LABOUR MARKET DATA SOURCES TOWARDS DIGITAL TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING (TVET)

NIKOS ASKITAS, RAFIK MAHJOUBI, PEDRO S. MARTINS AND KOFFI ZOUGBEDE

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Emerging Labour Market Data Sources towards Digital Technical and Vocational Education and Training (TVET)

This paper was prepared by Nikos Askitas of IZA, Pedro S. Martins of Queen Mary University of London and Rafik Mahjoubi and Koffi Zougbede of PARIS21. The authors thank all participants in the PARIS21 'Expert meeting on new labour market data sources', where a first version of this report was presented, for their invaluable comments and suggestions.

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About BMZ*

The German Federal Ministry for Economic Cooperation and Development (BMZ) introduced “Youth employment and innovation in rural areas” as one of its key priorities for the G20. In this context, BMZ developed various deliverables including the initiative “Build4Skills”.

Build4Skills aims at changing the scenario: infrastructure projects, especially those initiated by actors from the international community, shall serve as a vehicle to promote TVET as well as employment and allow local workers to be trained on the job based on labour market needs. Therefore, TVET can be integrated into the planning and tendering processes of infrastructure projects, benefitting national economies by increasing skill levels and employability and in return, creating a local workforce. This is how infrastructure projects become powerful vehicles to promote workplace-based TVET and maximise the economic benefits of financial cooperation in a sustainable way. The incorporation process of TVET into infrastructure projects can be achieved through the establishment of a digital information system, which will match the demand for skilled workers with the supply of local, mainly unskilled workers.

For this valuable endeavour, trustworthy data on the local labour market is key for the implementation of the project, as well as for future ones. However, in developing countries, the informal sector surpasses the formal one and the data landscape is weak. In the digital age, new data sources need to be leveraged to bridge the data gap in these countries, to get insights into the market, make the right predictions and implement sustainable measurements. BMZ supports this study as a way to start tackling this problem and find new labour market data sources.
1. Summary of Findings

- Experience from both technology and policy making shows that solutions for labour market improvements are simply choices of new, more tolerable problems. All data solutions supporting digital Technical and Vocational Education and Training (TVET) will have to incorporate a roadmap of changes rather than an unrealistic super-solution. The ideal situation is a world in which labour market participants engage in intelligent strategic behavior in an informed, fair and sophisticated manner.

- Labour market data captures transactions within labour market processes. In order to successfully capture such data, we need to understand the specifics of these market processes. Designing an ecosystem of labour market matching facilitators and rules of engagement for contributing to a lean and streamlined Logistics Management and Information System (LMIS) is the best way to create Big Data with context relevance. This is in contrast with pre-existing Big Data captured by global job boards or social media for which relevance is limited by the technology access gap and its variations across the developing world.

- Network effects occur in technology and job facilitation, as seen in the developed world. Managing and instigating the right network effects might be crucial to avoid fragmented stagnation and inefficiency. This is key to avoid throwing money behind wrong choices that do not gain traction.

- A mixed mode approach is possibly the ideal approach for developing countries. Mixing offline and online elements correctly will be crucial in bridging the technology access gap and reaping the benefits of digitisation at the same time.

- Properly incentivising the various entities is critical for progression, and more specifically the private sector, which is significantly more agile and inventive, has "skin in the game" and a long-term commitment to the conditions in the field, has intimate knowledge of how to solve the technology gap and brings a better understanding of the particular ambient context they are operating in. To summarise: Big Data starts small.

- Managing expectations and creating incentives for the various stakeholders will be crucial in establishing digitally supported TVET. Developing the right business models will be crucial in the short term and beyond, and it will be the result of creating the right mix of technological and policy expertise with good knowledge of the situation on the ground.

- Solutions must be fault tolerant, effective and functional. In this respect, it is important to not seek a perfect data model or technology choice but solutions that are adaptable and replaceable and that avoid lock-in effects.

- A Labour Market Information System (LMIS) capable of contributing to digital TVET programmes in developing countries must satisfy a series of requirements. The most important of which is to allow technical federations with a distributed ecosystem of other digital LMIS, to offer services to both supply and demand of labour, and use a stratified approach to connect a highly digital backend with the access gap on the ground.

- Despite significant financial restrictions, Mozambique is currently setting up a LMIS that provides data on the different dimensions of its labour market. The Labour Market Observatory plays a critical role in this area as it compiles, processes and disseminates a considerable amount of information, originally produced by different agencies of the Ministry of Employment and by other bodies, in particular the Statistical Agency.

- Public and private sector online portals, covering both the formal and informal labour markets have been in operation in Mozambique since 2014 and have already played a significant role in labour market matching. They also have the potential to contribute towards the training dimension, by disseminating information about skill demand and supply.

- The LMIS of Mongolia is more developed than that of Mozambique, and includes a regular labour force survey. However, the training system is also not yet fully able to deliver skills that are in greater demand by the labour market.
• We believe it is feasible for development banks or agencies to set up a single website (portal) where the development projects that they support are required to list their job vacancies and skill needs. These projects could include infrastructure investments as well as other smaller, development initiatives. For the success of this portal, it is critical the vacancies are easily accessed and are disseminated through national portals. It is also important to ensure that subcontractors engage with these portals, as they may represent a large share of the jobs that are created in the process.

• To increase the usefulness of the portal from a (digital) TVET perspective, it could be useful to have these vacancies follow a specific structure in terms of their skills, perhaps following the European Skills/Competences, qualifications and Occupations (ESCO) classification. On the other hand, the greater visibility and legitimacy found from posting vacancies in such an international portal may create incentives for multinational groups in employment and training services to react more rapidly to these emerging needs from investment projects and contribute to better matches.

2. Outline of Study

A Labour Market Information System (LMIS) can be defined as an interconnected set of procedures and mechanisms involving multiple stakeholders at different (national, regional, sectoral, local, governmental) levels for collecting, processing, storing, analysing and disseminating labour market data and insights, thus facilitating action and value creation towards the improvement of the labour market.

An effective LMIS can therefore help the continuous formulation of improved evidence-based policies following monitoring and evaluation. LMIS may be subject to many different policy priorities, including skill development, inequality and discrimination reduction, (foreign direct) investment promotion, migration flow management, productivity enhancement, policy evaluation, etc.

Given their dependence on a number of factors, successful LMIS tend to rely on partnerships between multiple stakeholder from the public and private sectors. The latter include training agencies, private employment centres, online job portals, and employer associations. The private sector should therefore not be seen as a mere user of labour market data - its contributions in the shaping and development of the LMIS, both sharing data and informing the public administration about their needs, can make an important difference to the success of the LMIS. The involvement of the national statistical agency in monitoring the quality of the data should also be stressed, given its typical nature as a public body of greater independence.

This report is a contribution to the improvements of the LMIS in developing countries. It focuses on new sources and ways to create, access and manage labour market data. Our definition of labour market data is quite comprehensive and includes everything that might help improve policy interventions aimed at better steering the labour market. It therefore includes, but is not limited to, official employment data, job board transaction data, data from the platform economy and data on vocational education.

The study is a response to the realisation that TVET in developing countries has not worked as desired and that a new form of digital TVET might be needed. A digital TVET might build on a better understanding of the new possibilities in the area of labour market data driven by new technologies. A prior version of the report was circulated among a group of experts and stakeholders that participated in a PARIS21 meeting and who provided valuable contributions for this version that the authors gratefully acknowledge.

1 Because of resource constraints, LMIS in Sub-Saharan Africa (SSA) tend to be irregular, fragmented, out of date and or unreliable. This hampers social and economic development as improvements in LMIS can make positive contributions towards job creation, inclusive growth, and social justice, by facilitating better policy and labour market measures.

2 (Expert Meeting on new labour market data sources, 2018)
High quality data, which is compiled in a timely manner and is made available without lags (or even in real time), is fundamental for the efficient functioning of labour markets and for the design, implementation and evaluation of effective policy interventions. Such data, however, is the by-product of transactions in the labour market. In result, this report focuses on job matching, facilitation methods and new data sources to improve labour market data.

We are well aware that advances in job matching are only a small part of the multiple drivers of economic and employment growth in developing economies. However, we believe that effective data driven job matching can greatly contribute to enhancing and optimising such growth. Given the limited structures currently in place for the dissemination of labour market information, further steps in that direction can greatly facilitate the processes of job searching by individuals and vacancy filling by firms. This can increase the productivity of firms and the levels of employment and their working conditions, with clear positive effects on economic and employment growth.

The strategy of this report (Section 3) is to sketch the current state of matching supply and demand in labour markets. It discusses methods and means of matching, the various old and new matching facilitators, the enhancements and resulting complexities of an increasingly data driven labour market and incorporates influencing the economy and other factors and modalities that interplay with the matching process. This sketch acts as a toolbox of elements to select from when we question the effect of new data sources in the TVET context in developing countries as well as a source of cautionary tales since the long history of job matching in the developed world is full of pitfalls with high pedagogical value. Our report then presents two developing country case studies, Mozambique (Section 4) and Mongolia (Section 5), focused on the description of their labour market information systems and their potential for TVET development. Informed by the two case studies, an analysis of the current situation, and expert feedback and stakeholder testimony, we formulate ideas regarding which type of (possibly) data driven facilitation of job matching might be suitable in the context of developing countries (Section 6).

3. Job Matching Facilitators and Data

Since the seminal works of G. T. Stigler, information is central to the way we study markets as the strategic behaviour of both labour supply and demand depends on the specifics of information asymmetries. For instance, Search and Matching Theory, originally developed by Nobel Prize winners Peter Diamond, Dale Mortensen and Christopher Pissarides, is undergoing a new impetus today due to the emergence of online markets as we record ever larger parts of socioeconomic life, all of which are of course central to the working lives of people. For research and policy purposes, the advantages of these novel online markets include the recording and replaying of market behaviours in order to better understand their challenges and opportunities for further optimisation.

With the onset and acceleration of digitisation taking place against the backdrop of rapid growth in Information and Communication Technology (ICT), more and more of socioeconomic life takes place online. Established markets are now online and new markets are born exclusively online, taking advantage of the penetration of ICT in daily life and the superior properties of ICT systems in documenting market functions. The core function of markets, the matching between supply and demand, is now more than ever data-driven and markets can increasingly be studied and understood using the data generated. This is administrative data in the sense that it is a by-product of an activity, job matching between supply and demand, and it is not a product of solicited surveying of sampled individuals.

3 Jacques Charmes’ comments in the meeting nicely identified, for example, some of the caution warranted in this sense (e.g. the danger of indecent work in the context of temporary work agencies or bogus self-employment in the context of the platform economy etc).

4 (Stigler, 1961), (Stigler, 1962)
5 (Askitas & Zimmermann, 2015)
At the same time, new market players and market facilitators emerge. In the case of the labour market in particular, search and matching activities are now occurring on top of higher dimensional data describing both supply and demand of labour. Hard and soft characteristics are being recorded and evaluated, ranging from formal classification systems to more ad hoc faithful representations. In this rapidly changing environment, everything changes and adapts simultaneously: employment and work relationships, the very definition of a job, social dialogue, institutions, and methods and facilitators of matching are all dynamically intertwined and often (and increasingly) supported by algorithmic, automated processes. This new data driven job matching is affecting the strategic behaviour of market participants. Therefore, while we get new chances to understand old questions, we are also at the beginning of formulating new ones.\textsuperscript{9,10}

Day labour hotspots on urban street corners; meeting points in rural areas; newspaper classifieds; headhunters; temporary work and outsourcing agencies; and online platforms are collectively summed under the term “Platform Economy” (or “Gig Economy”). Commercial online job boards; official employment offices; information from relatives, “analogue” friends or “digital” friends on social media; and networks, constitute a rough classification of the different ways in which the matching of supply and demand in the labour market is being facilitated across the world. Without attempting to be exhaustive, this report discusses these various methods in detail to initiate a better-founded discussion of what might apply for developing countries.

The number and nature of the parameters at play make this topic both interesting and impossible to treat in full detail within the confines of this report. Firms and workers possess different objectives, motivations, strategic behaviours and are subject to information asymmetries. Specific labour market conditions and country characteristics such as the educational system, institutional and regulatory frameworks and technological considerations such as internet access and penetration, cultural aspects (e.g. privacy), the structure of the host economy (e.g. sectoral composition) and the state of the business cycle as a whole all must be taken into consideration in such a discussion.

This section discusses various ways of matching supply and demand in the labour market. It also looks at how matching affects the labour market and its institutions and how it interacts with the regulatory framework.

Data considerations will be central across the discussion, ranging from the data models used to describe workers and their skills, firms and job openings to how operational or so-called “exhaust” data is being generated. These various forms of matching might be used to understand labour markets and design policy interventions.

### 3.1 Day Labour Hotspots

Some of the ways in which markets develop and evolve follow a biological evolutionary format. For example, supply and demand in the labour market may find each other without planned or systematic intermediation or other sophisticated enhancements. This is seen in the spontaneous emergence and persistence of day labour sites across the globe, even today. These offline sites then become a form of intermediation in their own right. In 2005, there were about 400 day-labour sites in the USA\textsuperscript{8} and today, they can be found in German metropolitan areas\textsuperscript{9}. As recently as 2005, Home Depot stores, a large home improvement supplies retailer, attracted day labourers in the US in a "parasitic" manner.\textsuperscript{10} Day labourer sites are highly informal forms of matching labour supply and demand. In developed countries, they often

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\textsuperscript{9} (Kuhn, 2014)
\textsuperscript{10} (Fabo, 2017)
\textsuperscript{8} (Day Laborer Battle Runs Outside Home Depot, 2015)
\textsuperscript{9} (“Arbeiterstrich” in Köln: Schwerarbeit für einen Hungerlohn , 2017)
\textsuperscript{10} It is interesting here to note that the recent acquisition of the platform Taskrabbit by IKEA is the formalization of this parasitic relationship to a more “symbiotic” level taking it to the digital era (Why is Ikea buying TaskRabbit? Think about it, 2017)
attract illegal immigrants, causing various disturbances and are characterised by exploitation and precarious work. They are nonetheless the simplest form of job matching because the tasks are simple and menial and the only data necessary is that of visual inspection. In settings where labour market informality is de facto prevalent, as in developing countries, such day labour sites might even have a positive effect in matchings labour supply and demand in a timely and efficient manner. In these cases, vocational training takes place almost solely in the form of experience and data retention might work in the form of reputation spread from word of mouth. It is important to note that contrary to popular belief, technological progress does not replace old forms of facilitation with new ones but rather creates an even changing, cumulative mix of such methods applied in the contexts they fit best.

3.2 Temporary Work Agencies

A further form of enhancement or mediation between labour supply and demand are temporary work agencies\textsuperscript{11}. Such agencies hire temporary workers and facilitates their placement with firms in a temporary or temp-to-hire basis. The agencies' main contribution to the enhancement of the matching process is to screen workers and to offer them permanent employment (if not contractually at least de facto in terms of frequency of employment opportunities) while freeing employers from this type of cost and risk. The benefits for both the demand and the supply side are obvious\textsuperscript{12}. While on the one hand temporary work agencies remove the burden of permanent employment from the employer, they are also able to remove the uncertainty from the temporary worker. In a rapidly changing and mutating labour market, traditional job descriptions are becoming increasingly obsolete as tasks and skills become liquid. The traditional aggregation of skills into a designated qualification or of tasks into a formal job description are no longer valid. Thus, a temporary work agency assumes the entrepreneurial risk of reducing the mismatch. The data generated in this area, which is unfortunately proprietary in many cases, ought to contain information useful for the understanding and evolution of skills and tasks in the labour market. Vocational training (cumulative experience) takes place when workers are being employed into temporary positions and can be well documented and essentially used to recompose worker profiles more adaptable to a dynamic labour market. This efficiency differentiates such agencies from other facilitators and powers their business model.

3.3 The Platform Economy

A more recent, relatively small\textsuperscript{13} but rapidly growing (Error! Reference source not found.), type of intermediation between supply and demand with a peer-to-peer model is the so-called platform economy. Driven by digitisation, platforms do matching of skills to tasks on any level of granularity (in terms of duration or scope of commitment to the task) in any kind of market. Their claim is the ability to allow the worker to leverage and monetise both unused labour as well as unused capital. Since the tasks and the commitments are very specific, supply and demand can be matched outside classical forms of employment. They often have a massively data driven back-end, which is made accessible via web services and smartphone apps to target participants. They enter markets based on business models driven not by a particular knowledge of the respective sectors but by their ability to use technology in order to increase speed, efficiency and quality in the matching process. Platforms are also an illustration of the ‘sharing economy’ in that they mobilise resources that are not fully used, including the time of under-employed or unemployed individuals. For example, Uber is the natural outgrowth of the fact that everyone has a smartphone with an affordable data plan, every smartphone has a GPS, there is a good amount of inactive capital in the form of unused cars, and access to Google maps via an API is free. These ingredients and an appropriate data driven back-end are a recipe for disruption in the Taxi business.


\textsuperscript{12} (Spermann, 2013; Spermann, 2013)

\textsuperscript{13} (Bonin & Rinne, 2018) find that in Germany the phenomenon is on the border of detectability. Other studies appear to overestimate the size of the phenomenon (Huws, Spencer, Syrdal, & Holts, 2018). Ironically data on the incidence of this phenomenon is scarce.
10 | Labour Market Data Sources

**Figure 1** World Wide, the interest for Uber has rapidly grown and surpassed soccer related interest, a popular topic.

Such platforms monetise idle capital (e.g. Airbnb) or labour (e.g. microwork - in the general sense of a task which is completed in small amounts of time from seconds to days), benefit from network effects after they dominate a market and replace or widen the concept of a job. These platforms often challenge existing regulatory frameworks by introducing new forms of employment and initially thriving on a sort of regulatory arbitrage. Typically, after initially being caught off guard, stakeholders such as trade unions push back and a period of adjustment follows. The business models of such platforms might range from offering an otherwise neutral platform in which market participants interact with each other freely to offering any number of enhancements from search assistance all the way to completely offering ratings, recommendations or payment systems. A user of such a platform might work for, with, on or via the platform and the relationship of the user to the platform itself is often contested. Disputes often include worker status, which could be described as self-employment, temporary work, open-ended, full-time, consumer, etc. Worker benefits include flexibility, specialisation, and independence in time and space, etc.

These platforms are data driven and generate micro-data with a high value for the understanding of many aspects of the labour market. They represent a challenge for policy making and are both the result and cause of disruption in the technology sector as well as in the labour market. Their ability to become a primary form of employment for individual workers is rather limited and their impact to the overall offline labour market is rather limited (e.g. in the EU). Such platforms are thought to at least compete with temporary work agencies. It is important to note that the platform economy is becoming increasingly significant in the developing world and might become a significant source of data for understanding its labour markets.

### 3.4 Job Boards

Job Boards come in the form of services offered by official, national and supranational employment offices (in many cases managed by Public Employment Service agencies, see Error! Reference source not found.) or in the form of commercial services (Error! Reference source not found.) which themselves come with different business models or features and enhancements of the matching process. The history of private job boards is long and full of controversy, the first recorded mention of one being in the mid-sixteen hundred's,

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14 The first author is involved in an ongoing research project, commissioned by the European Commission, studying Industrial Relations in this context. We are documenting, among other interesting things, the emergence of the first workers’ councils in the platform economy, the first legal action between supply and demand of labor as well as the new digital forms in which workers organize themselves in this new area dominated by the absence of physical headquarters and workplaces. (IRSDACE: Industrial Relations and Social Dialogue in the Age of Collaborative Economy, 2018)

15 [De Groen, Lenaerts, Bosc, & Paquier, 2017]

16 (Impact of the collaborative economy on the labour market, 2018)

17 [De Groen, Masielli, & Fabo, 2016]

18 https://www.ceps.eu/system/files/SR138CollaborativeEconomy_0.pdf

19 [Lenaerts, et al., 2018]

20 [Graham, 2018], [Heeks, 2018]

21 E.g. (EURES - The European Job Mobility Portal, 2018)
and the regulated and widely accepted form in which we know them today is a rather recent development\textsuperscript{22}. Public employment offices can match individual micro data following registration and profiling with other types of data, including labour outcomes (before or after registration), unemployment benefits, and active labour market policies, including employment and publicly funded training programmes. Employment offices differ from commercial job boards. While they often have limited digital aspects, they feature more pronounced offline intermediation, in the form of an employment advisor assigned to unemployed workers.

**Figure 2** Interest for "Unemployment Office" peaks during the 2008 recession in the US.

Commercial facilitators might charge fees to the supply and/or the demand side and they offer various types of services to both sides, which range from job search assistance to rankings, recommendation systems, CV optimisation or writing job descriptions. It is worth mentioning that job description services may range from publications on the “art and science” of writing a job description\textsuperscript{23} all the way to more elaborate and systematic position classification systems, like the Monster Position Classification and Position Description Systems\textsuperscript{24}. In these cases, hiring firms get a chance to post a vacancy formulating the tasks it entails and/or the skills they consider necessary while candidates get a chance to represent their skills in various ways. The services delivered by the matching firms might include sophisticated semantic search and matching with the use of AI and Big Data (e.g. https://www.textkernel.com/). Job Boards, like platforms, might vary from highly specialised ones to more general, from high skill to low skill, and they often act globally\textsuperscript{25} - as the marginal cost of being present in an additional country can be little more than an entry in a database. Possible sources of additional cost might come from market research, regulation, advertising or knowledge of language or cultural specificities.

**Figure 3** Interest for the commercial job matching facilitator glassdoor.com surpasses "unemployment office” in 2012.

These matching firms have invaluable data for the study of many labour market questions. The data resulting from these (and any other) systems depends on the classification and description systems used. In the face of a rapidly changing labour market where job descriptions change with the introduction of new

\textsuperscript{22} (i Romero, 1976)

\textsuperscript{23} E.g. (How to Write Great Job Descriptions, 2018)

\textsuperscript{24} (Welcome to Monster Position Classification (PC), 2018)

technologies, the ability to evolve a job description in a timely and non-labour intensive manner is crucial. This is at the heart of the business model of commercial job boards. In one way, the ability to formulate job descriptions in an efficient manner in the labour market is similar to occupational classification standards\textsuperscript{26} in the statistical world. One of the downsides, despite a high degree to digitisation, is the difficulty to count openings across job boards (multiple postings of the same job). The data is proprietary and while many of these firms do their own research, access to the data, especially for independent academic research, remains rather limited\textsuperscript{27}.

\textbf{Figure 4} Growing Google search interest for the website of the job board https://www.indeed.com

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{indeed_search.png}
\caption{Growing Google search interest for the website of the job board https://www.indeed.com}
\end{figure}

\section*{3.5 Social Media}

In recent years, social media such as Facebook or LinkedIn, and the networks people build in them are also playing an increasingly important role in the labour market\textsuperscript{28}. Firms and workers showcase themselves and network among each other, creating new structures of information flow and strategic labour market behaviour. Headhunters, in particular, use such sites to acquire potential job candidates and place them in vacancies. Often, these social media sites are well aware of the potential of their data for research purposes and actively invite research projects\textsuperscript{29}. In social media, we are witnessing a new online version of former personal networks of families and friends and its extensively studied role in job matching (Tatsiramos & Cappellari, 2015).

\textbf{Figure 5} Comparison of Google search interest, over time, for the websites of Indeed and LinkedIn

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{indeed_linkedin_search.png}
\caption{Comparison of Google search interest, over time, for the websites of Indeed and LinkedIn}
\end{figure}

\section*{3.6 Mixed Mode}

One of the challenges of digital enhancements in job matching in general is that access to technology is decisive. There are many ways in which access gaps might be mitigated. For example, in the UK and the US, many public libraries have been offering free CV writing services in addition to access to computing facilities and the internet. In the time of the Platform Economy and online Job Boards, they are a kind of locally acting analogue agent for a globally reaching digital platform. In some sense, both headhunters using social

\textsuperscript{26} E.g. the BLS’s (Standard Occupational Classification, 2018), the ILO’s (ISCO - International Standard Classification of Occupations, 2018) or other national standards.

\textsuperscript{27} The first author is currently organizing a more systematic approach to bringing research and job boards together (IDSC of IZA Workshop: Matching Workers and Jobs Online - New Developments and Opportunities for Social Science and Practice, 2018).

\textsuperscript{28} At the time of this writing the effect of the Cambridge Analytica affair on such platforms is still unfolding. It is safe to assume that the impact will not be negligible especially as the (EU - GDPR, 2018) enters the picture.

\textsuperscript{29} E.g. (The Economic Graph, 2018)
media and real-life relationships with customers or employment offices are essentially analogue facilitators of online access. Within the platform economy, the localisation of global platforms, as seen in the emergence of eBay or Airbnb professionals, might offer an insight into how to introduce online job boards and platforms that bridge the digital divide with locally acting representatives.

3.7 Apprenticeships: demand informs supply

In addition to these rapid changes in the matching of supply and demand in the labour market, we must not neglect to mention old and proven best practices in informing the supply of skills at an early stage by the demand for it. In the case of Germany, vocational training in its various forms, including the newer “dual studies”, which are part vocational part academic, appear to have a positive effect on the labour market. Together with a number of other factors, they appear to have allowed the country to come out of the Great Recession relatively unscathed, currently enjoying moderate wage increases, decreasing unemployment and increasing participation rates. Of course, even here there is a niche market in itself where supply and demand (for e.g. dual study opportunities) seek each other online.

Figure 6 The dynamics of the search for dual study opportunities, a mix of vocational training and academic studies, in Germany.

4. Case Study: Mozambique

4.1 Mozambique Background

Following a long and damaging civil war that ended in 1992, Mozambique entered a period of significant growth, spurred by foreign direct investment in extractive industries. Mozambique is still, however, one of the poorest countries in the world, with an estimated annual GDP per capita of less than 700 USD in nominal terms and not more than twice as much in PPP terms. It currently is in the bottom 10 countries in the world in terms of the Human Development Index.

Mozambique’s growth potential is based on several factors, including its youth population. In 2015, out of 26 million inhabitants, five million Mozambicans were estimated to be between the ages of 15 and 25 and therefore pursuing their transition from education to work. Over 11 million individuals were 14 years or younger and thus expected to enter the labour market in the next ten to fifteen years.

The population of working age (12.4 million as of 2015) individuals is concentrated in rural areas (eight million). The population is spread relatively uniformly across the 11 provinces of the country (plus the capital city, Maputo), with between one and two million inhabitants in all cases except Nampula and

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30 (Schneider & Rinne, 2018)
31 The second co-author thanks Ms Assa Guambre (Ministry of Employment of Mozambique) and Mr Frederico Silva and Mr Tiago Borges Coelho (both from UX) for many helpful discussions on labour market data in Mozambique. This document used as sources a number of documents available publicly or made available by multiple stakeholders, including research visits to Mozambique in 2015 and 2016 by the second author in the context of a scoping project supported by the International Growth Centre (LSE, University of Oxford and DFID) on ‘Developing Vocational Training in Mozambique’. All errors are the authors’.
32 (Human Development Index (HDI), 2018)
Zambézia provinces, each with around five million inhabitants\(^{33}\). Fewer than three million individuals have attained secondary school or above. Nearly four million individuals are estimated not to have attended school at all. Schooling quality is also estimated to be low, particularly in rural areas.

Unemployment as of 2015 was estimated at 2.2 million individuals or 20.7\% of the reference active population, according to the (relatively broad) national definition.\(^ {34}\) The unemployment rate was 29.4\% in urban areas and tended to be significantly higher amongst women. It decreases significantly with age, ranging between 46.2\% for those aged 15-19 and 9.8\% for those aged 55-59. On the other hand, the unemployment rate increases with schooling, from 15.2\% for those that have not completed the basic level to 32.6\% for those with secondary schooling or above. This relationship between schooling and unemployment reflects the increasing schooling attainment of younger cohorts, the expectations that schooling generates in school to work transitions (in particular in urban settings), and the challenges currently faced by education and training systems and labour markets in matching demand and supply of labour. Indeed, there is considerable albeit sometimes anecdotal evidence of businesses that are not able to find suitable skilled labour, particularly with specialised skills. Multinational firms are perceived to make widespread usage of expatriates when filling skilled positions and, with a few exceptions, some invest little in the training of local workers, particularly in the case of one-off or short-duration projects.

Mozambique has commercially important deposits of natural gas, coal, graphite, iron ore, titanium, copper, gold, and other minerals and natural resources. Some of these are already being explored, namely by a number of ‘megaprojects’ in the extraction industries; several new projects are also expected to be launched over the next years, depending on the prices of these commodities in international markets. Further growth is also expected to occur in other sectors, such as agriculture, fishing, construction, energy, transportation and tourism.

4.2 Sources of information - The Labour Market Observatory

The Labour Market Observatory (‘Observatório do Mercado do Trabalho’) in Mozambique is a public agency based at the National Directorate of Labour Market Observation, in the Ministry for Work, Labour and Social Security (MITESS). The Observatory was launched in February 2016 and its goal is to increase information about labour market issues, to improve the capacity of the Government and other stakeholders on the ‘design and implementation of the employment policy’, based on the ‘analysis of accurate data on employment, training and socio-economic trends’.

The Observatory was supported, in part, following an agreement between the Government of Mozambique and the African Development Bank (ADB), which was signed in 2015. ADB provided a grant of 0.57 million UA (740,000 USD) for Mozambique to establish a labour market information system. The components of this grant included: the supply of IT equipment for the electronic data platform to enable the preparation of annual statistical reports on the structure of the labour market and the economy; training of micro, small and medium enterprises on how to use the IT platform; supply of IT equipment for the modernisation of employment centres in Niassa and Zambezia (including services, internet access and computers);\(^ {35}\) training for the technical staff operating the job centres in Niassa and Zambezia; supply of IT equipment, vehicles and trailers for mobile employment units.

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\(^{33}\) The territory is also divided in 128 districts, 394 administrative posts, 1,072 localities and 10,025 villages.

\(^{34}\) This definition includes seasonal and occasional workers, the self-employed that did not work for economic reasons (lack of inputs, capital, etc), agricultural workers that did not work for economic reasons, and family workers that did not work, in the reference period (categories A, B and C).

\(^{35}\) Internet penetration in Mozambique is relatively low, with 17.3\% of the population as internet users and 5.9\% Facebook users (Internet World Stats - Africa, 2018).
The Observatory has also identified a number of partner organisations within the public sector that can participate in the LMIS, namely:

- The Ministry of Public Administration (‘Ministério da Administração Estatal e Função Pública’);
- The Ministry of Education (‘Ministério da Educação e Desenvolvimento Humano’);
- The Ministry of Science, Technology, Higher and Vocational Education (‘Ministério da Ciência, Tecnologia, Ensino Superior e Técnico Profissional’);
- The Ministry of Industry and Trade (‘Ministério da Indústria e Comércio’);
- The Province directorates of Labour and Social Security (‘Direcções Provinciais do Trabalho, Emprego e Segurança Social/Centros de Emprego’);
- The National Statistical Agency (‘Instituto Nacional de Estatística’);
- The Foreign Investment Promotion Agency (‘Agência de Promoção de Investimentos Estrangeiros’);
- The National Institute of Social Security (‘Instituto Nacional de Segurança Social’), including data on the number of social security registered workers and the average pay by industry;
- The Confederation of Economic Associations (‘Confederação das Associações Económicas’);
- The Commission for Labour Mediation and Arbitration (‘Comissão de Mediação a Arbitragem Laboral’);
- The National Directorate on Migrant Labour (‘Direcção Nacional do Trabalho Migratório’).

Currently, the main partner of the Observatory is the Statistical Agency.

The Labour Market Observatory is now publishing quarterly and annual reports (‘Boletim trimestral’ and ‘Relatório annual’) that present a number of statistics, described below. These reports cover the latest developments in the labour market and comparisons with previous periods, including breakdowns by industries and regions (provinces, municipalities and districts) when feasible and appropriate, and by employment and training dimensions. These reports draw on data made available by other agencies of the Ministry of Labour (namely jobcentres and training centre agencies, the social security agency, as well as the labour inspectorate) and other entities, including the Statistical Agency, and the Agency for the Promotion of Investments and Exports (APIEX).³⁶

The latest quarterly report (n. 4) was published in April 2018 and presented the fourth quarter (October-December) of 2017.³⁷ It was conducted in partnership with the Eduardo Mondlane University (Economics Faculty). In one of the main statistics, the report indicated that in that quarter, the number of new registered formal jobs (hirings) was 81,445. This represented an increase of 15.7% compared to the same quarter in 2016 and a drop of 31% compared to the third quarter of 2017.

The main components of this main variable are ‘direct admissions’ (27,154), followed by ‘other funds’³⁸ (19,757), self-employment (8,367), ‘hirings by private employment agencies’ (7,735), ‘hirings of foreign workers’ (5,628), and ‘hirings for the mines of South Africa’ (5,454), in a total of 15 components (also including PES placements (2,063)). The information on new formal hirings can also be broken down by province and industry. Maputo (City), Nampula and Zambezia are the most important provinces in this respect, with over 13,000 hirings in each case. In terms of industries, the most important are Construction (7,881), Agriculture (6,366), and Retail (5,757).

³⁶ It is not clear if the data is collapsed into tables at the Observatory or if this process is conducted by each agency that collects the original micro level data.
³⁷ The report itself could not be found online. The text corresponds to the content of news articles on the release of the report.
³⁸ This refers to a number of public agencies that promote development in particular areas and monitor the number of jobs created in that context. Some of the most important funds include FAIJ (Fund to support youth initiatives), FDA (Fund for agricultural development), FDD (Fund for district development) and FFP (Fund for fishing support) which have their own categories in the report.
The number of formal employees registered in the social security system was 460,229 as of the 4th quarter of 2017, corresponding to a decline of 5.5% when compared to both the previous quarter of 2017 and the same quarter of 2016. Maputo city accounted for 164,985 registered individuals alone. The total number of social security registered self-employed individuals was 3,776 in the 4th quarter. There were 42,637 social security registered employers in the same period.

A total of 79 investment projects were approved in the 4th quarter, corresponding to 3,803 jobs. The main sectors were ‘Services’, ‘Tourism’ and ‘Manufacturing’ and the main locations were Maputo (province) and Inhambane.

The report also provided information about a number of active labour market policies that are currently being implemented by the Ministry of Labour and other entities. For instance, 1,977 individuals were in traineeships in the 4th quarter of 2017, of which 665 were placed in firms with employment contracts in the same period. In addition, 1,015 individuals became self-employed following support from PES. Job centres registered 2,105 vacancies in the same period, having conducted 2,063 placements.

Moreover, at the end of the fourth quarter of 2017, there were 179,018 registered unemployed jobseekers, of which 45,730 were women and 90,921 were searching for a first job.

As mentioned above, the Observatory also provides information on migration data, an important component of the LMIS. In the case of immigration, authorities are concerned about the loss of job opportunities for Mozambique nationals, in particular in the context of foreign direct investment. Foreign workers are subject to quotas, of a maximum of between 5% and 10% of all workers in the firm (5% in the case of a large firm, with more than 100 workers, and 10% in the case of a small firm, with 10 or fewer workers). These limits are not applicable in the case of investment projects supported by the government or short placements, and are also subject to specific requirements in the cases of the oil and mining industries.

In the case of emigration, there are important flows of permanent or seasonal migration to farms and mines in South Africa. The latter have created diplomatic incidents in the past, given the opposition of groups of workers in South Africa to the competition created by Mozambican workers.

More generally, the Labour Market Observatory is introducing an electronic platform to better manage the labour market information system database, currently available at http://mlmis.info/. This platform is likely to be based on three components: schooling, demographics, and the labour market. According to the current plans, the labour market component will be based on the following 11 indicators: Rate of Activity (Sex, age, active population), Employment Rate, Employment by occupation, Weight of Employment by sector (Primary, Secondary, Tertiary), Part time workers, Hours of work, Unemployment rate, Weight of Long term unemployment, Unemployment rate by level of qualifications, Underemployment rate, Rate of inactivity, Vacancies, and Wages. 39

The Labour Market Observatory also conducts analysis of vacancies, using data collected from newspapers and online jobs portals. A recent analysis was based on the vacancies posted by newspaper ‘Jornal Noticias’ and the website ‘https://emprego.mmo.co.mz/’ between January and March 2018, leading to the (manual) collection of more than 1,500 jobs. 40 The analysis indicated that over a quarter of the vacancies concerned

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39 There is no reference to disaggregation by skills but this may be feasible. The schooling component will be based on the following indicators: Net basic schooling rate, Secondary school coverage, Secondary school coverage at beginning and end of school year, Pupils at the end of school year, Passed students, School achievement rate, Annual drop-out rate, Failure rate in relation to students enrolled, Gross completion rate, and Students-teachers ratio. The demographics component will be based on the following indicators: Population, Effective growth rate, Natural growth rate, Migratory growth rate, Population density, Life expectancy, Dependency ratio, Net migration rate, and HIV status of the work force.

40 It is unclear if these 1,500 jobs were all that were posted or published in the two outlets mentioned or only a sample of those.
the city of Maputo, followed by Cabo Delgado and Inhambane provinces. The most important sectors were Education and Health; education requirements focused on university degrees (46%) and secondary diploma (24%); 83% of the vacancies required experience and 65% required knowledge of English.

Finally, in terms of its human resources, the Observatory currently has five employees, one with a Master’s degree (and considerable previous experience at the Statistical Agency), three with university degrees, and one with a secondary school diploma. Its current main function is monitoring indicators. A recent plan, written by an international consultant for the International Labour Organisation and submitted in December 2017, proposes a significant increase in the human and technical resources of the Observatory.

4.3 Employment and training services

We now consider another key stakeholder in the labour market, Instituto Nacional de Emprego (INEP, National Institute for Employment), the Public Employment Service. This service was created in 2016, following the separation of the former INEFP which delivered both employment and training services. INEP’s goals are to deliver free labour market matching services, career information and guidance, traineeships, and labour market information.41

Its services are delivered through a network of 25 employment centres, with the following geographical distribution: Niassa (2 centres); Cabo Delgado (2); Nampula (3); Zambezia (2); Tete (2); Manica (2); Sofala (4); Inhambane (3); Gaza (3); Maputo Province (1); Maputo City (1). According to the data provided by the Observatory, these 25 job centres currently have 128 officials or about 5 officials per centre, on average. Also on average, the job centre officials are 40 years old, have 12 years of tenure, and are 48% are females.

An important recent development concerns the launch, in March 2018, by the Ministry of Employment of an online jobs portal, located at http://mitess.gov.mz:9083/inep/public/renderPage?c=home.page. At the end of May 2018, the portal displayed 14 vacancies and 2,350 jobseeker registrations. There are also a number of registered private employment agencies, with the following geographical distribution: Maputo Province (4 agencies); Maputo City (17); Sofala (1); and Cabo Delgado (1). There may be a larger number of private employment agencies that are not currently registered and operate informally or are focused on different services, including training.

Training delivered by the Ministry of Labour is now conducted by the new ‘Instituto de Formação Profissional e Estudos Laborais Alberto Cassimo’ (IFPELAC) public agency, which was created in November 2016 (law 47/2016), following the new structure of employment and training services mentioned above. Between 2015 until mid-2018, 436,273 Mozambicans benefitted from training, according to the statistics of the Ministry of Labour. To our knowledge, these programmes have not yet been evaluated, whether through counterfactual or other approaches.42 In the last quarter of 2017, 42,804 individuals attended vocational training, 62.7% of which in private training centres.43 (See Table M1 for more information on training activities across different types of centres and by different individuals.)

In some cases, training is delivered in partnership with some of the multinationals that are operating in Mozambique, in particular in the mining sector. For instance, in June 2018, the Training Agency (IFPELAC) signed a memorandum of understanding (MoU) with an Australian mining company (Twigg Exploration &

41 See Mwasikakata and Martins (2017) for a number of recommendations for the modernisation of the public employment services of Namibia, including its online jobs portal.

42 Ministry officials have attended training workshops on active labour market policy evaluation in 2017 and 2018 and may conduct or commission studies in the future. Some anecdotal evidence indicates that some of the training programmes delivered by the Ministry do not fully meet the needs of private sector employers, in terms of quality or match to their skills needs.

43 These include training providers associated to firms such as Maragra, Xinavane, Certilor e Mozal.
Mining). The latter explores graphite mines in the Cabo Delgado province, in a concession lasting for 40 years, and employs approximately 2,000 workers (construction stage). The MoU involves the construction of a training centre in the region, which will support over 100 trainees per year over a period of at least five years, in the areas of industrial maintenance, construction, machine operation, and logistics.

TVET activities have been conducted in the context of the ‘Integrated reform programme of vocational and technical education’ (Programa Integrado da Reforma da Educação Profissional, PIREP). Its Development Objective is ‘to facilitate the transition to a demand-led training system and provide the beneficiaries with more market relevant skills and improved economic opportunities’. PIREP has four components: Development of an Institutional Framework, Standards-based Qualifications and Training System, Quality Improvements in TVET institutions, and a Skills Development Fund (FUNDEC). To our knowledge, there are no formal evaluations of the performance of the TVET system but many individuals consider that it is facing a large number of limitations, both in terms of quantity and quality of the training and in terms of the matching with labour demand needs.44

According to the 2015/16 Labour Market Information report, there were 140 technical education schools in Mozambique (of which 67 were public) and a total of 67,000 students (of which 42,500 in public schools). In contrast, there were 97 schools and 45,679 students as of 2010, indicating significant growth over the period.

As in the case of vocational training delivered by the Ministry of Labour, there is currently little information about the labour market outcomes of participants in these programmes (see, however, a brief qualitative case study below). It is also unclear the extent to which training centres tend to respond effectively to changes in labour demand and its skills profiles.

4.4 Additional data sources

The last full labour force survey was conducted in 2004/2005. Since then, other surveys (such as the Household budget survey, 'Inquérito aos Orçamentos e Rendimento Familiar', conducted in 2014/15, 2008/09, 2002/03 and 1996/97 by the Statistical Agency) have included a labour force component.45 The next full labour force survey is expected to be conducted in 2019, depending on the budget available. This pattern of irregular or even infrequent labour force surveys is not uncommon in Sub-Saharan Africa, especially for countries of different economic development levels such as Ghana, Kenya, Namibia and Zambia, for instance, given the significant cost and administrative complexity of such nationally representative surveys.

The labour market information system also receives inputs from ‘Folha de Relação Nominal (FRN)’ (a detailed list of individual employees of each firm), ‘Sistema de Gestão do Fenómeno Migratório (SIMIGRA)’ (a record of migrant workers), and ‘Sistema de Informação da Segurança Social de Moçambique (SISSMO)’ (Social Security date). These three systems may be interlinked over the internet in the near future. The FRN system can be fed individually by firms over the internet (see Table M3 for information on some of the codes to be used by firms when providing individual information on their employees).

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44 A number of international agencies that are based in Mozambique meet regularly to discuss TVET matters in the country. They are listed in Table M5. Table M6 lists the studies that have conducted recently.

45 The Household Surveys indicate significant improvements in well-being over the 20-year period covered, despite concerns about data quality. However, large disparities between urban and rural areas and between the South and the North of the country persist (or have even increased). Inequality in consumption has also increased. Poverty rates (defined based on consumption levels below a basic level) are estimated to be between 41% and 46% (or about 12 million people), ranging from 60% in the Niassa province and 11% in Maputo (City). The Gini index was estimated at 47%. The survey was based on three interviews of 11,000 households in different quarters over a one-year period.
Moreover, a number of reports and studies on the Mozambique labour market have been released in recent years. These include ‘Mercados de trabalho em Moçambique face ao boom de recursos naturais’ ('Mozambique labour markets following the natural resource boom'), by Lynn Salinger and Caroline Ennis (2014); and ‘Emprego e transformação económica e social em Moçambique’ ('Employment and economic and social transformation in Mozambique'), by Rosimina Ali, Carlos Nuno Castel-Branco e Carlos Muianga (2017). At least two higher education institutions have also conducted reports on the employability and labour market outcomes of their graduates, including Universidade Pedagógica and Universidade Eduardo Mondlane.

In 2017, a survey of over 500 manufacturing sector firms was conducted by Eduardo Mondlane University, Copenhagen University, United National University (WIDER) and other organisations. This followed a previous survey conducted in 2012. The latest findings, released in April 2018, highlighted the negative impacts on employment following the 2016 and 2017 crisis, included in terms of job losses and wagebill cuts. Eduardo Mondlane University is also implementing a survey of 2,100 final year students on their transition to the labour market, in partnership with the Labour Ministry.

4.5 Online Job Portals - The Case of UX

UX Information Technology is a Mozambique technology firm that launched two innovative and successful online job portals in the country in 2014: emprego.co.mz and biscate.co.mz. ‘Emprego’ is an internet portal based on the posting of formal labour market vacancies by firms, the registration of (employed or unemployed) jobseekers and the subsequent matching between the two labour market sides. Firms above a given size are required to pay a small fee for the posting of their vacancies while smaller firms and jobseekers can use the portal freely. Workers and firms (vacancies) can enter information onto their profiles (education, experience, preferences, etc) in order to facilitate the screening. Matching, following an application, can also be conducted online by workers. As of the May 31st, 2018, ‘Emprego’ registered nearly 127,833 jobseekers, 12,837 (formal) vacancies and 1,608 firms.

‘Emprego’ is analysed in some detail in another study, ‘Clicking towards Mozambique’s New Jobs’. This study draws on the micro and very detailed data made available by the portal for research purposes, corresponding to over 15 million mouse clicks. The study presents evidence consistent with the high levels of unemployment and of underemployment already mentioned above. The findings are also suggestive of significant mismatches between labour demand and the supply of schooling and training, as well as of a ranking in terms of industry preferences by jobseekers.

‘Biscate’ is a more innovative portal, targeted instead at the informal labour market. As discussed above, the informal market is still prevalent in Mozambique, particularly but not only in rural areas. Moreover, it can be accessed online but also through mobile phones, including older models similar to those found in Europe in the late 1990s for instance, that cannot be used to access the internet but can serve as rudimentary interfaces through the selection of options in menus (USSD technology). This is very relevant, as many regions in Mozambique (and in other developing countries) do not have internet coverage (not even 2G or 3G) rendering more advance mobile phones useless in terms of internet access.


47 Other similar online portals include https://emprego.mno.co.mz/, http://emprego.infromoz.com/, https://www.olx.co.mz/emprego/, https://mz.gigajob.com/Todos-ofertas-de-emprego-tudo-Mo%C3%A7ambique. The second author has been conducting research work with UX since 2015.

48 The numbers presented here were made available by the owners of UX and or computed by the author based on microdata made available by UX in the context of an agreement established in 2015.

49 (Martins, 2017)
‘Biscate’ is an (informal) job board as it lists workers available to conduct a large number of pre-defined short-term occupations (air conditioning repair, gardening, plumbing, car repairs, hairdressing, cooking, sewing, carpentering, deliveries, electricity repair, painting, etc). As of April 30th, 2018, Biscate registered 59,355 self-employed individuals and 40,118 users. As registrations started on June 1st, 2016, the performance of Biscate can be said to be even better than that of Emprego, as far as registrations per month, at least on the labour demand side. This reflects not only the important of the informal labour market in Mozambique but also the innovative nature of the service delivered by Biscate.

When registering, workers also indicate the province and district of the country in which they are available or located as well as some additional background information, such as their schooling and experience. Workers provide a telephone number to facilitate the matching process. Moreover, users of these services can provide feedback on the quality of the services delivered by each worker, therefore reducing the information asymmetry between the two parties. Information on the number of unnoticed calls by workers is also available, which can be interpreted as a signal of individuals that are no longer participating in the platform. However, the portal cannot yet provide information about actual matches, at least when participants do not leave feedback on the other party following the delivery of a service. On the other hand, new features are being introduced, including the collection and dissemination of information about the costs of the services delivered. A partnership with training centres is also proposed, so that graduates of these centres can register in the platforms and provide information about the quality of the training delivered.

An interesting development made possible by Biscate concerns the (unintended) emergence of informal apprenticeships, also possibly spurring entrepreneurship and labour market formalisation. Given that the platform generates information about the most successful workers - in terms of ratings by users, for instance - some young workers registered in the platform are now contacting these more experienced workers with the idea of learning or improving their skills. The more experienced workers, although overwhelmed by the demand for their services in some cases, are usually happy to support the younger generation. As an experienced worker draws on the collaboration of a larger number of such informal apprentices, they may want to increase their level of formality and eventually even establish a firm.

More recently, UX has also launched a new skills-related tool (‘Numero’), a development programme from GIZ that aimed to train oil and gas technicians for 1,000 beneficiaries in the Cabo Delgado province. In order to select the best candidates for the training programme, ‘Numero’ delivered an efficient and affordable solution to register, test and select individuals for training. Within two weeks, Numero had already registered 11,000 candidates, significantly exceeding the original target of 5,000 individuals over a month. In the following month, 1,500 candidates had been tested, and SOGA was able to select the best 1,000 individuals to attend the training, based on the target profiles.

UX also develops additional software products, including Soma and Mopa. Soma supports saving groups whose members in agricultural communities in remote parts of the country commit to setting aside a given level of income during a given each period. Mopa is based on an interface that allows citizens in Maputo to report issues regarding the environment, garbage collection, and other related problems to the city council, and monitor the follow-up activities undertaken by the authorities. The two products, in particular Soma, not to mention Numero, can potentially interact with Biscate (and possibly Emprego), by linking work and saving activities.

4.6 The Metalwork Training Centre (CFPM) - A Case Study

CFPM (Centro de Formacao Profissional para a Metalomecanica) is a leading training centre in Mozambique, particularly in the manufacturing sector. It was originally set up by a trade union in the 1980s.

50 The second author thanks Mr Carlos Mucareia for discussing the activities of CFPM. All errors are the author’s.
In 1999, it became a dual tripartite organisation, led by the governments, trade unions and employer associations of both Mozambique and Portugal.

It currently offers twelve training programmes, in technical areas such as electricity, network maintenance and repair, welding, AutoCAD, technical drawing, milling, and metal cutting. The programmes include two-month practical traineeships at the end of the course, differing from the classical dual approach apprenticeships.\(^\text{51}\)

The courses typically involve 600 hours of study per semester, of which 80% tend to be of a practical nature. Entry requirements are typically the 10\(^{th}\) grade. The content of the training programmes is based on the Portuguese equivalent structures, with some changes to meet the needs of the Mozambique market.

Most trainees are young individuals looking for their first job. In some cases, participants are already employed and enrol to update their knowledge. Unemployed jobseekers are less common. Training fees are held between 5 and 12 thousand meticais per semester in 2016, or about 25% to 50% of the actual cost. The subsidy covering the difference is paid by the Governments of Portugal and Mozambique.

Graduates receive a certificate which is perceived to attract very good opportunities in the labour market. At the same time, the centre faces challenges in meeting the existing demand as well as in retaining instructors, due to the pressure from labour market demand in these areas. Occasionally, trainees leave the course before graduating as they are offered a job opportunity before completing their training.

4.7 Conclusions

As in the rest of the world, developing and emerging economies are increasing both their use and production of big data, particularly as it pertains to the labour market (jobs, skills, working conditions, etc). Despite the many challenges still faced by the country, Mozambique can also be said to be a part of this big data wave. Moreover, in some respects, Mozambique is leading the way, namely in the development of platforms for the informal labour market.

As indicated above, novel labour market data sets are pieced together, by both the public and private sectors. In the first case, a new job portal was launched, leading to a large number of jobseeker registrations over a short period of time. Although the portal has not yet delivered significantly in terms of job matching, given the low number of vacancies it has attracted, it is clear that this approach can contribute considerably to the provision of high-frequency quality labour market data.

A new public-sector initiative may also contribute to the generation of labour market information, namely the requirement of the annual (online) provision of detailed information on all employees of formal enterprises in the country. To the extent that compliance will be high and can be supported by appropriate staff numbers at the Labour Ministry, this initiative may also provide very useful labour market information, even if at a lower frequency than the online portal.

In the private sector there are other potentially useful sources of labour market data, including similar but so far more successful and more diversified online jobs portals. As the case of the UX technology firm indicates, these portals can attract a large number of both vacancy and jobseeker registrations and contribute to better, less costly, more equitable and faster matching.

Very importantly in the context of a country like Mozambique, in which over 70% of workers are estimated to have informal jobs, these portals can potentially cover both the formal and informal sectors. The

\(^{51}\) Unfortunately we were not able to collect data on the number of graduates per year.
information retrieved can also be made available for training and policy goals, including in terms of facilitating the provision of Technical and Vocational Education and Training (TVET) and addressing the shortage of skilled workers (especially amongst native individuals).

Given the experiences and case studies above, the establishment of digital TVET information systems that match and monitor the demand and supply of workers, appear to have significant potential to improve the skills base of the country in a sustainable way. These digital TVET information systems could operate in the context of legally binding training components as part of the tender process of large infrastructure projects funded by development banks or other international agencies.

5. Case study: Mongolia

5.1 Mongolia Background

Mongolia is a landlocked country in Eastern Asia. It became an independent country in 1911 and was led by a Soviet-influenced government from 1924 until the early 1990s. Mongolia is a unitary state comprising four layers of government. The Constitution of Mongolia (1992) establishes the system, including the requirement for decentralized governance systems in Articles 58.1 and 59.1. The country’s central government and its 3 sub-national levels consist of 21 aimags (provinces), 329 soums (sub-provinces) and 1559 bags (communities). The adoption of its democratic constitution in 1992 was followed by democratic elections in 1993. Since this transition, the country has been adjusting to a full market economy and ensuring its labour force is capable of operating independently in a modern economy. Importantly, Mongolia holds strong ties with China with over 80% of its exports going to China and approximately 45% of its imports coming from China. Mongolian development plans, therefore, must always keep up to date with China’s economic progress and prospects.

Mongolia has undergone a series of socio-economic and political transformations since its transition from a centrally planned economy to a market-oriented economy. While an upper-middle-income country in 2015, it swung back to lower-middle-income status in 2016. Lately, Mongolia experienced significantly low and weak growth as a result of declining demand for minerals. In fact, its economic growth has been slowing down since 2012, to 11.6% in 2013, 7.9% in 2014, 2.4% in 2015, and 1.2% in 2016. In addition to the decline in demand for minerals, the sharp decline in livelihoods in 2015-2016 could be attributed to the slowdown of the construction, professional, science and technology sectors outputs from 6.3% to 7.4% in 2016. A drop in the number of employees in the construction sector of 16,700 people was also reported, as well as zero increase in wages and pensions in 2015 and 2016.

However, a report published by the National Statistical Office (NSO) of Mongolia in 2018 shows that economic growth will remain solid in 2018 and 2019, despite the 2015-2016 economic downturn, building on 5.1% growth in 2017 led by industry and services.

Surprisingly, despite these performances over the past two decades, a joint report by the NSO and the World Bank estimates the poverty rate in Mongolia to be among the highest in the world. Reported to reach 29.6% in 2016 - it has known an increase of 8.0 percentage points since the 2014 poverty rate of 21.6%. This means that 907,500, out of a total population of 3.0 million people, were living in poverty. The country’s unemployment rate in 2018 stood at 9.7%.

In 2016 Mongolia adopted the goals of the Agenda for Sustainable Development, which calls for ending all forms of poverty, improving the tertiary and the vocational education system, promoting employment for the younger generation and placing greater emphasis on developing a knowledge-based society. This has been further reinforced by the 2016 adoption of the National Employment Policy, which is aligned with the 2030 Agenda for Sustainable Development.
With a population of around one million individuals, the 15-34 age group represent the largest demographic group in the country, constituting 34.9% of the population in 2015. The youth continue to face serious challenges accessing the labor market. According to the 2014 labour force survey, the rate of unemployment was 17.4% among young people. Many young Mongolians also experience a lengthy period of unemployment before finding a job. When they finally become employed, they might be trapped in the informal sector, which absorbs over 90% of the rural working youth and almost one-third of urban youth.

With limited opportunities and decent wages for its youth, the country struggles to decrease the overall levels of poverty and transition the national economy away from mining to new technologies and services. Youth are the driving force in achieving the Sustainable Development Goals (SDGs) by 2030 and the Sustainable Development Vision-2030 of Mongolia. However, according to the Mongolia Human Development Report 2016, the educated youth face a higher risk of unemployment in Mongolia. The rates of unemployment among young people with TVET and higher educational levels are much greater than the rates among young people with lower educational levels.

Given the demographic trends, youth will constitute 43% of the working age population by 2030, making their access to education and decent jobs one of Mongolia’s greatest challenges.

5.2 Sources of Labour Market Information in Mongolia

The National Statistical Office (NSO) is one of the main sources of labour market data and indicators, producing and publishing regular information about the working age population, its labour force and employed and unemployed people. Those indicators are generated from administrative data and sample surveys and published in different formats such as reports on Labor Force Survey (LFS), Surveys on Wages and Salaries, Monthly reports of the registered unemployed, and Statistical Overviews on Civil Servant Structure and Movements on an annual, quarterly and monthly basis. The NSO used to publish labour cost statistics collected from the Labor Cost Survey (LCS), which was conducted only once in 2012. In addition, in 2010, the NSO tested a Wage Structure Survey. In 2014, the Research Institute of Labour and Social Protection, part of the Ministry of Labour and Social Protection (MLSP), became responsible for labour cost statistics and is responsible for conducting the LCS once every three years.

Here is the list of Labour statistics data sources used by the NSO:

- Census
  - Population and Housing Census
- Sampling survey
  - Labor Force Survey (LFS)
  - Wage structure survey - 2010
  - Labour cost survey - 2013
- Administrative data
  - Monthly data on registered unemployed
  - Occupational accident, acute poisonings
  - Industrial dispute
  - Government employees of Mongolia

The LFS remains the most important source of labour statistics within the NSO. Mongolia first conducted the quarterly LFS in 2002-2003. The LFS was financially supported by the International Labor Organization (ILO) and conducted following international standards and methodologies. Since 2006, the LFS has been conducted on a regular basis and data is collected every month from selected households and compiled and disseminated on a quarterly basis, following amendments to the Mongolian Statistics Law of 2004. The geographic coverage of the LFS is Ulaanbaatar and urban and rural areas of 4 additional regions. The LFS provides a substantive amount of information to better understand how the labour market is functioning.
Unlike some developing countries, the LFS in Mongolia is believed to provide a reliable and regular source of data.

In addition to the NSO, the MLSP produces several indicators using administrative data collected from individuals and establishments through its regional offices. The National Employment Service, Research and Information Center (NESRIC), which was founded in 2015 under MLSP, is a major statistical body for labour market data. NESRIC absorbed the Centre for Employment Services (CES), Labor Exchange Central Office (LECO) and the Institute for Labor Studies (ILS). It also provides employment support services and employment support programmes related to the Employment Promotion Law and the Employment Promotion Fund for 21 aimags and the capital city of Ulaanbaatar. NESRIC’s Employment Research and Training Department is responsible for providing labour market information and conducting research and analysis of the employment situation in Mongolia. It also publishes annual reports based on surveys that are usually outsourced to private companies, thus illustrating a good example of a public private partnership.

In this section we did not attempt to provide an exhaustive list of all sources of data but only the most relevant to this study. There are several other sources of data and information including several surveys from which labour market and employment data are derived. In fact, reports such as those produced by the Institute of Labor and Social Protection Studies are also available:


2. Labor market demand barometer study - every year, nationwide - http://rilsp.gov.mn/studies-mn/labor/033/ (Mongolian)


5.3 The Labour Market Information System

The TVET sector in Mongolia in the 1990s and 2000s was not efficient enough to keep up with the demands of the country’s labour market due to weak system capacity and limited and outdated training equipment. The demand-driven training was largely absent and the qualification and certification systems were substandard. This situation led to the influx of skilled workers from other markets, mainly from China. At the same time, there was a high rate of unemployment among unskilled Mongolians, especially the youth.

Under the “Millenium Challenge Account-Mongolia (MCA-Mongolia): Labor Market Study in support of the TVET Project” (from 1st December 2009 to 14th June 2010) Cambridge Education Ltd. (UK), in association with MEC LLC (Mongolia), was contracted to provide technical assistance in support of the TVET Project to develop a comprehensive Labor Market Study. The study’s objectives were:
• Determining current and projected labor market demand and supply
• Identifying trends in labor market demand, including a trend analysis in wages/salaries
• Identifying skill demand by trade and occupation by means of a pilot gap analysis

Through the MCA TVET project:

• A ‘Gobi Region’s Technical and Vocational Skills, Labor and Training Survey’ was conducted in 2010.
• Websites for an integrated Labor Market Information System and a Career Guidance System were developed at the Labor Exchange Central Office (LECO).
• LECO was provided with necessary ICT equipment and technology and network servers.
• A contractor (Application GmbH & PEM GmbH) was hired to develop not only LMIS but also a career guidance system and train the instructors for career guidance services.

As result of the aforementioned efforts, a functioning LMIS, linked to all labor and employment offices in the provinces and capital city, was established in 2012. It is a labor market policy instrument to improve the information flow in the labor market. 54 indicators were proposed to use in LMIS to monitor the labor market situation. An online career guidance system was linked to LMIS. (Websites: http://www.mol.gov.mn/; http://www.hudulmur.mn/; http://mergejil.mn). In 2012, the government announced the transfer of TVET to the Ministry of Labor and social protection in an effort to restructure the TVET, improve its efficiency and responsiveness to labor market needs, and bring it closer to the demand side.

In terms of new sources of data, LMIS constitutes a large repository of invaluable amount of micro-data designed to facilitate:

• Job posting
• Job seeking
• Employee hiring
• Choosing a profession
• Workforce export and import

The LMIS registered more than 100,000 job seekers in 2017 and around 90,000 job postings. The system has a network of 48,000 registered employers. As of May 2018, 35,000 job seekers were registered, while only 5,000 people were employed in May through the system.

However, several discussions and interviews that were conducted show that some of the data is not systematically centralised and appear to be dispersed in different departments and offices. The creation of the NESRIC is a good step forward to resolve the problem. On the other hand, other obstacles were identified that go beyond the data and the platform and need to be addressed to have an efficient and useful system.

For example, the experience of job seekers with local offices seems to be negative and trust in the system is low. Declaring oneself as unemployed is primarily an administrative requirement to secure certain government benefits rather than a tool to access jobs. Most people still believe networking is the most efficient way to get information on jobs or vocational training. Some job seekers reported a lack of training of officers or suspicion that officers were retaining valuable information for themselves, their relatives or close connections.

To improve the performance of the LMIS beyond the platform itself and attract people to register and improve the matching between supply and demand, the following preparatory activities would be useful:
Labour Market Data Sources

- Properly train and supervise local officers to be able to:
  - Understand their role
  - Provide information and clear guidance on job postings and vocational trainings
  - Treat all job seekers respectfully and provide them with all needed information in the most transparent way (service oriented)
- Publish all jobs and vocational trainings systematically online, use more traditional methods in a centralised way and make sure all postings are available in all offices (ensure officers at the local level cannot hide information)
- Allow for application from social networks and from private job platforms by harmonising requirements for information on job seekers and job providers

These recommendations could be useful for other similar projects, including the Digital TVET.

5.4 Employment and training services

The 2015 Mongolian census of population and housing indicates that 37% of the population was below age 20. The working age population, defined as ages 15 to 64, represents 66.1%. The country’s population pyramid, according to the 2015 census, shows that the majority of the population is young and moving towards middle age. The need for policies and programmes, therefore, to support the youth, equipping them with the right skills for a smooth and speedy transition to the labour market is therefore of utmost importance. The rapid economic growth and its diversification changed the skills demanded, but the skills of the population did not adjust accordingly. As a result, the unemployment rate among youths aged 20-24 is double the national unemployment rate of 9%. Furthermore, large numbers of young Mongolians are in low paying jobs and in the informal economy, particularly in rural areas where over 90% of youth are active in the informal sector, which partially explains the high poverty rate of almost 30% in 2016.

While Mongolia has made significant achievements in expanding access to education, ensuring its relevance remains a major challenge. Skill gaps and mismatches between supply and demand in the Mongolia labour market are indicative of a lack of alignment of the educational system and the demand by Mongolian firms and enterprises. Several studies conducted by the World Bank and ILO conclude that the three interrelated problems of joblessness, informality and skills mismatches can be linked to the poor quality and relevance of skills and competences put forward by the educational system.

In 1991, student enrolment fell during the transition period from communist system to market oriented economy, largely due the withdrawal of Soviet Union funding. To fill the gap, the Asian Development Bank (ADB) supported Mongolia in developing its primary and higher education system, as well as rebuilding the technical and vocational education and training (TVET). Mongolia’s TVET system collapsed during the transition period, which led to a growing skills mismatch in the labour market.

ADB’s Third Education Development Project (TEDP) has been supporting TVET reform since 2006, backed by a Japan Fund for Poverty Reduction (JFPR) grant on Nonformal Skills for Unemployed Youth and Adults. While TEDP was focused on improving TVET for youth enrolled in public institutions, the JFPR project was focused on providing informal skills training for dropouts and poor adults living in Ulaanbaatar. The project introduced competency-based curricula into skills training courses in 2006-2009, laying the foundations for the subsequent TVET system reforms. The loan project—Skills for Employment that started in 2015—aims to further reform the TVET system by aligning it with the country’s economic diversification goals, achieved through supporting programs and courses in agriculture, construction, and transportation. To tackle the skills mismatch, the project supported an industry and employer-driven TVET system, such as occupational standards, competency-based training modules, skills assessment, and certification systems, as well as workplace training for students and trainers. The project also establishes systems for training TVET managers and teachers and strengthening career guidance.
ADB is also implementing a Higher education reform project with a component on increasing higher education institutions’ responsiveness in partnership with the Ministries of Education, Culture, Science and Sports. Under the project, guidelines for a graduate tracer study, an employer satisfaction study and a labour market study have been developed and introduced to Higher Education Institutions.

In recent years, Mongolia’s ‘National Council for Vocational Education and Training’ (NCVET) was created, consisting of a larger number of private sector organisations, to enable the participation of stakeholders at different stages of TVET policy and strategy development and implementation. In Mongolia, ‘platforms of sector stakeholders’ that guide TVET and match demand and supply are referred to as ‘sector councils’. Sector councils in Mongolia are meant to be industry-led partnerships of stakeholders of a particular economic sector that are hoped to address skills mismatches and to implement solutions in a timely and up-to-date manner. The objective of the sector councils is to unite representatives from business, labour, education and other professional groups to analyse and address skills development issues.

ADB is not alone in supporting Mongolia in the area of TVET. Many other active partners have been supporting TVET in Mongolia including Australia, Germany, Japan and The United States of America. A German funded TVET project, exhibited by GOPA Consultants, provides a better idea of the current trends in TVET development. The purpose of the project is to strengthen and consolidate the work of Mongolian governmental authorities responsible for the TVET sector to establish and initiate:

1. an efficient, sustainable and demand-driven TVET sector with attention to rural areas; and
2. an appropriate quality assurance procedure for assessment and certification.

The expected results of the German intervention are the following:

- Strengthened leadership capacities of the Mongolian governmental authorities responsible for the TVET sector.
- Strengthened capacities of TVET schools to meet the qualification requirements of an expanding and diversifying labour market through the nationwide implementation of competence-based programs and quality-assurance processes.
- Increased coverage of TVET best practices in the rural development sector and strengthened implementation capacities of TVET rural development programs to benefit rural economies.

Many development partners are supporting Mongolia in better structuring its education system regarding the necessary skills, so that TVET is more sensitive to the demand of firms. In projecting future needs of skills and to ensure that skills match demand, the economic dynamics of Mongolia and China must be taken into account.

5.5 Online job portals

Technology and internet penetration rates are important indicators of the potential of online job platforms role in facilitating access to jobs, especially among the youth. The number of smartphone users in Mongolia has doubled to 1.7 million since 2014, according to a study conducted by research and consulting firm Mongolian Market Consulting Group (MMCG). According to the report, 99.6% of Mongolians aged 15 to 60, or 2.1 million users, have a mobile phone. Of that number, 79%, or 1.7 million users, have a smartphone. The 21 to 37 age group, 48% of Mongolia’s population, are the most active in purchasing smartphones, with 88%, or 920,000 individuals, having purchased at least one. People aged 15 to 20 had the highest percentage of smartphone penetration with 95%. The 1.7 million smartphone users compared to the 3.06 million population results in a smartphone penetration of approximately 55%.
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In its latest analysis on Mongolia’s information technology sector, the Communications Regulatory Commission (CRC) reported that Internet service users rose from 200,000 subscribers in 2010 to 2.6 million by December 2016, increasing Internet penetration to 86%. The Press Institute of Mongolia reported that checking Facebook and reading news are the top two online activities for Mongolians. As of December 2017, the number of Facebook accounts from Mongolia is estimated to be around 1.9 million, representing 60.9% penetration.

The growth and the penetration rates achieved are impressive and show the level of online activity in Mongolia. It also presents an important channel to communicate information to the largest possible number of people in the country. This phenomenon explains the increase in job boards since 2008. (The crisis that have sent total unemployment rate skyrocketing from 2.8% in 2008 to 11.6% in 2009).

Currently, there are a dozen online job platforms in Mongolia (a list of main platforms is provided in the annex). The biggest one is an advertisement website called Unegui (www.unegui.mn) that currently has 13,774 job vacancies posted. It enjoys around 16,000 to 17,000 visits a day. However, this kind of website often posts low-wage, low-qualification and part-time jobs. It also does not require users to create a profile, which leads to an overcrowded website with outdated postings and potentially low utility in matching demand with supply.

Biznetwork (www.biznetwork.mn) is another portal and is considered to be the most popular and most professional job posting platform in the country. Biznetwork is a national business networking platform of Mongolian professionals, allowing users to connect to business partners, find jobs, connect with colleagues and search job seeker databases (paid membership required for job posting). It may also have the highest potential for linking to TVET. Launched in 2009, Biznetwork currently has over 100,000 users that include corporations as well as individuals and a network of 4,000 organisations. Currently, there are 2,855 active job posts on this platform. Both job seekers and vacancy posters need to create a profile, which is saved on the platform. Most of the traffic of biznetwork comes from Mongolia - the website is only available in Mongolian. Biznetwork has an average of 4,000 visits a day with only 6.3% of traffic coming from social networks (in the last 3 months), mostly from Facebook. Biznetwork presence on more labour-oriented platforms such as LinkedIn is very limited or inexistent. Biznetwork is hosted by the National Data Center of Mongolia, which might explain its poor ‘socialability’ in respect to social networks, limiting its coverage and missing Mongolia’s 1.9 million Facebook users.

Biznetwork website is to some extent well-structured and postings are classified by sector and profession, making the user experience friendly with easy content navigation. The following search options are available:

- keywords,
- profession, sector,
- by organisation,
- by posted time,
- by salary,
- by working time,
- by location, and
- by position level.

Once a job seeker identifies an opportunity of interest, they can apply using their account.

Biznetwork is a good example in how platforms could be used as an effective way of connecting labour supply and demand. Based on statistics of internet and smartphone use in Mongolia, online and mobile channels would be the most effective. However, it is important to note that people still look for job posts through more “traditional” methods, including newspapers, other printed sources and even going door to door asking for employment.
5.6 Conclusions

This study is intended to better understand how the labour market of Mongolia functions and identify the main sources of data from both official statistics and new sources. In addition to identifying strengths to capitalise on, weaknesses will also need to be resolved to ensure, among others, an efficient digital TVET platform which is believed to be in the pipeline supported by a German funding.

There is a strong need to enhance the accessibility, quality, and coverage of labour market information to allow job seekers to make informed decisions. The study reveals the high level of access to technology and the internet and the crucial role that can play in facilitating access to labour market information. Social networks, especially Facebook, are key to reach as many people as possible and publicise TVET as a platform to facilitate access to job market. It is also clear that several platforms, both public and private, can provide an invaluable source of data. These platforms can act as both a source of data as well as an access point to users to apply for jobs directly. One weakness that will need to be resolved is the low level of integration between these two types of platforms (job platforms and LMIS with social networks).

Another challenge will be developing effective long-term planning and skill forecasting to better shape the education system, especially with such a large youth population. One key constraint in providing demand driven TVET was the lack of quality labour market information on employer needs and the overall weak analytical capacity of staff in relevant institutions. Therefore, it is essential for Mongolia to actively engage with employers and take into account the national and international economies, particularly in relation to China.

Finally, properly training local officers in guiding job seekers and providing them with transparent and relevant information is as important as the content of the TVET itself. Job seekers will need to regain trust in local offices and the usefulness of the system in finding jobs. A national platform that indiscriminately publishes nation-wide TVETs, trained officers and transparent procedures can significantly help job seekers access the relevant job information. In addition to centrally opening all data to all users at the national level it is recommended to lay the regulatory foundation for a competitive (and hopefully flourishing) market of facilitators, that may include local career development facilitators. Such a market will help remedy the problems of access and to understanding of information as well as the public mistrust in local governmental officers all at once.

6. Conclusions / Discussion

Informing and supporting job matching is a crucial labour market function as witnessed by the long history, proliferation and diversity of commercial and publicly funded facilitators worldwide. Information is indeed a crucial ingredient in the labour market given the heterogeneity of jobseekers and vacancies.

In a time of digital disruption, such labour market information is increasingly coded into and mined out of data. The nature and form of such data itself depends on design decisions on various levels: from labour market specifics to the shape of industrial organisation and the sectoral composition of the economy, all the way to technical or business decisions of the facilitator itself.

In a competitive environment, the design decisions and the suitability and performance of the underlying data model in terms of efficiency and quality of matching are crucial for commercial (or public policy) success of the various facilitators. An important part of the data model and the data retention policies is its suitability for evaluating the matching process. Whether or not it is available for research, suitable for experimentation or amenable to tweaking determines a large part of the success of such models. Design and data models as well as the corresponding matching methods might be proprietary or trade secrets in such a competitive environment.

In developed countries, the number and diversity of job matching facilitators show that the market of matching facilitation itself is quite responsive to the demand for facilitation. Not only does it evolve new
forms of facilitation tailored to new and emerging facts, but it also continues to use them all in a cumulative manner. As the economy becomes more dynamic due to technological disruption, classical job boards will become more sophisticated in formulating job descriptions in a formal but dynamic manner. The platform economy will continue to match supply and demand in less conventional contexts where the concept of a job might not make as much sense. Somewhere in between the two, temporary work agencies develop a business model that attempts to remove firm risk and employee uncertainty. At the same time, while social media changes the way networks form and affect matching, old ad hoc forms of matching like day labour hot spots persist. A more structured manner to inform labour supply is to allow labour demand to affect it directly, as witnessed with apprenticeships in Germany.

Contrary to the popular narrative, the disruption in the labour market does not completely eliminate old forms of facilitation but instead creates a cumulative array of old and new ways to conduct job matching.

While we can use knowledge and experience from the developed world, any efforts to create digital data facilitation in developing countries will have their own difficulties. It is also reasonable to assume that there cannot be a single shot at the problem. Any solution will have to mix and match the right elements, which might differ from country to country and it will have to be both fault tolerant, so it can work in an imperfect evolving world, as well as designed with the need to admit iterative improvements. Our experience in technology and policy making shows us that any solution creates a new selection of problems. As can be witnessed by the current situation in developed economies, establishing data driven job matching facilitation will not correspond to anyone's efficiency standards but will instead allow stakeholders to have an informational foundation in which they can be market participants engaging in sophisticated strategic behaviour informed by accessible data. For a properly designed ecosystem of matching facilitators to succeed, it will need to include a proper mixture of public and private entities and provide enough labour market data to create a sufficiently supported LMIS capable of steering the supply of skills to the tasks that need to be accomplished in an efficient manner.

We can imagine that offline elements such as local face-to-face agents and digital hubs (similar to how libraries assist with job applications in parts of the developed world) might help bridge the digital gap, while allowing a digital data backend to unfold its beneficial payload. The more general problem is to find solutions optimised for the reality in the field. This assessment is supported and motivated by the testimony of UX, an internet company operating in Mozambique that found that SMS-based surveys were far more effective than standard approaches where teams of individuals conduct surveys by travelling to different locations. This example is also demonstrative of the fact that data is the result of specific transactions in a specific context and it is best captured by those with intimate knowledge of the modalities in the field, a conclusion we might summarise by saying that context matters.

As seen in both the developed world and in the cases of Mozambique and Mongolia, fragmentation, due to business models or stakeholder incentives, is an issue that might present obstacles towards increasing efficiency. Official data might be lagging or unavailable, and proprietary data might be available as a public good, as may be the case of UX data, but it might also be inaccessible, as in the case of other companies. There is a variety of responses necessary to streamline the multitude of incentives. We were impressed at how fragmented data, governing structures and institutions are in both case studies (although we observed an effort to streamline in the case of Mozambique). At a time when a personal computer has enough computing capacity to run the entire LMIS of a small country like Mongolia, to be so fragmented and inefficient is less a matter of lack of means than political will. The necessary response here likely relates to institutional redesign.

Moving on to the specifics of how development banks or agencies might facilitate a data driven infrastructure suitable for digital TVET as part of their investment strategies, it will be useful to draw on past experience of how such projects typically run. While more inputs from the development bank or international donor perspectives would certainly be relevant, an outside firm executing an infrastructure project in a developing country will bring in some highly skilled personnel, create and rely on partnerships
with local firms as well as a cascade of subcontractors. Aligning the stakes of all participants in such complex networks of cooperation might be a challenge and will certainly require the right designing of incentives.

This assessment is supported by a number of testimonies that pointed to some fundamental misalignment of incentives. Jürgen Siebel, Head of Siemens Professional Education International, told us that his firm, is focused on business development and conducts training activities depending on their needs. Firms like Siemens have little incentive to make data about their training needs or activities available to external parties or in producing portable certification, which workers might use outside of the specific project. Moreover, there is a misalignment between those on the ground and donor countries. Whenever development projects with a finite time engagement do not involve natives with long term stakes in the matter, a condition we might call "having skin in the game", the impact of such projects is also of a finite horizon and may not have long-term effects. This is the second reason why aligning the incentives between the international businesses and the host countries is vital to maximise the domestic spillovers that may accrue from these businesses' knowledge of the specifics in their fields of activity.

Depending on the scale of investment, a central digital repository to serve multiple developing countries with a flexible but well designed and documented data model (based on international standards for comparability) might be considered. Such a repository can have national instances that federate with each other in order to avoid political, legal or sovereignty issues. Moreover, in order to optimise localising properly across various countries and public/private players within these countries, such a portal ought to offer federations possibilities on a technical level so that interested parties can contribute and consume data in a structured programmatic manner. Important aspects of such a construction are:

1. The availability and quality of a so-called RESTful API will allow federated parties to hook into the system to have central control of quality and other aspects and a distributed impact.
2. The system must offer services to both supply and demand of labour so that everybody is properly incentivised to contribute to and consume its data. Incentivising might be mandated by regulation or contractually depending on the nature of the stakeholder.
3. It has to start at a high level of digitisation and, through a managed stratified approach, enter the offline reality on the ground to become accepted by the supply side.
4. Such an approach federates local public and private entities and hooks into online service providers on the ground who bridge the digital gap. Federation is important in order to avoid state or private monopolies and increase trust in the matching facilitation.

In conclusion, we believe, in the context of this project, it is feasible for development banks and agencies to set up a single, worldwide website or portal where the development projects that they support list their job vacancies and de facto vocational training needs and opportunities. These projects could include infrastructure investments as well as other smaller development initiatives. We understand that these vacancies are currently spread out over multiple national portals and receive little visibility. While they showcase the work and contributions of the development banks, the funding agencies and the countries, the spillover effects in terms of practical on the job vocational training fails to be captured and reused properly.

For the success of this global portal, it would be critical for vacancies to be easily accessed and disseminated through national portals (including for example emprego.co.mz and its public-sector counterpart in Mozambique and many other countries). Ultimately, from the perspective of the development banks and agencies, relevance won't depend on whether the vacancy is filled through the national portal or through the global portal, but instead for the vacancies to be filled effectively and for opportunities of domestic spillovers to be maximised, namely in terms of the training of host country workers.

It could also be important to ensure that subcontractors engage with these portals, as they may represent a large share of the jobs that are created in the process. The prime contractors may require subcontractors
in order to minimise their exposure to problems that may arise from subcontractors not following the labour and health & safety regulations of the host countries. The involvement of subcontractors may also be important in the case of job targets, or when projects are subject to some conditionality (a given number of workers or workers-month hired and a given number of worker-hours of training provided) by the development banks.

To increase the usefulness of the portal from a TVET perspective, it could be useful to have these vacancies follow a specific structure in terms of their skills, perhaps following ESCO\textsuperscript{52}. This could make it easier for training providers (public or private ones) to shape their supply towards the needs of these investments. However, time constraints may be tight - preventing providers from changing their courses and their contents, assuming they are able to do so in the first place, particularly in developing economies where both the public and private sectors may face big resource constraints.

On the other hand, the greater visibility and legitimacy gained from posting the vacancies in such an international portal may create incentives for multinational groups (in employment and training services) to react more rapidly to the emerging needs and contribute to better matches.

\textsuperscript{52} (ESCO - European Skills/Competences, qualifications and Occupations, 2018)
References


Labour Market Data Sources


Kuhn, P. J. (2014). *The internet as a labor market matchmaker.* Retrieved from http://dx.doi.org/10.15185/izawol.18


Annexes

Table M1 - Vocational training in public and private centres, by province and gender, 3rd quarter, 2017

<table>
<thead>
<tr>
<th>Province</th>
<th>Total</th>
<th>Public centres</th>
<th>Private centres</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Men</td>
<td>Women</td>
<td>Men</td>
</tr>
<tr>
<td>Niassa</td>
<td>840</td>
<td>401</td>
<td>439</td>
</tr>
<tr>
<td>Cabo Delgado</td>
<td>944</td>
<td>640</td>
<td>304</td>
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<tr>
<td>Nampula</td>
<td>5.926</td>
<td>3.433</td>
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<td>Tete</td>
<td>1.474</td>
<td>1.362</td>
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<td>Manica</td>
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Source: 4th quarter Labour Market Information Bulletin and IFPELAC, 2017

Table M2 - Applicants' schooling and vacancies' schooling (analysis of emprego.co.mz micro data)

<table>
<thead>
<tr>
<th>Applicants’ schooling</th>
<th>Vacancies’ 'Required’ schooling</th>
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</thead>
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<td>Basic</td>
<td>Basic</td>
</tr>
<tr>
<td>1.713</td>
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<td>9.53</td>
<td>51.94</td>
</tr>
<tr>
<td>Secondary</td>
<td>1.806</td>
</tr>
<tr>
<td></td>
<td>11.29</td>
</tr>
<tr>
<td>Higher</td>
<td>2.922</td>
</tr>
<tr>
<td></td>
<td>9.22</td>
</tr>
<tr>
<td>Total</td>
<td>6.441</td>
</tr>
<tr>
<td></td>
<td>9.81</td>
</tr>
</tbody>
</table>

Notes: For each type of actual schooling, the first row indicates the number of observations per required schooling and the second row indicates their percentage. Own calculations based on 'Emprego.co.mz' data. Analysis at the applications level.

Source: Table 1 of (Martins, 2017)
Table M3 - Excerpt of codes to be used in new online reporting system (formal employment) - ‘Folha de Relação Nominal (FRN)’ - job types and schooling levels

8.5. Tabela de Código de Categorias Ocupacionais

<table>
<thead>
<tr>
<th>Código</th>
<th>Categorias Profissionais</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPE</td>
<td>Operário</td>
</tr>
<tr>
<td>EMP</td>
<td>Empregado</td>
</tr>
<tr>
<td>TE</td>
<td>Técnico Elementar</td>
</tr>
<tr>
<td>TB</td>
<td>Técnico Básico</td>
</tr>
<tr>
<td>TM</td>
<td>Técnico Médio</td>
</tr>
<tr>
<td>TS</td>
<td>Técnico Superior</td>
</tr>
<tr>
<td>ESP</td>
<td>Especialista</td>
</tr>
<tr>
<td>CHD</td>
<td>Chefia e Direcção</td>
</tr>
</tbody>
</table>

8.6. Tabela de Código de Habilitações Literárias

<table>
<thead>
<tr>
<th>Código</th>
<th>Habilitações Literárias</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSLNE</td>
<td>Não sabe ler nem escrever (NSLNE)</td>
</tr>
<tr>
<td>SLESEP</td>
<td>Sabe ler e escrever e possui ensino fundamental (SLESEP)</td>
</tr>
<tr>
<td>EP1</td>
<td>Ensino Primário do 1º Grau - 5º Classe (EP1)</td>
</tr>
<tr>
<td>EP2</td>
<td>Ensino Primário do 2º Grau - 7º Classe (EP2)</td>
</tr>
<tr>
<td>ESG1</td>
<td>Ensino Secundário 1º Ciclo - 10º Classe (ESG1)</td>
</tr>
<tr>
<td>ESG2</td>
<td>Ensino Secundário 2º Ciclo - 12º Classe (ESG2)</td>
</tr>
<tr>
<td>ETE</td>
<td>Ensino Técnico Elementar - 7º Classe (ETE)</td>
</tr>
<tr>
<td>ETB</td>
<td>Ensino Técnico Básico - 10º Classe (ETB)</td>
</tr>
<tr>
<td>ETM</td>
<td>Ensino Técnico Médio - 12º Classe (ETM)</td>
</tr>
<tr>
<td>B</td>
<td>Bacharelato - B</td>
</tr>
<tr>
<td>L</td>
<td>Licenciatura - L</td>
</tr>
<tr>
<td>M</td>
<td>Mestrado - M</td>
</tr>
</tbody>
</table>

Note: An additional code concerns occupations, with nearly 1,000 different entries.
Source: Ministry of Labour

Table M4 - Number of students per school grade, 2014 (Source: Ministry of Education, Mozambique)

<table>
<thead>
<tr>
<th>Grade</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>1,365,865</td>
</tr>
<tr>
<td>2nd</td>
<td>1,186,341</td>
</tr>
<tr>
<td>3rd</td>
<td>936,754</td>
</tr>
<tr>
<td>4th</td>
<td>775,499</td>
</tr>
<tr>
<td>5th</td>
<td>635,477</td>
</tr>
<tr>
<td>6th</td>
<td>437,524</td>
</tr>
<tr>
<td>7th</td>
<td>410,311</td>
</tr>
<tr>
<td>8th</td>
<td>286,219</td>
</tr>
<tr>
<td>9th</td>
<td>231,407</td>
</tr>
<tr>
<td>10th</td>
<td>239,487</td>
</tr>
<tr>
<td>11th</td>
<td>137,987</td>
</tr>
<tr>
<td>12th</td>
<td>91,565</td>
</tr>
<tr>
<td>Total</td>
<td>6,734,436</td>
</tr>
</tbody>
</table>
### Table M5 - List of entities that participate in the TVET Mozambique group

<table>
<thead>
<tr>
<th>Entity</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFD (Agence Française de Développement)</td>
</tr>
<tr>
<td>French Embassy (SCAC)</td>
</tr>
<tr>
<td>Embassy of Finland</td>
</tr>
<tr>
<td>Embassy of Portugal</td>
</tr>
<tr>
<td>Embassy of Argentina</td>
</tr>
<tr>
<td>GIZ Germany</td>
</tr>
<tr>
<td>SOGA - Employment and skills for Eastern Africa</td>
</tr>
<tr>
<td>KfW Germany</td>
</tr>
<tr>
<td>CES/ATEC/ICON Institute</td>
</tr>
<tr>
<td>High Commission of Canada</td>
</tr>
<tr>
<td>AICS (Italian Agency for Development Cooperation)</td>
</tr>
<tr>
<td>JICA (Japan International Cooperation Agency)</td>
</tr>
<tr>
<td>Royal Norwegian Embassy</td>
</tr>
<tr>
<td>UK DFID</td>
</tr>
<tr>
<td>EU Delegation</td>
</tr>
<tr>
<td>ILO-OIT</td>
</tr>
<tr>
<td>UNESCO</td>
</tr>
<tr>
<td>World Bank</td>
</tr>
<tr>
<td>AVSI Maputo</td>
</tr>
<tr>
<td>ESSOR Mozambique</td>
</tr>
<tr>
<td>IYF (International Youth Foundation)</td>
</tr>
<tr>
<td>MLAL Mozambique</td>
</tr>
<tr>
<td>Instituto Superior Dom Bosco - Salesians</td>
</tr>
<tr>
<td>ONG UPA</td>
</tr>
<tr>
<td>HELVETAS</td>
</tr>
<tr>
<td>Swiss Contact</td>
</tr>
<tr>
<td>Plan International Mozambique</td>
</tr>
<tr>
<td>Terre des Hommes Italy</td>
</tr>
<tr>
<td>OPM Oxford Policy Management</td>
</tr>
<tr>
<td>AKDN (Aga Khan Development Network)</td>
</tr>
<tr>
<td>Colleges and Institutes Canada (CICan)</td>
</tr>
<tr>
<td>EP-Nuffic</td>
</tr>
<tr>
<td>Centre International d'études pédagogiques</td>
</tr>
<tr>
<td>Céreq - Centre d'Études et de Recherches sur le Qualifications</td>
</tr>
<tr>
<td>ENAIP</td>
</tr>
<tr>
<td>IGC (International Growth Centre)</td>
</tr>
<tr>
<td>Queen Mary University of London</td>
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<tr>
<td>Country</td>
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<tr>
<td>---------</td>
</tr>
<tr>
<td>France</td>
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