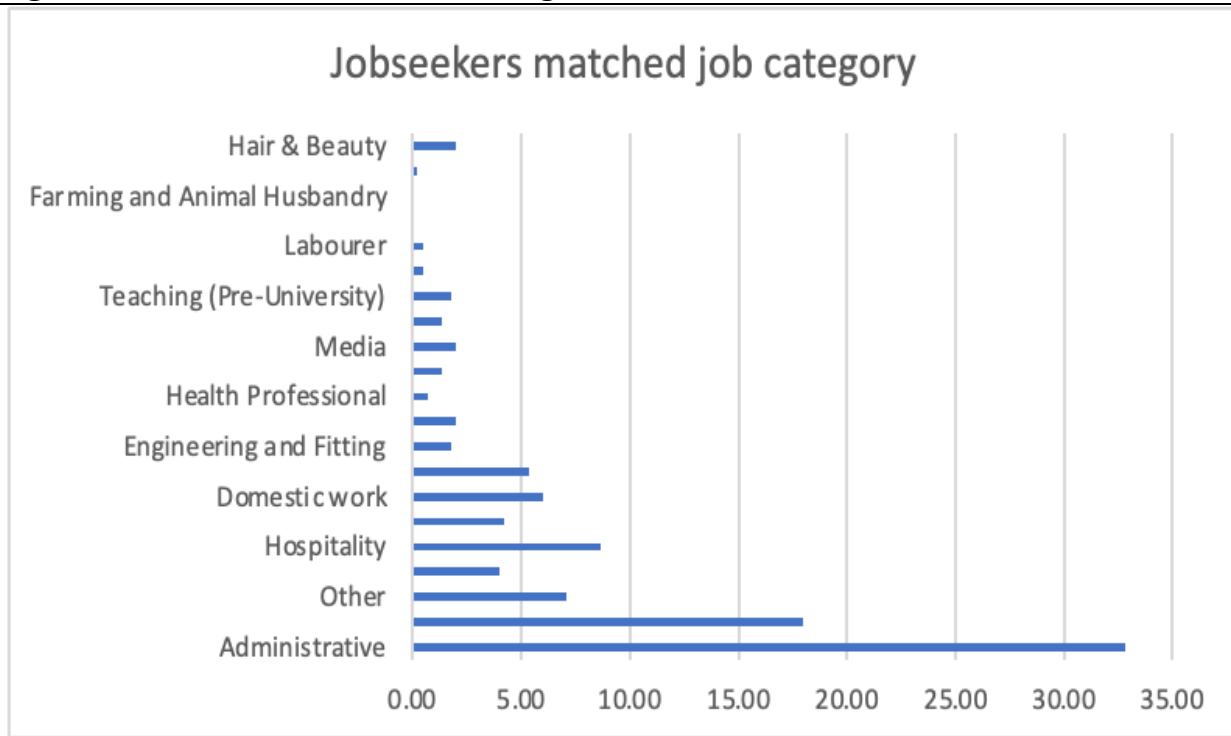
The jobseekers who used Text4Jobs Ghana in the brief pilot period were mostly between the ages of 18-24 years who had completed either secondary education (47 percent) or only basic level of education (11 percent). As shown in Table 2, they were mostly male (57 percent), single/never married (85 percent) with about 0-3 years working experience (57 percent). About 80 percent of the jobseekers opted for self-service with only 20 percent opting for the assisted service. They mostly (68 percent) expected to be paid between GH¢1,000-GH¢3,000 a month. On average, the maximum expected salary for the jobseekers was about GH¢2,300 (~\$210) per month. From Figure 2 we note that they were mostly looking for administrative (37 percent), Sales & Marketing (12 percent), Hospitality (6 percent), IT (5 percent), Domestic Work (5 percent) or Kitchen & Catering (4 percent) positions. With respect to matching, over the pilot period, about a quarter of the jobseekers had been matched to at least one vacancy (see table 1).

Table 2: Administrative Data - Jobseekers

	Mean	Std. Dev	Obs
Service Preference			
Assisted	0.200	0.400	1312
Self-service	0.800	0.400	1312
Gender of respondent			
Male	0.568	0.496	1312
Female	0.432	0.496	1312
Applicant Educational level			
Basic Education or less	0.109	0.312	1312
Secondary/Vocational School	0.470	0.499	1312
Training College/School	0.098	0.297	1312
Tertiary (Bachelor and Postgraduate)	0.289	0.453	1312
Professional Certification	0.035	0.184	1312
Respondent's marital status			
Single	0.857	0.350	1312
Married	0.139	0.347	1312
Formerly married	0.003	0.055	1312
Total matches			
No matches	0.656	0.475	1312
1-3 matches	0.257	0.437	1312
4+ matches	0.087	0.282	1312
Maximum Salary Range Expected			
Less than GH¢ 1,000	0.155	0.362	1312
GH¢1,000 - GH¢ 3,000	0.682	0.500	1312
GH¢ 3,001 - GH¢ 5,000	0.111	0.376	1312
Above GH¢ 5,000	0.051	0.241	1312

Source: Text4Jobs Data, 2023

Figure 3: Jobseekers Matched Job Categories



Source: Authors' Construction based on data from Text4Jobs

Table 3 provides a summary of the jobseeker characteristics by matched status. Overall, the administrative data on the jobseeker platform shows that about 34 percent of the jobseekers that engaged the platform were matched during the pilot phase. Of those who were matched, there were slightly more males (53 percent) than females (47 percent) with majority (87.8 percent) being single. The data also shows that for the jobseekers who were matched, about 75 percent received between 1-3 matches while a quarter received 4 or more matches from the platform. This signals the efficacy of the platform to reduce the matching inefficiency in the labour market. More than half (54.3 percent) of the jobseekers who were matched with vacancies have secondary or vocational training with about 1 in five of the matched jobseekers having completed tertiary education. The average maximum expected salary of jobseekers who were successfully matched with positions is about GH¢2,117 (~\$192) with less than 20 percent requesting for more than GH¢ 3,000 (~\$273).

Table 3: Jobseeker Characteristics by Match Status (Administrative Data)

	<i>applicant matched</i>					
	<i>Unmatched</i>			<i>Matched</i>		
	Mean	Std. Dev	Obs	Mean	Std. Dev	Obs
<i>Service Access Mode</i>						
Assisted	0.188	0.39	861	0.224	0.417	451
Self-service	0.812	0.39	861	0.776	0.417	451
<i>Gender of respondent</i>						
Male	0.588	0.49	861	0.530	0.500	451
Female	0.412	0.49	861	0.470	0.500	451
<i>Respondent's marital status</i>						
Single	0.848	0.36	861	0.876	0.330	451
Married	0.148	0.35	861	0.124	0.330	451
Formerly married	0.005	0.07	861	0.000	0.000	451
<i>Total matches</i>						
No matches	1.000	0.00	861	0.000	0.000	451
1-3 matches				0.747	0.435	451
4+ matches				0.253	0.435	451
<i>Maximum Salary Range Expected</i>						
Less than GH¢ 1,000	0.125	0.33	861	0.211	0.408	451
GH¢ 1,000 - GH¢ 3,000	0.700	0.46	861	0.650	0.478	451
GH¢ 3,001 - GH¢ 5,000	0.117	0.32	861	0.100	0.300	451
Above GH¢5,000	0.057	0.23	861	0.040	0.196	451
<i>Applicants educational level</i>						
Basic education and below	0.117	0.32	861	0.093	0.291	451
Secondary/Vocation School	0.431	0.50	861	0.543	0.499	451
Training school	0.111	0.31	861	0.071	0.257	451
Tertiary	0.247	0.43	861	0.208	0.407	451
Post Tertiary	0.093	0.29	861	0.084	0.278	451

Source: Text4Jobs Data,2023

User Feedback

Tables 5 and 6 summarises the feedback from the jobseekers and employers respectively. Table 5 shows that 25 percent of the randomly sampled jobseekers received notifications with information about vacant positions that had been matched to them. About 51 percent of those who received the notifications also applied for the vacant job position that were sent to them even though just about 40 percent admitted that the vacancies they received matched exactly the kinds of jobs they were looking for. And of those who applied about 16 percent them had been interviewed for the position with 65 percent accepting one of the job offers. About 56 percent of the jobseekers who were interviewed indicated that the Text4Jobs platform is useful. Similarly, about 52 percent of the jobseekers registered their satisfaction with the platform with over two-thirds (67.8 percent) stating that they are likely to recommend the platform to family and friends (see table 5).

Table 5: Experience of Jobseekers on Text4Jobs (Survey Data)

	Mean	Std. Dev	Obs
<i>Have you received any text messages of vacant job positions since the time your...</i>			
No	0.749	0.434	820
Yes	0.251	0.434	820
<i>In general, on a scale of 0-10 how well did the vacancies you received match what...</i>			
Poorly matched	0.466	0.500	206
Neutral	0.131	0.338	206
Well matched	0.403	0.492	206
<i>Did you apply/call to any of the jobs vacancies that were sent to you?</i>			
No	0.490	0.501	206
Yes	0.510	0.501	206
<i>Have you been interviewed by any of the employers for any of the job vacancies you applied for?</i>			
No	0.840	0.368	206
Yes	0.160	0.368	206
<i>Have you accepted any job offers in past two months?</i>			
No	0.347	0.478	147
Yes	0.653	0.478	147
<i>Did this job come from Text4Jobs Ghana</i>			
No	0.885	0.320	96
Yes	0.115	0.320	96
<i>On a scale of 0-10 how useful do you think Text4Jobs Ghana is</i>			
Not useful	0.183	0.387	820
Neutral	0.254	0.435	820
Useful	0.563	0.496	820
<i>On a scale of 0-10 how satisfied are you with Text4Jobs Ghana?</i>			
Not satisfied	0.220	0.414	820
Neutral	0.263	0.441	820
Satisfied	0.517	0.500	820
<i>On a scale of 0-10 how likely are you to recommend Text4Jobs to friends and family?</i>			
Not likely	0.170	0.375	820
Neutral	0.152	0.360	820
Likely	0.678	0.468	820

Source: Text4Jobs Data,2023 Note: Sample size changes to 206 and further to 96 because questions are conditioned on having been matched.

Table 6 summarises the experiences of employers based on the survey conducted. Over the short period during which the service was piloted, about a quarter (24.9 percent) of the employers indicated that the platform had helped them in finding their workers and close to half (47.5 percent) indicated that they found the service useful. In addition, more than half (52.5 percent) of the employers said they were satisfied with the service. With respect to the quality of the match, about 36.5 percent reported

satisfaction with their workers recruited via Text4Jobs. Over half of the employers (56.4 percent) reported that the Text4Jobs service was better than their previous methods of finding workers. Based on this, a large majority of them (72.9 percent) were likely to recommend the service to other people. When asked if the service should continue, 69.1 percent of the employers indicated that it should continue with close to 30 percent asking for some improvement in the service to make it even more helpful to them.

Table 6: Experiences of Employers (Survey Data)

	Mean	Std. Dev	Obs
<i>Have you found all the workers you are looking for?</i>			
Yes	0.301	0.460	181
No	0.699	0.460	181
<i>On a scale of 0-10 how satisfied are you with the workers you have employed</i>			
Dissatisfied	0.409	0.493	159
Neutral	0.226	0.420	159
Satisfied	0.365	0.483	159
<i>Do you think the Text4Job service has helped in finding some of the workers you</i>			
No	0.751	0.433	181
Yes	0.249	0.433	181
<i>On a Scale of 0-10 how useful do you think Text4Jobs Ghana is?</i>			
Not Useful	0.365	0.483	181
Neutral	0.160	0.368	181
Useful	0.475	0.501	181
<i>On a scale of 0-10 how satisfied are you with Text4Jobs Ghana?</i>			
Dissatisfied	0.238	0.427	181
Neutral	0.238	0.427	181
Satisfied	0.525	0.501	181
<i>On a scale of 0-10 how likely are you to recommend Text4Jobs to other employers?</i>			
Not likely	0.127	0.334	181
Neutral	0.144	0.352	181
Likely	0.729	0.446	181
<i>Do you think Text4Jobs should continue working or should stop?</i>			
Stop	0.011	0.105	181
Continue	0.691	0.464	181
Improve	0.298	0.459	181
<i>In comparison to your previous methods of finding workers, you think Text4Jobs</i>			
Worse	0.033	0.180	181
Neither better or worse	0.398	0.491	181
Better	0.564	0.497	181
Not Applicable	0.006	0.074	181

Source: Text4Jobs Data, 2023

5. Lessons Learnt and Recommendations

In this study we have been able to design, build and operate a fully functional inclusive labour market information service in Accra. The study has practically demonstrated that it is feasible to use frontier digital technology to address the challenge of the labour market information frictions in Developing Countries in a way that does not limit access to people who make have accessibility issues.

We launched a new labour market matching and information service and have been able to successfully run it. It has attracted over 1,312 jobseekers and hosted information on about 507 vacant job positions in Accra that would have been publicised widely or in any formal way. For those 507 job positions, the employers were looking for 1460 workers in total. We were able to directly help 206 jobseekers find out about the vacancies that match the kinds of jobs they were looking for with about 96 of them getting a job. We also helped 30 percent of employers find all the workers they were looking for.

Our results show that for 25 percent of the vacancies, the employers were looking for worker who had no formal education. This is a group that is likely to be excluded from online website and formal job portals. Our intervention, Text4Jobs Ghana was able to register about 11 percent of such low education jobseekers. Our results show that close to 60 percent of registered jobseekers did not have tertiary education and over half of the jobseekers who were matched had Secondary/Vocational education or lower. Further, the platform functioned effectively as it successfully matched jobseekers with vacancies within their specified locations as well as job category. The ability of the system to achieve this was critical to the central objective of the Text4Jobs solution. Additionally, jobseekers were promptly notified once a match was established, ensuring that there is timely communication and facilitating quick action on the part of the job seekers. Another feature of the solution that made it appealing to users was its simplicity. By following a few steps and prompts, jobseekers and employers were able to fill out the necessary details on the platform. The ease of use and the instant feedback from the platform makes it appealing to its users who also find it to be cost effective.

However, certain aspects of the system functionality require enhancement. Changes will have to be made to improve the matching accuracy; to better validate the identities of users to address privacy concerns and strengthen cyber security; and to improve/automate how jobseekers and employers can stop receiving help from the service when they no longer require it. In the future we aim make the necessary changes to enhance the service and undertake a more rigorous impact evaluation or a series of experiments to firmly answer various questions.

This intervention could be adopted, improved and scaled-up nationally by the Labour Department of the Ministry of Employment and Labour Relations. The Labour Department Offices are mandated to provide job matching services by keeping registers of jobseekers and vacancies. The Text4Jobs Ghana intervention transforms the work of the Labour Department, through the use of digital technology in a way that is even more inclusive or accessible. This proof of concept may also guide and inform the Labour Market Information System projects being sponsored by the World Bank in some countries.

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