European Training Foundation

Big Data for labour market intelligence

Web labour market of Tunisia

Landscaping and brief overview

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May 2020

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1 Introduction

This report is part of the new phase (2020) of the ETF Big Data for labour market intelligence project. The report provides an overview of key characteristics of the web labour market in Tunisia and contextualises the forthcoming analysis of online job vacancies (OJVs) collected from January 2020. A first comprehensive landscaping report of OJVs in Tunisia was elaborated in 2019, with the aim of exploring the feasibility of a system for analysing demand (occupations, skills) based on data from OJVs.

1.1 Objectives and approach of the Big Data for labour market intelligence project

Governments and socioeconomic partners in most ETF partner countries are unanimous on the need to develop and better use information on labour market and skills dynamics to improve the performance of education and training, the availability of qualifications and skills for employment, and lifelong societal and personal development of individuals. Today, this implies engaging in innovation to improve labour market intelligence (LMI).

In this context, most partner countries have been reinforcing their systems, capacities and methods to identify, analyse and anticipate demand and skills needs in a context of changing economic structures, new types of work, and rapid digital transformation of occupations and tasks.

While conventional LMI, based on regular statistics, specific-purpose surveys and qualitative methods, has gained ground in ETF partner countries, there is much room to further innovate on data sources, improve analytical capacities and modernise the formats and instruments available to visualise and disseminate insights for users (policy makers, socioeconomic partners, and education and training players).

Big Data analytics offers new opportunities to improve LMI and deliver real-time and fine-grained skills analysis and insights for users. Big Data is all around us. Big Data is characterised by volume, variety, velocity and – eventually – value. Machine learning and artificial intelligence (AI) algorithms, combined with vast computing power, anytime and anywhere, allow data science to exploit certain Big Data sources that have great potential to supplement and enrich conventional LMI; this is the case with OJVs managed by a large variety of online portals and boards.

ETF partner countries have seen a growing use of digital tools and online portals – public and private – for posting and managing job vacancies. In this context, in 2018 the ETF started an initiative aimed at exploring the potential for the application of Big Data analytics for LMI in ETF partner countries, focused on data from job vacancies announced online.

- **Phase 1** (June 2018–2019) was dedicated to creating a specific methodological guidance and disseminating it among data analysts, national statistical offices and labour market institutions.

  A key output of this phase was a short handbook published in June 2019: 'Big Data for labour market intelligence – an introductory guide' (Mezzanzanica and Mercorio, 2019). Two training workshops were conducted in 2019 to present and discuss the methodology. The thematic materials of the in-depth training workshop of November 2019 are available online[1].

  The introductory guide is aimed at statisticians, researchers, policy analysts and decision makers in the ETF partner countries who are confronted with the challenges of anticipation and dissemination of insights on the dynamics of demand for jobs, skills and qualifications. This short handbook addresses key conceptual, methodological and organisational aspects

[1] https://www.etf.europa.eu/en/news-and-events/events/big-data-labour-market-information-focus-data-online-job-vacancies-training

of using Big Data for LMI. It clarifies how Big Data can be used to go beyond the frontiers of conventional approaches to LMI systems and add value to established statistics.

- **Phase 2** was dedicated to starting the practical application of the knowledge discovery in databases (KDD) approach defined in the above-mentioned short handbook. The first step of the approach was tested in two countries (Tunisia and Morocco), with a feasibility study focused on the identification, analysis and ranking of web job vacancy sources (Mercorio and Mezzanzanica, 2019). This analysis covered 16 OJV websites in Tunisia and 15 in Morocco. Based on the results of this feasibility analysis, the ETF decided to continue the analysis of OJVs in Tunisia (2019–2020) and to add Ukraine (2020) to the project.

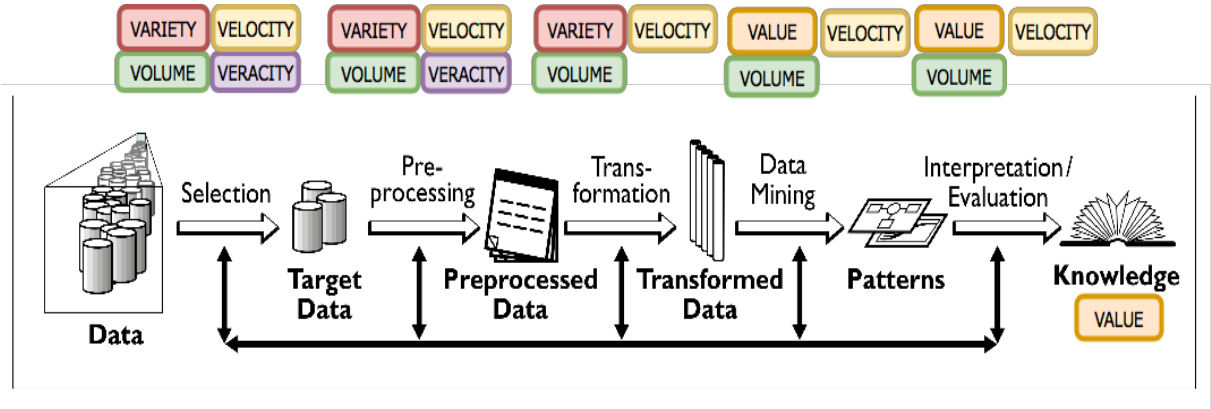
  The report of the feasibility study, focused on step 1 of the KDD approach in Tunisia and Morocco, has not been published, but can be shared with interested organisations. This report focused on the selection and ranking of data sources (OJV websites). Each internet source was evaluated and ranked in terms of the reliability of the information. This analysis took into account the vacancy publication date, the website's update frequency, the presence of structured data, and any downloading restrictions. The outcome of step 1 is the ranking of reliable web sources.

- **Phase 3**, in 2020, is the application of the approach in two countries (Tunisia and Ukraine).

To structure the process of analysing OJVs, the ETF project follows the approach, conceptual framework and steps proposed in the above-mentioned guide. Cedefop applied the same process for the Skills-OVATE: Skills Online Vacancy Analysis Tool for Europe[2].

The application of the methodology in a selected number of ETF partner countries follows the process depicted in Figure 1.

Figure 1: Steps in the knowledge discovery in databases (KDD) approach



1.2 Objective and expected results of the 2020 phase

The objective of the 2020 phase is:

To design and build a system for analysis of OJVs based on the conceptual and technical approach and instruments indicated below. Two countries are included in this phase: Tunisia and Ukraine.

The OJV analysis system should contribute to improving the LMI, generate knowledge, and enrich the ETF's work with partner countries, the European Commission and other relevant organisations. In particular, it will:

[2] https://www.cedefop.europa.eu/en/data-visualisations/skills-online-vacancies

- identify and assess demand (skills, qualifications, occupations, sectors, regions);
- identify skills rates, pervasiveness of digital/hard/soft skills by occupations;
- identify emerging skills and changing skills mix;
- identify and compare indicators of mismatch;
- contribute to anticipation of future skills and jobs.

In addition, the OJV analysis system will contribute to: assessing the characteristics and drivers of the landscape of OJV websites and their use by employers and job seekers; sharpening the policy and wider questions to which OJV analysis can respond and contribute to clarifying; exploring ways to combine OJVs analysis with other sources and methods for LMI, including conventional statistical data; exploring innovation and the effective use of existing data sources and analytics powered by new data science developments and machine learning.

The planned result(s) are of the project are as follows.

A. OJV data analysis system with data classification and visualisation tool

1. OJV analysis system designed and operational with data analysed and classified, and results presented using visual analytics tools

The proposed design and architecture should be sustainable and scalable; should include a data pipeline that collects data periodically; and should exploit machine learning and ontology matching algorithms to classify vacancies and skills.

2. Results of data analysis and selected indicators processed and presented using visual analytics tools (for example, dashboards)

The ETF will host the website, within which the visual analytics tools can be embedded.

B. Reports

3. Report analysing the outcomes of implementation of the OJV analysis system in the countries

This should be a comprehensive report on the benefits and challenges of the approach to gain new and value-added insights on: coverage of demand by OJVs; characteristics of the landscape of OJV websites; use of OJVs by employers and job seekers; and types of features prioritised by employers (skills, qualifications, experience, others).

4. Final project implementation report

This should cover the main conceptual and technical questions along the steps of the approach, the recommendations and an overview of significant challenges and problem areas.

2 Landscape of Tunisia's web labour market

In Tunisia, data about labour demand is scarce and incomplete, especially data about employers' current and future demand for skills by type and sector. The workforce surveys conducted by the National Institute of Statistics (Institut national de la statistique, INS) provide quarterly data on employment, while vacancies are not subject to thorough investigation and analysis (total demand being calculated as employment + vacancies). There is obviously an urgent need to fill this gap, as employers and policy makers in charge of the management of the labour market need to know what kind of skills the country requires. It is urgent because unemployment has been persistently high and, as suggested by several indicators, there is a wide gap between the skills demanded by employers and the skills produced by the education and training system. No accurate measure of the skill mismatch is currently available and the LMI system needs to be strengthened and integrated. Therefore, this project – which aims to use data on online vacancies to develop a system to collect OJVs, and classify, analyse and visualise the insights on skills demand – is highly relevant in the context of Tunisia.

2.1 Labour demand and skill mismatch

The available Labour Force Survey data shows that the economy does not generate enough jobs, and that unemployment has been high and very persistent. The total number of unemployed people has increased over the previous ten-year period (around 600 000 in total and an average rate of 15%) for the past six years. Most of those who are unemployed are young and educated, and there is a larger proportion of women. Is this because young people do not have the right skills or because the overall demand for skilled workers is not high enough? It is both, but the lack of data on vacancies makes it impossible to give precise measures.

The distribution of employment by sector reveals the weakness of the total demand for skilled labour, as total employment is mainly in sectors where most of the employment is in the low-skill categories (agriculture, construction, commerce, etc.). This is also true for manufacturing industries, though less so, and with some good exceptions. An increasing number of leading private enterprises are creating skilled jobs, primarily in professional services, information and communication technologies (ICT), education and health services, but the share of such jobs in total employment remains low. Most skilled employment has been in the public sector, where recruitment has decreased. On the supply side, the number of university graduates has increased dramatically, with close to two-thirds of them being women. Overall, the supply of skilled labour has clearly been growing faster than the demand.

Skill mismatch is also a real issue, as low-quality jobs in the informal sector are growing in number and easier to find but are often rejected by young people with tertiary education. A large proportion of educated women would rather keep searching or leave the labour market than accept such low-quality jobs. INS data shows that most of the newly created and existing firms are small and rather informal.

2.2 Use of the internet

Micro and small firms are unlikely to operate through formal employment agencies or the internet. Their vacancies are hard to classify by type and level of skill. However, they may have computers and mobile phones that allow them to access the internet. The existing data shows that the use of the internet will not be a major barrier to monitoring job vacancies and the labour market online. Based on the recent survey conducted in 2019 by the National Telecommunication Agency (the

Tunisian telecommunication regulator), two-thirds of mobile phone owners use their phone to access the internet, the proportions being higher among women (75%) and young people (90%).

Overall, according to the 2019 survey, almost 70% of individuals use the internet, 80% of women and 90% of young people. The Internet Users Statistics for Africa in 2018 gives a smaller proportion – 66.8% instead of 70%. The difference could reflect growth from 2018 to 2019. Compared to the African average and the world average (58.8%), Tunisia scores relatively well.

Obviously, individuals use the internet for several purposes, both personal and professional. The survey results show that 45% of individuals use the internet at work. This proportion reflects quite accurately the depth of internet penetration in the production system, and it may be explained by the size of the informal sectors: about half of labour is in the informal sector where the use of the internet is limited.

According to an earlier INS survey reflecting the situation in 2015[3], 84.7% of firms in the private sector used the internet, though less than half of their employees did; it is expected that this proportion will be higher by now. The sample of the survey included small enterprises. The number must be close to 100% for medium and large firms. As shown in Table 1, some sectors are lagging behind, such as restaurants, where most of the enterprises are small and rather informal. But even in this case, 61.1% of these businesses use the internet. All public sector enterprises are connected to the internet.

Table 1: Proportion of enterprises using the internet in Tunisia, by sector, 2015 (%)

Sector	**Enterprises using the internet**
Mining	87.4
Manufacturing	82.8
Utilities (electricity, gas, water)	77.7
Construction	81.9
Commerce and car maintenance	86.9
Transports and logistics	85.0
Hotels and restaurants	61.1
ICT	99.2
Real estate	94.2
Specialised, scientific and technical activities	98.5
Other administrative services	94.0
Education	98.5
Health and social services	90.9
Arts and recreation	80.2
Other services	97.4
Total	**84.7**

[3] INS 2017 : « Indicateurs fondamentaux sur l'utilisation des technologies de l'information et de la communication par les entreprises en 2015 ». http://www.ins.tn/sites/default/files/publication/pdf/rapport-tic-2015-sn.pdf

3 Job vacancy services

3.1 Legal framework

As shown in the previous section, the level of internet usage is not an impediment for the promotion of online job employment services. However, there is a real issue with the legal and institutional set-up.

Article 280 of the Labour Code[4] stipulates that recruitment may be carried out either directly or through the public employment agency, and that all newly recruited personnel must be reported by the employers to the public employment agency (within 15 days).

As per Article 285, all types of private employment agencies are prohibited. That is, recruitment through private intermediaries is illegal.

However, vacancies may be advertised through the media (Article 282). Enterprises may also delegate their recruitment mission to a person (an attendant) whose name, nationality and address must be conveyed to the public employment agency (Article 284).

This makes OJV problematic and the current situation unclear. While some portals are designed for advertising only, some of the portals are operated by private agencies offering employment services, including profiling, counselling and matching. Moreover, not only informal but even formal private enterprises do not always comply with the required reporting of their vacancies and new recruitments.

The debate about amending the law and authorising private employment agencies has been going on for decades. At present, all parties seem to tolerate and live with the de facto situation, and there are no plans to tackle and resolve the issue. Hopefully, this ETF Big Data OJV project may open the way for a reform leading to a better arrangement and to the integration of private agents and their portals into an appropriate national framework under a solid legal status.

Meanwhile, actions have been taken to modernise and digitise the functioning of the public employment agency (*Agence Nationale pour l'Emploi et le Travail Indépendant*, ANETI), which could be a step towards the solution.

3.2 Public employment agency (ANETI)

Not all vacancies are reported to ANETI, in part because the agency does not have the resources it needs to fully enforce the labour law and impose its monopoly as the only legal employment agency. Nevertheless, it has been the main employment agency and the manager of all public employment programmes, such as subsidies and training. Employers and job seekers interested in these services and benefits have to cooperate with ANETI and to be its clients.

As a result, ANETI has the only well-established database on vacancies, comprising 81 096 vacancies at the end of 2017, a large share of all vacancies. It was able to offer valid matches for approximately two-thirds of these vacancies, drawing on its database of job seekers. Most importantly, ANETI's active databases are available online[5]. However, the ANETI website does not give access to time series. Only active vacancies have open access online, and not all vacancies provide a full description of the specific skills required.

[4] http://www.legislation.tn/sites/default/files/codes/travail.pdf

[5] http://www.emploi.nat.tn/fo/Fr/global.php?menu=1

Table 2, based on ANETI data, shows that manufacturing industries, particularly textiles, have the most vacancies, followed by commerce and tourism.

Table 2: Vacancies, 2016 and 2017 (number)

Sector	2016	2017
Agriculture	1 902	2 319
Fishing	56	83
Mining	436	465
Manufacturing (excluding textiles)	25 515	25 642
Textiles	15 325	17 718
Construction	2 484	2 200
Tourism	5 755	5 881
Commerce	9 479	9 977
Transport	1 888	1 696
Public administration	3 485	4 006
Other services	13 285	14 045
Leather and shoes	1 461	2 064
Total	**81 071**	**86 096**

Source: ANETI

It is not easy, on the basis of ANETI data, to determine how many and which vacancies were hard to match.

It is important to mention that ANETI is going through a modernisation and upgrading process. It aims to digitise and improve the quality of all the services it provides. Its recent publication of the *Référentiel Tunisien des Métiers et des Compétences* (Tunisian classification of occupations and skills)[6] is a step in the right direction.

Nevertheless, diversification of the job vacancy market is underway.

3.3 Private sector OJV portals

As previously mentioned, a large number of private employment offices are openly operating and posting vacancies online, and there is clearly a demand for their services. A significant number of modern private enterprises prefer to rely on private agencies instead of ANETI when searching for and identifying candidates who fulfil their recruitment requirements in terms of skills and competences. It is not clear how these agencies manage to deal with or circumvent the law. This seems to be particularly the case with major agencies such as Manpower, Adecco and Manwork, which are not in the ETF landscaping list. Their websites hide their real size and show only a few vacancies, as they advertise most of their vacancies through other operators. In the Table 3 and in spreadsheet in the Annex their portals have been added to the initial list and a link provided, as an example, of a number of Manpower vacancies posted under a different name. Some other portals have also been added, though portals that are too small or that have stopped operating have not been included.

6 Further details: http://www.emploi.nat.tn/RTMC/index.html and http://www.emploi.nat.tn/fo/Fr/global.php?page=3&id=3804.

3.4 Identified OJV portals

The list of OJV portals identified during the landscaping exercise includes 25 different sources, including the ANETI website. The full ranking procedure covered 16 of these portals, while a further 5 sources underwent a tentative ranking.

Table 3: List of online job vacancy portals identified during the landscaping exercise

Job portal	Website address
keejob	www.keejob.com
Tanitjobs	www.tanitjobs.com
Tunisie Travail	www.tunisietravail.net
Tunisie Tmploi	www.tunisie-emploi.tn
ReKrute	www.rekrute.com
Farojob	www.farojob.net
Jora	tn.jora.com
offre-emploi.tn	www.offre-emploi.tn
Jobi	www.jobi.tn/
Tunisie annonces	http://www.tunisie-annonce.com/
ANETI emploi.nat.tn	emploi.nat.tn/fo/Fr/global.php
Bayt	www.bayt.com/en/tunisia/
Ballouchi	www.ballouchi.com/annonces/emploi-services/
opensooq	tn.opensooq.com/ar/
Wzayef	www.wzayef.com/en/jobs/tunisia
Tanqeeb	tunisia.tanqeeb.com/s/jobs/jobs-in-tunisia
EmploiTunisie.com	https://www.emploitunisie.com/
Tayara	https://www.tayara.tn/l/tunis/sc/emploi-et-services/offres-emploi
optioncarriere	https://www.optioncarriere.tn/emploi-travail.html
Jamaity	https://jamaity.org/forsa/
talents	https://www.talents.tn/offres/
Atct	www.atct.tn
Manpower	https://manpower-professional-tunisie.jobs.net/fr-FR
Adecco	http://adeccotunisie.com/jobs/
Manwork	http://manwork.tn/

The results of the ranking of the identified OJV websites are included in the Annex.

4 List of abbreviations

AI	Artificial intelligence
ANETI	Agence Nationale pour l'Emploi et le Travail Indépendant (public employment agency
ETF	European Training Foundation
ICT	Information and communication technologies
INS	Institut national de la statistique
KDD	Knowledge discovery in databases
LMI	Labour market intelligence
OJV	Online job vacancy

5 References

Mercorio, F. and Mezzanzanica, M., 'Feasibility study for Tunisia and Morocco to identify, validate and rank web job vacancy sources – practical guidance', 2019, unpublished.

Mezzanzanica, M. and Mercorio, F., European Training Foundation, 'Big Data for labour market intelligence – an introductory guide,' ETF, Turin, 2019: https://www.etf.europa.eu/en/publications-and-resources/publications/big-data-labour-market-intelligence-introductory-guide

6 Annex

Country	Name of the job-portal	Website address	Type of operator (normalized)	Rough position in the Google ranking (normalized)	OJV volume (approximate number of OJV)	Sectoral scope	Publication date of OJV	Update frequency	Occupation (normalized)	Type of contract (normalized)	Working time (normalized)	Sector (normalized)	City (normalized)	District (normalized)	Region (normalized)	Qualification level (normalized)	Wage (normalized)	Normalized size	Type of job portal	Media	Final Ranking
TN	keejob	www.keejob.com	1	1	1521	1	1	1	0.5	1	1	0	1	1	1	1	0	0.040749261	1.00	0.78	2
TN	tanitjobs	www.tanitjobs.com	1	1	3369	1	1	1	0.5	1	0.5	1	0	1	1	0.5	0	0.091357213	1.00	0.72	4
TN	tunisietravail	www.tunisietravail.net	1	1	36549	1	1	1	0.5	0.5	0.5	1	0	0	1	0.5	0	1	1.00	0.69	8
TN	tunisie-emploi	www.tunisie-emploi.tn	1	1	628	1	1	1	0.5	0.5	0.5	1	0.5	0.5	0.5	1	0	0.016294227	1.00	0.69	7
TN	rekrute	www.rekrute.com	1	1	75	1	1	0	0.5	1	0.5	1	0.5	1	1	1	0	0.001150181	1.00	0.72	6
TN	farojob	www.farojob.net	1	1	11061	1	1	1	0.5	0.5	0.5	1	0	0	1	0.5	0	0.302004601	1.00	0.64	12
TN	jora.com	tn.jora.com	1	1	10036	1	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0	0.273934714	0.50	0.61	13
TN	offre-emploi.tn	www.offre-emploi.tn	1	0.8	5140	1	1	1	0.5	0.5	0.5	1	0	0	1	0.5	0.5	0.139856501	1.00	0.65	11
TN	Jobi	www.jobi.tn/	1	0.5	546	1	1	1	0.5	1	1	1	1	1	1	1	1	0.014048636	1.00	0.88	1
TN	Tunisie annonces	http://www.tunisie-annonce.com/	1	0.5	3143	1	1	1	0.5	0.5	0.5	1	1	1	1	0.5	0.5	0.085168145	0.80	0.74	3
TN	emploi.nat.tn	emploi.nat.tn/fo/Fr/global.php	1	1	4458	1	1	1	1	0.5	0	1	0	0	1	1	0	0.121179757	1.00	0.66	10
TN	Bayt	www.bayt.com/en/tunisia/	1	1	113	1	1	0	0.5	0.5	1	1	1	1	1	0.5	0	0.00219082	1.00	0.72	5
TN	ballouchi	ww.ballouchi.com/annonces/emploi-services	1	0.5	4114	1	1	1	0.5	1	0.5	0	1	1	1	0.5	0	0.111759229	0.80	0.68	9
TN	opensouq	tn.opensooq.com/ar/	1	0.5	33	1	1	0	0.5	1	0	0	0	0	1	1	0	0	0.80	0.49	16
TN	wzayef	www.wzayef.com/en/jobs/tunisia	1	0.5	60	1	1	0	0.5	0	0	1	0	0	1	0	1	0.000739402	1.00	0.50	15
TN	tunisia.tanqeeb	tunisia.tanqeeb.com/s/jobs/jobs-in-tunisia	1	0.5	650	1	1	0	0.5	0	1	1	0	0	1	0.5	0	0.016896703	1.00	0.53	14
TN	EmploiTunisie.com	https://www.emploitunisie.com/	1	0.8	413	1	1	1	1	1	0	1	1	0	1	0	0	0.010406397	1	0.6756504	#N/A
TN	Tayara	ww.tayara.tn/l/tunis/sc/emploi-et-services/off	1	1	2843	1	1	1	0.5	0	0	5	0.5	0	1	0	0.5	0.076952569	0.5	0.817309536	#N/A
TN	Optioncarriere	tps://www.optioncarriere.tn/emploi-travail.ht	1	0.8	6366	1	1	1	0.5	1	0	1	0	0.5	1	0.5	0	0.173430825	1		
TN	Jamaity	https://jamaity.org/forsa/	1	0.5	65	1	1	1	0.5	0.5	0.5	1	1	0	1	0.5	0.5		0.5		
TN	Talents	https://www.talents.tn/offres/	1	0.8	1888	1	1	1	0.5	1	0.5	1	0	1	1	1	0.5		1		
TN	atct	www.atct.tn	1	0.5	,																
TN	Manpower	le.jobs.net/fr-FR/job/responsable-planification-et-achat-h-f/J3QSJT6YYKRR2YP2BL																			
TN	Adecco	http://adeccotunisie.com/jobs/			²																
TN	Manwork	http://manwork.tn/																			