

# Toward a World-Class Labor Market Information System for **Indonesia**

An Assessment of the System Managed by  
the Indonesian Ministry of Manpower



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# Executive Summary

## Building a Labor Market Information System to Improve Human Capital Development

Human capital development is at the top of Indonesia's economic development agenda. The National Long-Term Development Plan (RPJPN 2005–2025) identifies human resource development as one of the key drivers of the eight national development goals to be achieved by 2025. As part of this push, the government of Indonesia has taken several steps to build a skilled and competitive workforce building on the country's demographic strengths, strategic position, and sustained economic growth. An important milestone was the launch in 2016 of a national initiative known as Revitalization of Secondary Vocational Schools, which the Ministry of Education and Culture has updated recently. This initiative focuses on strengthening the quality and relevance of secondary vocational schools.

Strengthening the labor market information system (LMIS) is central to Indonesia's efforts to build a skilled and competitive workforce. Labor market information failures contribute to skills mismatches. When labor market information is incomplete, job seekers lack information on the skills demanded by employers, leading to the misallocation of educational investments. At the same time, employers experience higher search costs due to limited information on job seekers' skills or short supply of relevant skills in the labor market. Labor market information failures can lead to inefficient job matches, limit workers' economic prospects, lower firms' productivity, and ultimately weaken the long-term competitiveness of the country. National labor force statistics, enterprise surveys, and educational assessments indicate that skills mismatches are building up in Indonesia, in part due to these information deficits. A recent assessment of the Indonesian workforce development system confirms these findings and identifies the development of an advanced LMIS as one of the interventions needed to overcome these information failures.<sup>1</sup>

An advanced LMIS produces intelligence and analysis to improve the functioning of the labor market. An advanced LMIS has institutional arrangements that allow

1. The assessment identifies other types of interventions to strengthen Indonesia's workforce development system: (1) reforms to the institutional architecture of the system, (2) stronger emphasis on a demand-driven approach, (3) more attention to continuous technical and vocational education and training (TVET), (4) faster development of competency standards and national qualification certification schemes, (5) improved accreditation practices, (6) stronger employment services (including the establishment of an LMIS), (7) a comprehensive set of targets to improve the quality of public training, (8) a national strategy for the development of instructors and administrators of TVET institutions, and (9) stronger focus on assessing the labor market outcomes of training programs (World Bank, forthcoming).

information to flow regularly between a wide variety of key stakeholders, while constantly integrating both data services (data collection, processing, and dissemination) and labor market services. By providing relevant and timely information, an advanced LMIS can help stakeholders to make informed decisions on a variety of issues, including job search, career planning and skills upgrading, business investment and hiring, public or private workforce and skills investments, and optimal employment and skills policy designed to meet future demands.

This report proposes a framework with which to define and identify the key elements of an advanced LMIS. The framework includes the following:

- Stakeholders, including users and producers of labor market intelligence generated by the LMIS
- Functions that the system should offer, such as job matching, career and skills guidance, government support, and labor market information and analysis
- Key elements for the provision of those functions, including data collection and validation, accessibility and user experience, targeted service delivery, strategic marketing, system interoperability, human resources, information technology (IT) infrastructure, data management, and information security
- Essential features to produce relevant information and to coordinate the overall system, including institutional arrangements, partnerships, and technological solutions.

To date, the most developed function of Indonesia's LMIS is AyoKitaKerja, a publicly managed job-matching platform launched in 2016. AyoKitaKerja provides job seekers with basic information on job vacancies and firms with basic information on potential candidates to facilitate employment matches. While other initiatives also form part of the country's LMIS, they are more limited in scope.

To guide the reform efforts focused on developing a modern, effective, and efficient LMIS, the government of Indonesia asked the World Bank to undertake a benchmarking exercise between AyoKitaKerja and the Republic of Korea's Work-net. Both platforms are just one part of each country's system overall. They were selected for this exercise given the similarity of their trajectory. Work-net—developed by the Korea Employment Information Service (KEIS) under of the Ministry of Employment and Labor (MoEL)—also started as a basic job-matching platform, similar to what AyoKitaKerja is now. It has evolved to become a more complex system, offering all functions expected of an advanced LMIS either through the platform or through its interoperability with other systems. For this reason, Work-net offers a practical example of how the government of Indonesia could develop its LMIS from its current state.



Korea was selected for this benchmark exercise because its LMIS is considered to be a world-class system.<sup>2</sup> Work-net, the online platform of labor market services established in 1998, is at the core of Korea's LMIS. Among other things, Work-net provides the key functions that all advanced LMIS systems should have: (a) job matching, (b) information on skills available in the workforce, (c) current and future jobs and skills in demand, (d) education and training sought by employers for different careers, jobs, and skills, (e) personal fit to specific careers and jobs, vacancies, and job seekers, and (f) support from the government for acquiring skills through different measures, including scholarships and other active labor market policies (ALMPs). Work-net is linked to other relevant online systems, including social security and human resource development networks. Its functions are supported by strong institutional arrangements involving the private sector, central and local governments, the education system, a strong technological base for sharing information, and advanced-technology solutions (big data, artificial intelligence) for efficiently analyzing data and disseminating the available information.

This report presents the key findings of a benchmarking exercise focused on job-matching platforms, with broader conclusions for building up an effective LMIS. In evaluating the performance of the Korean and Indonesian systems, the report recognizes differences in the context in which they operate as well as in their trajectories. The functions of Work-net highlighted in this report correspond to the characteristics of an advanced LMIS and provide a potential example of what the government of Indonesia could aim for in the process of revamping its LMIS.

2. The terms "world class" and "advanced" are used interchangeably throughout the report.

## Work-net vs. AyoKitaKerja: Gap Analysis

The benchmarking exercise suggests that the key elements of an advanced LMIS are not fully developed in AyoKitaKerja. While AyoKitaKerja has made some progress related to data collection and validation, the development of these elements is more limited than those of Work-net. Work-net collects information on job vacancies from a wide variety of sources through well-established partnerships with the private sector (including both firms and job portals) as well as national, regional, and local governments and institutions. As a result of these partnerships and the consequent relevance of information on the platform, job seekers rely on Work-net to find jobs. In addition, the Korean government requires job seekers to register on Work-net to be eligible for unemployment benefits or to participate in ALMPs. Through public employment service (PES) offices, Work-net provides support to small and medium enterprises (SMEs) posting their vacancies and to vulnerable job seekers requiring more personalized help. Work-net has a four-step validation process to ensure that all information posted on the platform is reliable, including local PES offices, computer algorithms, monitoring experts, and system linkages validations. Different from Work-net, AyoKitaKerja only reports data collected from firms posting vacancies on its portal; it does not report vacancies posted on other job portals. Most vacancies are directed to low-skill workers. Staff at PES offices, although limited in number, are available to assist job seekers and SMEs. Data validation is manual and infrequent: regional offices of the Ministry of Manpower (MoM) perform some job-vacancy checks, while PES offices validate job seekers' data if and when workers obtain an AK1/job-seeker card.

AyoKitaKerja lacks several elements needed to provide client-centric, comprehensive services such as those offered by Work-net. Work-net is accessible through multiple devices (personal computer, tablet, mobile web, and app). The platform is easy to navigate, with a user-friendly screen design and interface (which was designed using User Interface/User Experience [UX/UI] technology) and interoperability with other subsystems in the Korean LMIS (with a unique log-in). The platform also offers customized services and information based on job seekers' profiles, including services tailored to vulnerable workers. In addition, Work-net operates a 24/7 call center and a feedback system for rapid client support as well as a customer complaint resolution mechanism. AyoKitaKerja, although accessible through various devices (not mobile app), is not user friendly and lacks linkages with other subsystems in Indonesia's LMIS. Furthermore, it does not have a responsive client support mechanism or a feedback system, and it does not tailor services to a job seeker's profile.

AyoKitaKerja has limited human resources and technical infrastructure, which has an impact on the provision of reliable and efficient services. Work-net has a dedicated marketing team to attract job seekers; the team conducts active marketing campaigns and events, targets specific groups (for example, youth), fosters partnerships (for example, with universities), and disseminates research findings. A large number

of skilled counselors in PES offices use the platform. Work-net has a research team dedicated to providing high-quality analysis and labor market intelligence, which are later disseminated through the marketing team. Work-net's technical infrastructure benefits from services available round-the-clock due to its redundancy server and replication system. A daily and weekly backup system and a disaster recovery system are in place, with data centers at different locations to prevent loss of data. In contrast, AyoKitaKerja has very limited human resources for developing and operating the system: it only has four dedicated staff at MoM headquarters; about half of PES offices use the platform, which has a limited number of staff and no marketing or research team. AyoKitaKerja's technical infrastructure is also relatively limited: although services are available round-the-clock, they are slow, and, in event of failure, there is no safeguard redundancy system; backup systems are in place, but they are stored on MoM servers, and there are no disaster recovery procedures.

AyoKitaKerja's management of data quality and information security is not sufficient to provide reliable services. Work-net has a data quality management system, which allows for periodic monitoring and evaluation of data, a master data management system, which allows for personalization of services, and quality standards. Strong security policies and systems are in place to protect users' information, including administrative security (guidelines and trainings), physical security (data access), and technical security (network, server, and user). In contrast, AyoKitaKerja has no quality control guidelines or correction devices for monitoring and performing data quality checks, and its information security is limited to firewalls.

Finally, AyoKitaKerja's functions are not comprehensive. Work-net either directly provides functions besides job matching or is linked to subsystems within the Korean LMIS that do so. For example, the platform links users to the Korea Network for Occupations and Workers for career and skills guidance and to HRD-net for vocational training. For government support, the platform provides information on employment and welfare policies at the national and local levels; it has partnerships and links with other ministries and public agencies. In the area of labor market information and analysis, Work-net feeds information to the Korean LMIS, which KEIS uses to evaluate and produce analyses and forecasting that it makes available to a wide variety of users. Work-net also shares information through open application programming interfaces (APIs). In contrast, AyoKitaKerja's functions are limited mostly to providing job-matching services for low-skill workers and basic tools for career guidance.

A full summary of the existing gaps in service is presented in table ES.1.

Table ES.1 **Summary of Gaps between AyoKitaKerja and Work-net**

Area	Work-net	AyoKitaKerja
Data collection	Collection of vacancies from a wide variety of sources, including firms and other platforms	Limited to some firms looking for low-skill workers
	Support for SMEs to post vacancies	Limited support provided by PES staff
	Direct registration of job seekers	Limited to a small % of the workforce
	Strong links with ALMPs and other government programs	No
	Support with registration for vulnerable groups	Limited support provided by PES staff
Data validation	Data verification through multiple steps and sources	Limited to basic and manual verification by PES staff
Accessibility and user experience	Accessible through multiple devices (personal computer, tablet, mobile web, and app) with assistance services	Limited to personal computer, tablet, and mobile web; very limited assistance
	Interconnected systems	No
	User-friendly design and unified log-in for all subsystems	No
	Feedback system, client support, and customer complaint resolution mechanisms	No
Tailored service delivery	Tailored job recommendations, services, and information, including vulnerable population	No
Strategic marketing	Dedicated marketing team	No
	User trainings	No
Interoperability with other systems	System linked to other subsystems	No
Human resources serving the system and users	Used by skilled counselors	Limited to PES staff
	Research team	No
	LMIS management team	No
Technical infrastructure	Backup system	Yes, but on MoM server
	Disaster recovery system	No
	Integrated monitoring system	No
	Big data platform for analysis	No

Data management	Data quality management systems, team, standards, and checks in place	No
Area	Work-net	AyoKitaKerja
Information security	Information protection (system and training)	Limited to firewall; NO training
	Security measures in place	No
Functions other than job matching	Career and skills guidance	Limited to basic guidance and application material templates
	Government support	No
	Labor market information and analysis	No

Note: SMEs = small and medium enterprises. ALMPs = active labor market programs. PES = public employment service. LMIS= labor market information system. MoM = Ministry of Manpower.

## Going Forward: A Vision for Indonesia’s LMIS

The job-matching platform and the broader LMIS managed by the MoM in Indonesia have many potential users and uses, but careful reforms are needed for Indonesia to move from a basic-to-intermediate LMIS toward an advanced LMIS. The reform will require continuously innovating and improving the services available in response to changing client needs and in accordance with changes in local, national, regional, and global labor markets. At the same time, the job-matching platform should integrate current advances in technology in order to raise both efficiency and effectiveness of the system. Broadening services and reaching out to a more diverse set of clients should be a transversal theme. The timing of reform is advantageous because recent advances in artificial intelligence, the overall digitization of government services, and the experience of countries with more developed systems can help Indonesia to become a top-performing and resource-efficient system.

Five key characteristics are at the core of the vision that could take Indonesia’s LMIS to an advanced level. Figure ES.1 presents a vision for what Indonesia’s LMIS could aspire to be.

The vision centers on improving the job-matching capacity and building the foundations of a coordinated and integrated system of services. A world-class LMIS has five key interrelated characteristics:

Figure ES.1 **Vision of a World-Class Labor Market Information System**

### Five key characteristics of an advanced LMIS



- *Relevance.* It attracts, collects, and coordinates large volumes of trustworthy data, actively gathers data, both qualitative and quantitative, from a variety of sources, and transforms these data into relevant and reliable information for different users.
- *Reliability.* It uses strong data management and IT and security systems that guarantee the validity and continuous accessibility of data.
- *Efficiency.* It applies technology to connect users to the system, improves the services provided across various dimensions, and monitors outcomes to improve services and policies.
- *Clients-at-the-center.* It responds to client feedback, targets individual needs, and is easily accessible, navigable, and user friendly.
- *Comprehensiveness.* It forms part of, and feeds into, broader development policies and serves a wide variety of stakeholders, offering various services and attending to different needs.

The entire system needs to be underpinned by the smart use of technology, collaborative partnerships, and institutional arrangements. The system should rely on advanced-technology solutions (including advanced algorithms, artificial intelligence, and big-data techniques) and integrate traditional and nontraditional sources of data. The system should also foster collaborative partnerships with both public and private sector actors (that is, workers, firms, policy makers, researchers, and practitioners), who will use and produce information that feeds the system. Finally, the system should

have institutional arrangements (policies, systems, and resources) for managing the LMIS and coordinating effectively with all stakeholders. These essential features will strengthen the availability, coherence, and use of data needed to inform key decisions and improve coordination of the overall system.

The report also presents a set of concrete actions to arrive at this strategic vision. Over the short term, the actions focus on improving the job-matching platform by attracting a critical mass of users, improving the effectiveness of job matching, and setting the basis for a broader LMIS. This improvement can be accomplished by making the platform more user friendly through the application of technological solutions, strengthening data quality and security, identifying key stakeholders, strengthening the connection with offline services in PES offices, and linking the platform with existing information databases for education and training, labor market information, government ALMPs, and social programs. Over the medium and long terms, the different segments of an advanced LMIS can be developed by deepening and tailoring the services available for providing career guidance, labor market information, and links to relevant labor market government programs. Once these building blocks are in place, they could be integrated further so that users can move easily across functions.

## Organization of the Report

Chapter 1 proposes a framework for defining an advanced LMIS that includes stakeholders, functions, key elements, key characteristics, and essential features that go well beyond those of an online job-matching platform. Chapter 2 discusses the current state of Indonesia's AyoKitaKerja, which is the main focus of the analysis, is the most developed LMIS function and is considered the building block of Indonesia's LMIS. Chapter 2 also presents Indonesia's LMIS-related initiatives in addition to AyoKitaKerja and introduces some comparison with LMISs in other countries. Chapter 3 focuses in more detail on the factors that are essential for building up the five key characteristics of a well-functioning LMIS. The analysis benchmarks AyoKitaKerja against Korea's Work-net in each of these areas, with a particular focus on the job-matching function. Finally, chapter 4 provides a vision and action plan for developing a comprehensive LMIS.

## Abbreviations

<b>AI</b>	artificial intelligence
<b>ALIO</b>	All Public Information in One (Rep. of Korea)
<b>ALMP</b>	active labor market program
<b>API</b>	application programming interface
<b>BLK</b>	work training center
<b>BNSP</b>	Professional Certification Authority
<b>BPS</b>	Central Bureau of Statistics (Indonesia)
<b>COL</b>	Critical Occupations List
<b>EPS</b>	Employment Permit System (Rep. of Korea)
<b>GDP</b>	gross domestic product
<b>HRD-net</b>	Human Resources Development Service (Rep. of Korea)
<b>ICT</b>	Information and communication technology
<b>IT</b>	Information technology
<b>KBJPI</b>	Indonesian Standard Classification of Occupations
<b>KEIS</b>	Korea Employment Information Service
<b>KNOW</b>	Korea Network for Occupations and Workers
<b>LMIS</b>	labor market information system
<b>LMO</b>	labor market observatory
<b>LVM</b>	German Virtual Labor Market
<b>MoEL</b>	Ministry of Employment and Labor (Rep. of Korea)
<b>MoM</b>	Ministry of Manpower (Indonesia)
<b>NIK</b>	citizen identification number (Indonesia)
<b>OEVS</b>	Occupational Employment and Vacancy Survey
<b>PES</b>	public employment service
<b>PIAC</b>	Program for the International Assessment of Adult Competencies
<b>PISA</b>	Programme for International Student Assessment
<b>RPJPN</b>	National Long-Term Development Plan (Indonesia)
<b>Sakernas</b>	National Labor Force Survey
<b>SKKNI</b>	Indonesia National Work Competency Standards
<b>SMEs</b>	small and medium enterprises
<b>SMS</b>	short message service
<b>SSC</b>	sector skills council
<b>TKA</b>	Foreign Workers System
<b>TVET</b>	technical and vocational education and training
<b>UX/UI</b>	User Experience/User Interface
<b>VOC</b>	Voice Of Customer
<b>WLKP</b>	Mandatory Employment Reporting

## 1. Introduction: Improving Labor Market Efficiency in Indonesia



As Indonesia's economy has grown in recent years, poverty has fallen. Over the past two decades, gross domestic product (GDP) per capita increased fivefold, from USD823 in 2000 to USD3,932 in 2018, and the national poverty rate fell by more than half, reaching 9.8 percent in 2018.<sup>1</sup> These achievements were accompanied by the significant structural transformation of the labor market. Between 2001 and 2018, the share of employment in the agriculture sector declined from 44 percent to 29 percent and wage employment rose from 29 percent to 40 percent. However, about 26 million Indonesians are still poor, and another 50 million are vulnerable to falling into poverty. Indonesia also faces many jobs-related challenges. Informality remains the norm, with 57 percent of the workforce either being self-employed or working for wages without regular employment. About 22 percent of workers are in elementary occupations. Recent estimates suggest that the low-skill, low-productivity nature of many jobs in Indonesia makes them vulnerable to automation (Patrinis 2017). Meanwhile, although the labor force is expanding rapidly, women remain an untapped resource, as only slightly more than half of them are active in the labor market, compared with slightly more than 80 percent of men. Indonesia is looking to improve the quality of available jobs, make rapid progress toward eliminating poverty, and ensure sustainable improvements in welfare for its large population through a strategy centered on human capital development.

There are indications that skills mismatches are building up in Indonesia due to labor market failures. If the labor market was functioning well, matches between job seekers and employers would be the norm. However, this is not happening in Indonesia at the moment. While unemployment rates are low overall, at 5.4 percent, young people and those with higher levels of education are overrepresented.<sup>2</sup> At the same time, according to the 2015 Enterprise Survey conducted by the World

1. See <https://www.worldbank.org/en/country/indonesia/overview>.

2. Estimates for 2018, based on National Labor Force Survey (Sakernas) data.

Bank, employers complain about the difficulty of filling high-skill jobs, suggesting that not only the level but also the relevance of skills in the population do not match what firms actually need.<sup>3</sup> More than 90 percent of Indonesians looking for work rely on informal networks (family and friends) rather than on publicly provided employment services, suggesting that such services are not sufficiently developed.<sup>4</sup>

Labor market failures in the areas of information, coordination, and credit constraints contribute to skills mismatches in Indonesia.<sup>5</sup> When labor market information is incomplete, job seekers lack information on the skills demanded by employers, potentially resulting in the misallocation of education investments. At the same time, employers experience higher search costs due to limited information on job seekers' skills or short supply of relevant skills in the labor market. Coordination failures also contribute to skills mismatches, with employers underinvesting in training if they expect that workers will change jobs after acquiring the additional skills. Finally, failures in credit markets imply that poorer households might be unable to finance appropriate training, job search, or self-employment options, thus ending up either unemployed or in jobs that do not match their skills.

Ultimately, these labor market failures lead to inefficient job matches and limit the economic opportunities for less well-off job seekers. On the employer side, poor job matches raise costs by lowering productivity and outputs, reducing competitiveness, and limiting long-term performance and investments. On the employee side, workers receive lower wages, have less job security, and are less satisfied when their skills are poorly matched to their job. As a result, the country's economy does

not benefit from its investments in human capital and is unable to compete effectively due to low productivity and weak economic performance (figure 1.1).

Governments around the world use active labor market programs (ALMPs) to address these labor market failures. ALMPs are usually categorized into three groups: interventions that increase employability (for example, targeted vocational training and self-employment/entrepreneurship programs), interventions that spur labor demand (for example, wage subsidies, labor-intensive public work), and interventions that facilitate the job-matching and placement process (for example, job-search assistance and information on job seekers). However, ALMPs are not a silver bullet for addressing all market failures;<sup>6</sup> complementary interventions focused on the demand side (for example, programs helping firms to innovate, grow, and create more jobs) and on labor regulations (for example, minimum wages and labor laws) are also important (McKenzie 2017).

This report examines how the development of a well-functioning labor market information system (LMIS) can improve the information provided to different stakeholders in Indonesia. The services provided by a well-functioning LMIS fall under both the ALMPs and the demand-side type of policy interventions. All of these services seek to improve labor market outcomes by providing better information. Providing information and guidance is particularly important in low- and middle-income countries where access to labor market information from other sources is limited and in communities where socioeconomic status and social norms affect aspirations (; Dizon-Ross 2014). For example, providing students and job seekers with information about skills and career prospects, own abilities, and avenues for financing has been shown to have positive impacts on education and employment outcomes (see, for example, Dinkelman and Martínez 2014; Jensen 2010; Nguyen

6. McKenzie (2017) shows that ALMPs are not always highly impactful and that the most effective ALMPs are usually designed to overcome spatial and sectoral mismatches.

3. A Program for the International Assessment of Adult Competencies (PIAAC) survey carried out in 2015 in Jakarta also found mismatches in the literacy skills of workers and the level of proficiency demanded in their jobs (OECD 2015).

4. Estimates for 2018, based on Sakernas data.

5. A forthcoming report by the World Bank provides more evidence on these market failures and on how the government is addressing them (World Bank, forthcoming).

Figure 1.1 Potential Costs of Labor Market Failures



Source: Adapted from CMEA and WB 2019.

2008). The overall objective of an LMIS is, therefore, to produce relevant information to improve human capital management and labor outcomes so that the country can meet its economic development and growth potential. To achieve this objective, the LMIS needs to provide accurate, timely information and services that facilitate the decision-making processes of various stakeholders in the labor market.<sup>7</sup>

The Indonesian Ministry of Manpower (MoM) is seeking to develop a more modern, comprehensive LMIS. As a first step toward achieving this goal, it is seeking

7. A well-functioning LMIS does not crowd out privately managed job portals; instead, it makes them active players. The government plays an important role as a coordinator of information so that all stakeholders in the labor market have accurate, timely information for decision making.

to strengthen its job-matching platform, AyoKitaKerja.<sup>8</sup> MoM launched AyoKitaKerja in 2016 to serve a growing number of firms and job seekers (both unemployed and employed who are looking to improve their working situation). The platform has some basic elements of an integrated LMIS but is not yet a world-class job-matching platform with a broad-based set of users, a critical mass of high-quality information, and a high success rate in terms of jobs placements.<sup>9</sup>

8. A job-matching platform that connects the demand for and supply of workers is a critical, but not sufficient, element of a well-functioning LMIS.

9. On September 29, 2019, MoM launched the online platform named Sisknaker, which aims to offer an entry point to all MoM databases, whether used by the public or by government practitioners. Sisknaker also incorporates a job-matching platform—KarirHub—that includes some of the desirable characteristics discussed in this report. Yet that platform is too



In order to identify the actions needed to develop AyoKitaKerja, the government of Indonesia asked the World Bank to benchmark the functions and features of AyoKitaKerja against an advanced job-matching platform. The Republic of Korea's Work-net system was chosen for this exercise. Work-net is the job-matching platform managed by the Ministry of Employment and Labor and Korea Employment Information Service, a public agency at the center of Korea's LMIS. Work-net, which, similar to AyoKitaKerja, started as an online job-matching platform, now provides comprehensive employment information and employment support services. By highlighting some important gaps between the functions, organization, and implementation of Work-net and AyoKitaKerja, the benchmarking exercise is intended to provide practical information on possible actions for developing AyoKitaKerja and improving its performance.

young to be evaluated comprehensively, as only a few job seekers and firms were registered at the time this report was written.

## Labor Market Information Systems

Most countries produce labor market information, but many lack accurate, relevant, and up-to-date information that can assist key labor market actors.<sup>10</sup> An advanced LMIS that provides relevant, timely information can help stakeholders to make informed choices on a variety of issues, including job search, career planning and skills upgrading, business investment and hiring decisions, migration policies, public or private workforce and skills investments, and optimal employment and skills policy designed to meet future demands. An advanced LMIS is an integral part of modern employment services that help to reduce unemployment, boost the productivity of firms, manage and prevent risks related to labor markets, and maximize the impact of skills and labor market programs (Sorensen and Mas 2016; Woltermann 2012; Yoo 2018). The LMIS does not compete with private

10. Typical examples are labor force data collected by national statistics offices.

actors; instead, it complements and promotes them by linking to and incorporating functions that are undertaken by private institutions.

LMISs can be classified according to the quality of information they produce, the involvement of stakeholders, and the strengths of the connections between institutional partners. Table 1.1 presents the distinctive characteristics of a basic, intermediate, and advanced LMIS (chapter 2 elaborates more on this classification; see Sorenson and Mas 2016).

A key element of an LMIS is an online platform that is managed by the government and used to disseminate labor market information and provide online services. While being an important component, the online platform managed by the government is only one element of an LMIS. LMISs also include the information and services provided by the private sector, such as private intermediation services or private career guidance providers. The government-managed platform evolves in response to and jointly with the information and services of the whole system. Government-managed platforms rely on several sources of information, including other government agencies such as national statistics offices, line ministries, education institutions, and private intermediation services, among others. These platforms are often connected to the face-to-face services of other organizations, such as public employment agencies and schools and training institutions. This report focuses mainly on this element of the LMIS; hereafter, the term LMIS refers to the public interface and its underlying support services.

## Framework for an Advanced LMIS

This report proposes a framework defining an advanced LMIS (figure 1.2). The framework includes LMIS stakeholders, the functions it offers, the underlying key elements, and the essential features.

## Stakeholders

Stakeholders are the potential users and producers of labor market intelligence generated by the LMIS. Stakeholders include actual or potential workers (for example, unemployed, inactive, or current and future students), firms, policy makers, researchers, and practitioners (for examples, those in skills development systems, public and private employment services, and other public service systems, such as social protection).

## Key Functions

The key functions of an advanced LMIS are to provide direct services to different users as well as to provide data and information analyzed and processed by users. The various functions serve the needs of stakeholders but also rely on them for their input and processing. The LMIS includes the following key functions:

- *Job matching.* Core services that help unemployed or employed workers—looking to improve their working situation—to identify job opportunities, help firms to close their skills gaps, and assist practitioners in public or private employment services to conduct job matching. AyoKitaKerja is, above all, a job-matching platform.
- *Career and skills guidance.* Services that guide current and future workers in identifying the skills that are, or will be, in demand, their own aptitude and interest in different types of jobs, and the skills development paths needed to fulfill their ambitions. Successful career guidance services connect users with education and training opportunities.
- *Government support.* Services that help individuals and practitioners to identify potential government programs (ALMPs, other skills-building programs, business support, social welfare programs) from which they could benefit.
- *General labor market information and analysis.* Information that provides policy makers, practitioners, and researchers with comprehensive information on labor market outcomes and the impact of different policies

Table 1.1 **LMIS Classification**

Element	Basic	Intermediate	Advanced
Information	Provides basic information via statistical indicators using national surveys and administrative data	Provides market intelligence using different data sources beyond surveys	Provides several subsystems of information and digital tools to collect, produce, evaluate, and disseminate updated (often real-time) information using big data
Services	None	Provides basic services to different stakeholders— in particular, job seekers and firms	Provides several services tailored to different users
Actors	Involves a small number of public sector actors	Involves more public sector actors, including education systems, job-counseling and job-matching services, social security, statistics offices, and business registries	Involves both public and private sector actors as users and producers of data and services

Source: World Bank adaptation from Sorenson and Mas 2016.

and programs, largely with the purpose of informing policy formulation. Usually, a labor market observatory (LMO) is the entity in charge of producing the information and intelligence of the LMIS and disseminating it to stakeholders (Rutkowski, de Paz, and Levin 2018). LMOs can be separate agencies, a department in a ministry (Labor/Manpower, Economy/Planning, etc.) or contracted out to think tanks or universities.

### Key Elements and Features

A well-functioning LMIS has the following key elements:

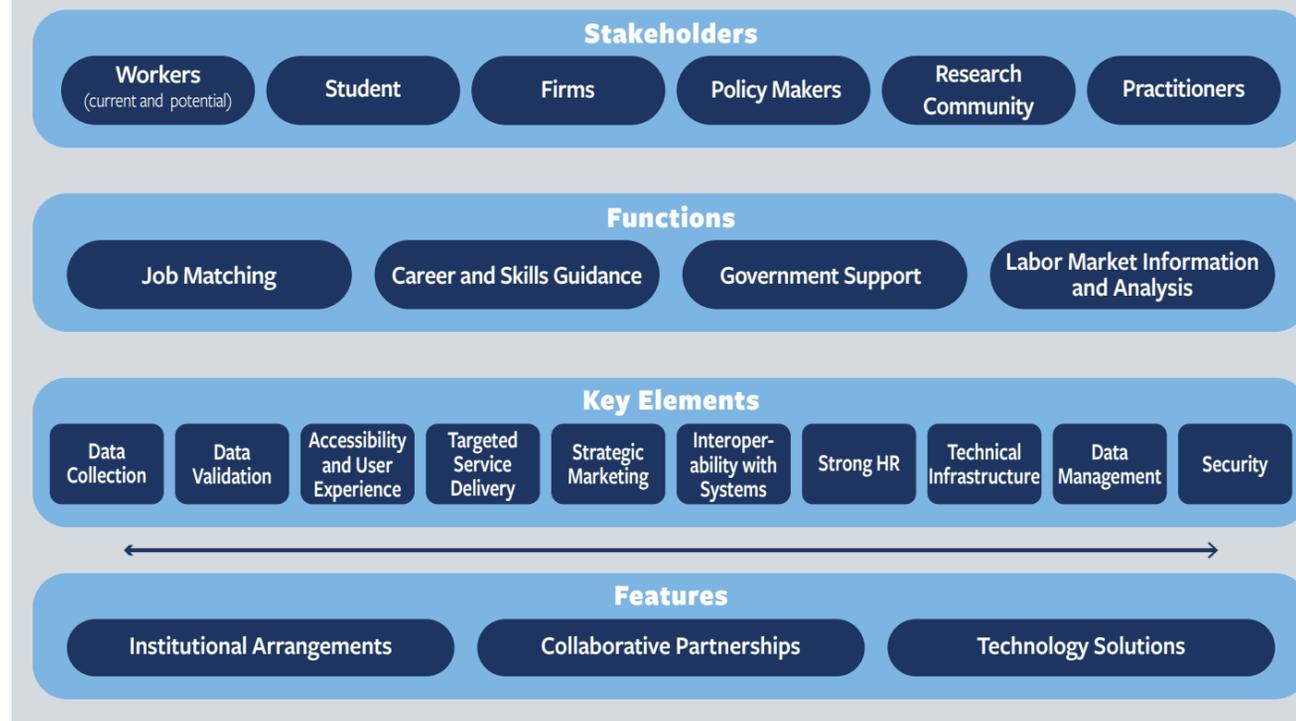
- Data collection
- Data validation
- Accessibility and user experience
- Targeted service delivery
- Strategic marketing
- Interoperability with other systems
- Human resources serving the system and its users

- Technical infrastructure
- Data management
- Information security.

Three features are essential to support these functions. First, the system should build on strong institutional arrangements involving key stakeholders such as policy makers and the education system. Second, the system should enjoy an active partnership with private sector actors, which is, in itself, an indicator of the value of the LMIS (Sorenson and Mas 2016). Third, the system should rely on a strong technological base and advanced- technology solutions (including traditional surveys and real-time data such as big data and artificial intelligence) for sharing data efficiently and for analyzing and disseminating the available information.<sup>11</sup>

11. Big-data analysis should be used to complement, not replace, traditional surveys because information available online might be biased toward specific groups. For example, the jobs posted online are usually high-skill jobs in the formal sector; they are rarely jobs in the informal sector.

Figure 1.2 **Framework of an Advanced LMIS**



In addition, five characteristics are key to the success of an advanced LMIS. These characteristics are based on the benchmarking exercise described in chapter 3, good practice observed in other countries, and a recent cross-country comparison of LMISs (Sorenson and Mas 2016). These key characteristics allow the system to undertake the following:

- *Provide relevant information by attracting, collecting, and coordinating a critical mass of trustworthy, updated information that improves job matching and by actively linking to other sources of data, both private and public.*
- *Be reliable and trustworthy by providing frequent updates, establishing quality control systems—manual and information technology based—and ensuring the necessary technical infrastructure that guarantees service availability and information integrity.* Technical infrastructure should include hardware capacity, backup and disaster recovery systems, and

- *data management and information security systems.*
- *Ensure the provision of effective and efficient services by applying technology to facilitate the use of online services (by individuals, officers in public employment service offices, and career counselors) and by regularly monitoring all aspects of system efficiency and effectiveness to improve services continuously.*
- *Be client centered by providing users with comprehensive, targeted, and relevant information and other services through an appropriate design of the online experience, prompt resolution of user inconveniences, several channels of communications, and analysis using both traditional surveys and real-time information (artificial intelligence, big data).*
- *Strive for comprehensiveness in providing a broad range of stakeholders with a diverse set of services to improve their basis for decision making and operate in connection with other public information systems (social protection, education, and training) and as a fully integrated part of national development policies.*

## 2. The Indonesian Labor Market Information System



As presented in chapter 1, the ultimate goal of a labor market information system (LMIS) is to improve human capital management and labor market outcomes in order to help the country meet its economic development and growth objectives. An advanced LMIS is defined as a set of stakeholders, functions, key elements, key characteristics, and essential features that produce relevant information and provide services that facilitate the decision making of diverse stakeholders.

To this end, the Indonesian Ministry of Manpower (MoM) is seeking to develop a more modern and comprehensive LMIS.<sup>1</sup> In Indonesia, the job-matching platform, AyoKitaKerja, is the most developed function within the country's system, and the Indonesian LMIS overlaps almost fully with it. This chapter examines the AyoKitaKerja platform in detail and identifies its current users and functions according to the LMIS framework presented in chapter 1. It describes additional initiatives that are part of Indonesia's broader LMIS, discusses international examples of advanced LMISs, and suggests a classification for Indonesia's system.

1. See note 9 in chapter 1.

Table 2.1 **AyoKitaKerja Job Vacancies and Job Seekers, 2016–19**

Year	Average number of job vacancies	Average number of job seekers
2019*	69,732	511,131
2018	500,480	539,170
2017	55,466	170,853
2016	161,573	468,672

Source: Ministry of Manpower and AyoKitaKerja website.

Note: AyoKitaKerja was initially designed to cover domestic vacancies only. The significant rise in vacancies in 2018 was due to the incorporation of international vacancies as well as to the establishment of a team focused on posting vacancies from various sources. The team was dissolved in 2019.

\* January 1, 2019 to November 4, 2019.

## AyoKitaKerja: Overview of Its Functions and Users

In 2016 MoM launched AyoKitaKerja as a job-matching platform catering primarily to job seekers and firms but also to practitioners in public employment offices who assist these groups in the job-matching process. The platform provides basic job-matching services and some job-search guidance but lacks career guidance as well as links to relevant public and private information sources and labor market analysis. This section assesses AyoKitaKerja's performance in each of the four key LMIS functions.

### Job Matching

AyoKitaKerja currently works as an online employment service intended to improve labor market intermediation, reduce unemployment (and duration of unemployment), and help enterprises to find qualified workers to fill their needs. The service matches job vacancies with job seekers using an online tool that connects job seekers and companies. The job-matching platform enables job seekers to find information on current job vacancies and requirements of the jobs offered and enables employers to find information on job seekers.

Since its inception, the number of users of AyoKitaKerja has fluctuated significantly. The platform currently covers a relatively small portion of Indonesia's total unemployed. Table 2.1 shows indicators for AyoKitaKerja since its inception. In 2018, the latest year for which labor force data are available for comparison, AyoKitaKerja had around half a million active registered job seekers, compared with a pool of unemployed of nearly 6 million and a labor force of 130 million.<sup>2</sup> From the labor demand side, some 12,000 companies were registered. By November 2019, the annual average number of active job vacancies was just below 70,000, far fewer than the number of job seekers, at more than half a million. AyoKitaKerja staff recognize that these figures may overestimate the actual number of vacancies and job seekers, as data are not updated regularly. By November 2019, the average daily number of visits was just below 40,000.<sup>3</sup>

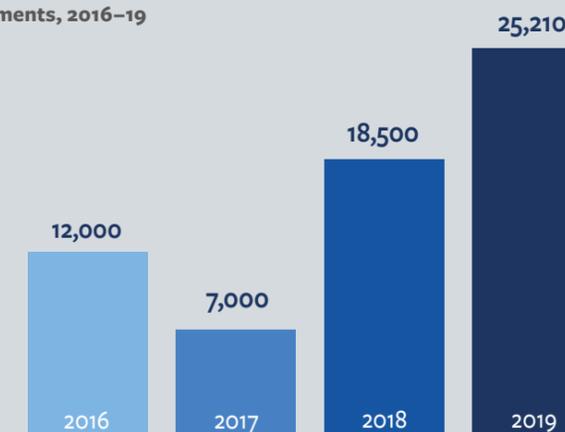
According to the most recent information available, AyoKitaKerja serves a specific segment of the labor market.<sup>4</sup> From the supply side, a majority of job seekers are

2. AyoKitaKerja considers a user to be active if she or he has logged in at least once during the previous six months.

3. Information accessed on the AyoKitaKerja website on November 4, 2019.

4. Produced by the AyoKitaKerja team on September 12, 2019.

Figure 2.1 **AyoKitaKerja Job Placements, 2016–19**



Source: Ministry of Manpower (2016–18) and AyoKitaKerja website (2019).

\* January 1, 2019 to November 4, 2019.

based in Java (73 percent) and are young (81 percent are 25 years or younger); men and women are represented almost equally; the vast majority of those registered (86 percent) have completed no more than senior high school. From the demand side, vacancies are directed largely to job seekers with low or medium education (97 percent require no more than a senior high school diploma); as many as 81 percent of vacancies are posted by firms in the manufacturing sector.<sup>5</sup>

Since it was first launched, AyoKitaKerja has had a positive trend in terms of job placements (figure 2.1). The total number of job placements has kept up with the increasing number of job seekers. The best year for total job placements was 2019. Between January 1 and November 4, 2019, AyoKitaKerja made 25,210 job placements, corresponding to about 5 percent of job seekers and one-third of vacancies on the platform.

To become part of Indonesia's broader human capital policy and a building block of the country's LMIS, AyoKitaKerja would have to target and reach other segments

5. As of 2018, a labor regulation requires firms wishing to hire a foreign worker to also appoint a "domestic companion worker" to facilitate skills transfer. This regulation may encourage firms to post vacancies for very low-paying jobs in order to meet this requirement.

of the labor market. Moreover, to be representative of the Indonesian labor market, the platform would have to expand the services offered to firms seeking workers with higher-level skills and to capture additional information on more qualified jobs and job seekers. The limited use of AyoKitaKerja among the total number of unemployed and other job seekers (and, presumably, total job offers) affects the services it can offer. The quality of the job matching and other LMIS functions will depend on the volume and representativeness of the labor supply and labor demand reached. The current numbers do not reflect national employment trends; as such, they have limited use for policy making and for public employment services beyond the current job matching in the system.

### Career and Skills Guidance

AyoKitaKerja currently provides basic job-search guidance on its homepage. The platform is not operated by career guidance counselors; it includes generic templates for résumés and job-search letters as well as general job-search tips. Through an online form, users can post questions related to job-search approaches, trends in job vacancies, information on the requirements of different jobs, and training needed. The Counseling and

Job Guidance Group in MoM (outside of AyoKitaKerja) responds to questions by e-mail. No information is available on the volume or quality of this service.

AyoKitaKerja does not connect its users to other relevant and currently available sources of information. For example, MoM's website provides very basic information on training opportunities and e-learning platforms,<sup>6</sup> but not on general or vocational training through the education system. This information is not linked to AyoKitaKerja.

Although it is planning to expand relationships, AyoKitaKerja does not take full advantage of career centers at educational institutions. The platform is advertised in career guidance centers at some universities and training institutions, but it is not linked to any of their online services and is not operated by career guidance counselors.

Overall, given its narrow focus on job search, AyoKitaKerja cannot provide information or counseling services to students or persons wishing to upgrade their skills.

## Government Support

Only about half of local public employment service (PES) offices use AyoKitaKerja to assist job seekers because they have limited staff, computers, and budget to cover internet costs as well as unreliable internet connection, particularly in the eastern region. MoM has 514 regional offices; of these, 262 offices use the AyoKitaKerja platform. In each regional office, on average, only about two staff are responsible for delivering employment services.<sup>7</sup> Counselors at PES offices assist

6. An example is the Workers' Capacity Building and Job Training Search, which provides information on training and courses offered by national and subnational work training centers (BLKs). See <http://elearning.pusdiklat.kemnaker.go.id/> as well as <https://pelatihan.kemnaker.go.id/>.

7. Job placement services make up a very small part of PES work in Indonesia. For example, MoM's Bogor Regional Office has 65 staff members, and only 6 staff are in charge of job placement services. Nationally, about 524 PES staff use the platform. MoM officers provided the estimates during an interview on May 23, 2019.

job seekers who need help registering on AyoKitaKerja. However, given the limited information provided by the platform, counselors cannot draw on AyoKitaKerja to identify training opportunities to enhance the skills needed for a chosen career path or to identify government programs and support that can help job seekers to succeed in the labor market.

The platform is not linked to other government services such as social protection programs or to training opportunities and scholarships. However, it is linked with the Ministry of Home Affairs population database through a unique identification number that allows registered users to retrieve some basic data.

## Labor Market Information and Analysis

Although AyoKitaKerja provides information on job seekers and vacancies, its broader use as a source of labor market information is limited and not tailored to different stakeholders. Moreover, as AyoKitaKerja covers a very small share of the labor market, the underlying data are not yet sufficiently informative about general labor market trends, job-seeker profiles, or the job-matching process. While Indonesia's Central Bureau of Statistics (BPS) produces labor market data, it does not present information from AyoKitaKerja on its website, and AyoKitaKerja does not share information with other users through open application programming interfaces (APIs).

## Additional Initiatives That Are Part of Indonesia's LMIS

Besides AyoKitaKerja, the government of Indonesia has several other platforms that, although not currently interconnected, can be considered part of Indonesia's LMIS (table 2.2):

Table 2.2 Indonesia's LMIS Initiatives, by Function

Initiatives	Job matching	Career and skills guidance	Government support	Labor market information and analysis
Ministry of Manpower	No	Limited to e-Bursa Kerja	No	Limited to information on TKA, WLKP, and SKKNI
AyoKitaKerja	Yes	Limited	Limited	No
BNSP	No	Limited to certifications	No	No
BPS	No	No	No	Yes, basic statistics based on Sakernas
Civil Servant Selection System	Basic and limited to civil servants	Basic and limited to civil servants	No	No
Ministry of Education	No	No	Yes	No
Education and training platforms	No	Yes	No	No
Privately managed platforms	Yes	No	No	Yes

Note: TKA = National Work Competency Standards. TKA = Foreign Workers System. WLKP = Mandatory Employment Reporting. BNSP = Professional Certification Authority. BPS = Central Bureau of Statistics.

- *Ministry of Manpower* ([kemnaker.go.id](http://kemnaker.go.id)). The website provides information on different services offered by the ministry, including:<sup>8</sup>
  - Links to the Indonesia National Work Competency Standards (Standar Kompetensi Kerja Nasional Indonesia [SKKNI]), which provides basic information on the objectives of the competency framework and standards and on ALMP training courses.
  - Links to the Foreign Workers System (Tenaga Kerja Asing [TKA]), which provides information and services to foreign workers and employers

8. See note 9 in chapter 1.

- hiring foreign workers in the process of obtaining a work permit. Information includes the process, documents to download and fill out, requirements, frequently asked questions, and contact information.
- Link to Mandatory Employment Reporting (Wajib Laporkan Ketenagakerjaan di Perusahaan [WLKP]), which gathers information on companies fulfilling the Mandatory Report on Company Employment.<sup>9</sup> Firms can enter specific details on the company as well as labor-related information.

9. The online submission of the report is mandatory according to Regulation 18/2017.



- Link to e-Bursa Kerja, which is a webpage with job fair announcements.
- *BNSP* ([bnspp.go.id](http://bnspp.go.id)). The website of the Professional Certification Authority (BNSP) provides information on regulations and processes to job seekers who wish to be professionally certified. It also provides links to professional certification agencies (listed and licensed by BNSP).
- *BPS* ([www.bps.go.id](http://www.bps.go.id)). The national statistics institute provides basic indicators and publications related to the state of Indonesia's labor force based on the analysis of Sakernas (Indonesia's Labor Force Survey).
- *Civil Servant Selection System* ([sscn.bkn.go.id](http://sscn.bkn.go.id)). The website is the official site for the national registration of civil servants and provides an integrated system for their recruitment, including job postings for all government institutions and ministries.
- *Ministry of Education and Culture* ([kemdikbud.go.id](http://kemdikbud.go.id)). The official website of the Ministry of Education and Culture contains information on scholarships for education and training programs, both degree and non-degree, as well as courses and training information.
- *Education and training platforms* (for example, <https://forlap.ristekdikti.go.id/perguruan tinggi> and <http://sekolah.data.kemdikbud.go.id/>). These platforms include government websites with detailed information on degree and nondegree educational opportunities.
- *Privately managed platforms*. Platforms such as Ruangguru, JobStreet, LinkedIn, Glassdoor, and Global Salary Calculator are also part of the LMIS, providing job-matching services and labor market information that complement government-managed subsystems.

## LMIS Classification

LMIS can be classified into basic, intermediate, and advanced systems according to the quality of information they produce, the involvement of stakeholders, and the strengths of the connections between institutional partners. This classification is based on the framework presented in Sorenson and Mas (2016) and built on a landscape review of international best practices of LMIS models.

Sorenson and Mas (2016) argue that an LMIS is not just the technical infrastructure that gathers, processes, and disseminates labor market data (what they call a data-driven system) or just the services that provide information to workers, employers, and intermediaries (what they call a service-oriented system). Instead, a comprehensive LMIS has institutional arrangements that allow for constantly revolving information flows between key stakeholders (as well as policy makers, researchers, and other institutions), integrating both data-driven and service-oriented subsidiary systems. A comprehensive LMIS produces labor market intelligence and analysis needed to improve the functioning of the labor market since “data, policies, and services are interlinked and mutually reinforcing.” In addition, the proposed framework provides useful guidance on how to add stakeholders progressively and enhance their contributions and functions to help countries to move toward a more advanced system.<sup>10</sup>

Basic LMISs are mostly data driven. They provide statistics on the labor market and involve only a few public actors as users or producers. They focus on statistical indicators produced from surveys and registries (labor force surveys, establishment surveys, registry data), and they do not integrate employment services, to the extent that such services exist. Other sources of labor market data, generated from, for example, social

security or education systems, are not centralized or analyzed.

Intermediate LMISs involve more public actors, including, among others, education systems, job-counseling and job-matching services, social security, statistics offices, and business registries. Intermediate systems provide both data and some basic services to diverse stakeholders, in particular, job seekers and private firms. Different data sources beyond surveys are used to produce labor market intelligence. The private sector is still far from an active user or producer of information or services, however.

Advanced LMISs have fully developed the five characteristics outlined in the framework in chapter 1. Specifically, they are relevant, efficient, reliable, and comprehensive, and they put clients at the center. They involve both private and public actors as producers of information and users of data and services. These information systems are complex and comprehensive, consisting of several subsystems of information that successfully serve different users and help to reduce information gaps. Advanced LMISs collect, produce, evaluate, and disseminate labor market-related intelligence (historical, current, and projections). They provide both data for different users as well as direct services tailored to different users. They connect the demand and supply sides of labor markets and provide policy makers and researchers with data for policy evaluation and labor market analysis. Data and services are both inputs to and outputs from the system: reliable data are needed to inform services and interventions, and information emanating from service functions provides input for generating data (for example, input from employment offices). To provide updated information and customized services, several data sources need to be combined, including both traditional surveys as well as real-time data analyzed using big-data techniques (box 2.1).

10. The landscape review examined the LMISs of Australia, Botswana, Cameroon, Denmark, France, Jamaica, Rwanda, South Africa, the United Kingdom, and the United States (California).

### Box 2.1 Data Sources for an Advanced LMIS

An advanced LMIS gathers, analyzes, and disseminates information based on diverse and complementary data sources.

*Traditional labor market sources* are typically worker-level and firm-level surveys, censuses, and administrative databases. Surveys and censuses have been designed explicitly to capture information on the labor market and to be representative of a specific population (country, regions). These attributes make traditional data relevant for analyzing labor market and occupational trends, demand for skills, supply and shortages of skills, and so forth. Administrative data can also provide detailed information, and although not all administrative data may be relevant, the information can be disaggregated at the local level. Examples of traditional sources include labor force surveys, enterprise surveys, surveys on salary and wages, vacancy and occupational surveys, population censuses, administrative vacancies, job seekers, firms, and tax records.

*Real-time labor market sources* are an increasingly important source of data with two key characteristics. They are continuously available and provide granular information on the current state of the labor market due to the large volume of data generated by humans and machines. For example, analyzing online job vacancies can provide specific information on desired skills, worker attributes and characteristics, job titles, and occupations demanded as well as up-to-date information about job-related activities. However, given their nature, real-time data should be used as a complementary source of information, not as a replacement for traditional labor market data. Data from online sources is likely to be biased toward specific groups or to cover a specific subsample of the population. Online data have methodological issues related to quality, representativeness, and generalizability (Kureková, Beblavý, and Thum 2014). In the case of online job vacancies, for example, postings are likely to be related to formal job opportunities, to be directed to highly skilled workers, and to cover opportunities in the main job centers, larger firms, and specific sectors of the economy (Zhu, Fritzier, and Orłowski 2018).

Since real-time labor market data have not been designed for analytical purposes, big-data techniques are used to transform the data into a usable form for their analysis. The structure and content of real-time labor market data (text, videos, links) vary significantly. Big data also provide the raw material for many of artificial intelligence applications, where machines “learn” from data how to mimic human behavior (for example, chatbot services, which automate customer interaction mimicking a real person).

Big data play a central role in advanced LMISs by providing new approaches to labor market analyses and improving job matching. The following are examples of this role:

- *The Administrative Data Research Network in the United Kingdom* (<https://esrc.ukri.org/>), which links data from universities, government, and statistical authorities’ research centers, among others. In a recent project, big-data analysis provided an improved understanding of the links between employment, benefits, and committing an offense. The results of the analysis informed policies that help ex-offenders to reintegrate into society through gainful employment.
- *The German Virtual Labor Market (LVM)* ([www.jobboerse.arbeitsagentur.de](http://www.jobboerse.arbeitsagentur.de)), which provides a matching engine. This matching engine can provide tailored search results based on big-data analysis even when not all search criteria are fulfilled. The matching process works both from the job-seeker side and from the employer/job-vacancy side.
- *The Republic of Korea’s Job Compass* (<https://www.work.go.kr>), which uses information on millions of clients who found jobs via Work-net to provide tailored recommendations to current job seekers.

Sources: Cedefop 2019; WCC Development 2017; World Bank 2019.



Based on the current profile of information and services provided, Indonesia’s system can be classified as a basic-to-intermediate LMIS. The system has not yet developed the quality and variety of data and services or the institutional interconnectivity of an advanced system. Within the current platforms of the Indonesian government, AyoKitaKerja is the most developed, which is why it was selected for the benchmarking exercise in chapter 3. The platform provides job-matching services to private actors, provides limited career guidance, government support, and information, and is used, to a limited extent, by job seekers, PES offices, and firms. Still, to be considered an advanced system, the platform needs to be targeted and developed further: a limited number of private actors use the platform; AyoKitaKerja does not produce information for other users or purposes; data sources are limited; and AyoKitaKerja is not linked with other producers or users of data, including the BPS, education and training institutions, social security agencies, or private job portals. The benchmarking exercise in chapter 3 highlights gaps that the platform needs to overcome to be considered an advanced LMIS.

### International Examples of Advanced LMISs

This section presents examples of advanced LMISs in other countries.<sup>11</sup> These systems have different public interfaces tailored to different users; they provide customized services at the individual level, including through applications. Job-matching, career guidance, and skills development services are sophisticated and integrated and include advanced tools such as big-data analysis. Data and services are provided at the local level, and industry-specific data and services are available. Research and analyses on different labor market-related topics are produced and accessible. Real-time data, survey-based information, and case studies are collected from a variety of private and public sources and then analyzed, transformed, and communicated through a variety of channels and tools, including downloadable reports and briefs, illustrations, games,

11. The international examples presented in the tables include (1) a list of subsidiary systems, (2) detailed descriptions, and (3) their functions. International examples from Australia, Denmark, France, and the United Kingdom were adapted from Sorensen and Mas (2016).

Table 2.3 **Subsidiary LMIS Systems in Australia**

Subsidiary systems	Details	J-M	C&S	Gov S	LM I&A
Labor market information portal (lmip.gov.au)	Provides up-to-date information on local, state, national, and regional labor markets Displays labor market indicators and publishes analyses and background reports		✓		✓
Employment research and statistics (employment.gov.au)	Provides policy makers, researchers, and others with relevant research and analyses on labor market and industry trends, skills shortages and needs, and recruitment experiences to support policy development	✓	✓		
JobActive (jobactive.gov.au)	Provides job-matching services throughout the country and career and skills guidance Includes detailed information on vacancies, salary, job prospects, and location Also has a mobile application		✓	✓	
JobOutlook (joboutlook.gov.au)	Provides career guidance to help individuals to match skills, aptitude, and ambition with jobs Provides local information Identifies future growth industries and occupations		✓		✓
Myskills (myskills.gov.au)	Provides students, job seekers, workers, career counselors, and employers with information on education and training opportunities across the country		✓		
MyFuture (myfuture.edu.au)	Provides career-related tools and information for students, job seekers, workers, and career counselors, including pathways to apprenticeships Is targeted specifically to youth		✓		

Note: J-M = job matching. C&S = career and skills guidance. Gov S = government support. LM I&A = labor market information and analysis.

and videos. These systems provide information and services over both the short term (job matching) and medium to long term (career guidance, skills forecasts). Private and local government actors provide input to the system and obtain information from the system.

### Australia

Australia offers a clear example of how subsidiary systems feed into one another and the importance of active engagement with the private sector (table 2.3). For example, the JobActive job-matching platform, which in-

Table 2.4 **Subsidiary LMIS Systems in Denmark**

Subsidiary systems	Details	J-M	C&S	Gov S	LM I&A
Job Indsats (jobindsats.dk)	Provides information on different employment services and policies (unemployment insurance, welfare benefits, training opportunities)			✓	
Job Effekter (jobeffekter.dk)	Provides research from private and public sources, analyses of labor market trends, and evaluation of the effectiveness of various labor market policies				✓
Jobnet (jobnet.dk)	Provides tools for job matching, finding information on employment services, searching for jobs, and finding career guidance information Serves both job seekers and employers with tailored platforms Has specific interfaces for vulnerable groups	✓	✓	✓	
Jobindex (jobindex.dk)	Private job-matching portal	✓			
Employment statistics (dst.dk/en/statistik/emner/)	Provides labor market-related statistics and analysis using a wide variety of data sources (municipalities, job centers, business registries, social welfare, and immigration) Allows time series to be customized by, for example, gender, age, and regions				✓

Note: J-M = job matching. C&S = career and skills guidance. Gov S = government support. LM I&A = labor market information and analysis.

cludes up-to-date information from private agencies on job vacancies and skills in demand, continuously feeds the MyFuture and JobOutlook platforms for analysis and intelligence. MyFuture also partners with large private firms for providing information on apprenticeships. At the same time, the labor market information portal extracts data from the JobActive platform and then provides information on skills, wages, and employment prospects per occupation at several geographic levels. Because of this connectivity, the LMIS is able to produce several up-to-date reports to users on the state of the labor market.

### Denmark

Denmark has interconnected subsidiary systems that combine specific services for labor market supply and demand with data for decision makers and policy makers (table 2.4). Labor policies are based on labor market intelligence and analysis provided by the country's LMIS.

### France

A wide variety of stakeholders use France's subsidiary systems (table 2.5). Employers widely use the Pôle emploi's database to find and hire workers though a

Table 2.5 **Subsidiary LMIS Systems in France**

Subsidiary systems	Details	J-M	C&S	Gov S	LM I&A
National Institute for Statistics and Economic Studies (insee.fr)	Provides highly detailed national labor market statistics and analysis using a variety of sources (surveys, census, and administrative data)				✓
DARES Employment dashboard (travail-emploi.gouv.fr)	Provides labor market data analysis on the themes of work, employment, professional training, and social dialogue Also has PoEm, a monthly dashboard and series on employment policies		✓	✓	✓
Compte Personnel Formation (mon-compteformation.gouv.fr)	Links personal training accounts accompanying the worker through working life to online career counseling and training services and tracks certifications received		✓	✓	✓
Orientation pour Tous (Orientation-pour-tous.fr)	Information on training opportunities		✓		
Pôle emploi (Pole-emploi.fr)	Contains detailed information on vacancies, salary, and firm information Allows employers to access job seekers' profiles, interact with an employment agency, and schedule interviews Also provides information on hiring, training, and public benefits	✓	✓	✓	

Note: J-M = job matching. C&S = career and skills guidance. Gov S = government support. LM I&A = labor market information and analysis.

customized employer portal. Job seekers use it to find jobs. This portal includes almost 7 million résumés that can be filtered easily using sophisticated engines; it also allows employers to add selected candidates to a pool and then to interact with employment agencies to receive help with the recruitment process. Intermediaries—such as employment, career, and training centers—use Orientation pour Tous to help youth to find jobs. Orientation pour Tous provides information on qualifications and training needs, complementing information provided on the Compte Personnel Formation. Policy makers have access to detailed, updated labor market projections from a

wide variety of traditional and nontraditional sources disaggregated by gender and with geographic visualizations. Table 2.5 presents examples of France's LMIS subsystems.

### Republic of Korea

Korea offers another example of how interconnecting all subsystems adds value to the system (table 2.6). Korea Employment Information Service (KEIS) uses information in the LMIS to monitor and evaluate public policies and create labor market intelligence (such as analysis and forecasting) for

Table 2.6 **Subsidiary LMIS Systems in the Republic of Korea**

Subsidiary systems	Details	J-M	C&S	Gov S	LM I&A
Korea Employment Information Services (eng.keis.or.kr)	Provides targeted information to customers and policy makers so that they can continuously improve the employment service tools and subsystems Provides linkages to the other subsystems				✓
Work-net (work.go.kr)	Provides job-matching and customized advice, information, and support on employment services and programs, government support for training and education, social welfare programs, and lifelong career guidance (including vocational psychological tests) Provides comprehensive, targeted information on occupations, fields of studies, and labor market research and analysis based on a variety of data sources, including big data	✓	✓	✓	✓
HRD-net (hrd.go.kr/hrdp/ma/pmmao/indexNew.do)	Provides information on training and tracks an individual's training history through an individual training account Supports training providers Provides employers with services such as workplace information management, application for training Tracks trainee attendance at government-funded vocational skills development projects to prevent fraud		✓	✓	✓
Employment Insurance Network (ei.go.kr/ei/eih/cm/hm/main.do)	Provides information, statistics, and trend analysis of employment and unemployment insurance Provides services to individuals, employers, and PES staff to integrate unemployment insurance and other benefits			✓	✓
Employment Permit System (eps.hrdkorea.or.kr/main/intro.do)	Provides foreign workers, employers, and government staff with integrated EPS-related information, such as workplace transfer history, labor employment contracts, and training history	✓		✓	

Note: J-M = job matching. C&S = career and skills guidance. Gov S = government support. LM I&A = labor market information and analysis. PES = public employment service. EPS = Employment Permit System.

different users, including job seekers, employers, researchers, and policy makers. Data sources include national statistics, surveys related to employment and skills, and databases from KEIS networks, which include Work-net, HRD-net, and the Employment Insurance Network. Work-net provides data to KEIS and provides users with information on occupational

outlooks, working conditions, and demand for skills in KEIS. HRD-net, a job-training platform, provides training opportunities in conjunction with job information on Work-net. Both systems are connected and interoperable. The Employment Information Integration Analysis System analyzes data collected from all of the subsystems in real-time.

**Table 2.7** Subsidiary LMIS Systems in the United Kingdom

Subsidiary systems	Details	J-M	C&S	Gov S	LM I&A
National Online Manpower Information System (nomisweb.co.uk)	Provides detailed, up-to-date UK labor market statistics from several official sources and subsystems Is run by the University of Durham				✓
Office for National Statistics (www.ons.gov.uk/employmentandlabourmarket)	Partners with the University of Durham to provide labor market statistics based on surveys and administrative data Contains detailed local data by occupation, industry, gender, and employment projections				✓
National Occupational Standards database (www.ukstandards.org.uk)	Contains data on expected tasks, standards of performance, knowledge, and skills for different occupations Is linked to (employer-led) sector skill councils setting these standards	✓			
StatXplore (stat-xplore.dwp.gov.uk)	Provides a tool to explore statistics on benefits administered by the Department for Work and Pensions, currently holding data relating to 16 benefits/programs			✓	✓
Universal Job Match (findajob.dwp.gov.uk)	Provides information on job vacancies through a publicly managed job-matching platform with an advanced search function Allows job seekers to search with an optional login and to apply for jobs through the portal (if the applicant has an account)	✓	✓		

Note: J-M = job matching. C&S = career and skills guidance. Gov S = government support. LM I&A = labor market information and analysis.

## United Kingdom

The United Kingdom offers a clear example of the value of partnerships (table 2.7). The University of Durham, through a partnership with the Office for National Statistics, runs the National Online Manpower Information System. The platform provides web-based databases and labor market intelligence that integrate data and information from the Department of Work and Pensions, the UK Commission for Employment and Skills, and national statistics, among others. At the same time, this

national system provides customized statistics and analyses to regional systems. The private sector is heavily involved through UK sector skills councils (SSCs), employer-led organizations designed to boost labor force skills at the sectoral level. SSCs provide research and advice to employers and policy makers on skills shortages and needs through sector skills assessments, which are disseminated through official LMIS channels.

### 3. Benchmarking AyoKitaKerja against Work-net: What Can Indonesia Learn from the Republic of Korea?

In order to strengthen the efficiency and effectiveness of the Indonesian labor market information system (LMIS), the government of Indonesia asked the World Bank to benchmark AyoKitaKerja against the Republic of Korea's system. Work-net, the platform managed by the Korea Employment Information Service (KEIS), is an advanced LMIS platform and a central feature of the Korean LMIS. Given AyoKitaKerja's current focus on job matching, the benchmarking exercise presented in this chapter focuses mainly on the job-matching functions of the two systems. However, Work-net also provides access to other LMIS services, which could yield useful lessons for AyoKitaKerja and for the Indonesian LMIS in general.

Work-net hails back to 1998, when it was established as a publicly managed job-search portal by Korea's Ministry of Employment and Labor (MoEL). The platform has undergone several transformations since its launch, with the purpose of improving the quality, scope, and targeting of services. It first offered only web-based services, but, following technological advancements, it incorporated mobile services (2010), big-data services (2018), chatbot services (2019), and, most recently, artificial intelligence (AI) for job-matching services (2020).<sup>1</sup> In order to provide these services, MoEL implemented several reform programs, including establishing an information hub, improving technical infrastructure and security, creating a user-friendly environment, improving the interoperability of the platform with other systems, creating a master database, fully integrating systems, and incorporating AI techniques into job-matching services.<sup>2</sup> Since 2011, Work-net has provided consolidated job postings in strong partnership with local governments and the private sector (for example, Incruit, JOB-KOREA, LinkedIn, Albamon, and Jobplante) in addition to a variety of relevant, high-quality employment-related information.

1. Figure A.1 in the appendix presents a chronological timeline of Work-net's developments since its inception.

2. Table A.1 in the appendix presents a detailed description of the various phases of reform that Work-net experienced between 2005 and 2017.



Table 3.1 **Select Development and Labor Market Indicators Comparing Indonesia and the Republic of Korea**

Development and labor market indicators	Indonesia	Korea, Rep.
Population (millions)	267	51
GDP per capita (USD current)	3,894	31,363
GDP growth (average annual %), 2011–18	5.4	3
Human development index (0–1), 2017	0.54	0.85
Labor force participation, 2018	67.7	63.4
Female labor force participation	53.2	53.27
Labor productivity (USD, thousands, per employee), 2019	26	72
High-skill employees (% of employees), 2019	11.91	40.33
Working-age population with advanced education (%), 2019	12.7	56.15
PISA performance (score), 2018		
Math	379	526
Reading	371	514
Science	396	519
Individuals using the internet (% of population), 2018	39.9	95.0

Sources: World Development Indicators database, ILOSTAT database, PISA.

Note: PISA = Programme for International Student Assessment

Work-net is widely considered to be a well-functioning service and is credited with helping to reduce the individual and societal costs of the 2007 global financial crisis. It has received various customer satisfaction and brand-related awards (App Award Korea, Good Brand Trusted by Consumers, Top Public Service Award of Korea, National Service Satisfaction Award of Korea, and Top 10 Public App Loved by the People). In 2018 the number of registered users reached about 16 million (set against a labor force of just under 30 million). In 2017, 2.2 million jobs were placed through Work-net, indicating significant turnover.

The success of Work-net is due to its solid organizational structure. Work-net operates under KEIS, which has 407 specialized employees who plan and manage KEIS information strategies, operate the system, and collect and analyze information on the labor market, among other duties. In addition, KEIS has about 100 outsourced employees who work on system development

projects for the whole structure.<sup>3</sup> About 175 employees have specific roles and responsibilities related to Work-net, including human resources, information technology, customer services, employment support services, lifelong career development services, and labor market research, analysis, and forecasting. Work-net employees are highly specialized staff, including engineers (54 percent), master’s degree holders (15 percent), and PhD holders (14 percent).

Korea and Indonesia differ in several ways, which implies that the approach followed to upgrade the Indonesian LMIS should be tailored to its specific context. Table 3.1 presents a set of select indicators for the two countries. Although gross domestic product (GDP) growth rates have been greater during the past decades in Indonesia than in Korea (5.4 percent vs. 3 percent),

3. Appendixes C and D present KEIS’s organizational structure and staffing information related to Work-net.

Indonesia’s GDP per capita is eight times lower than Korea’s (USD3,894 vs. USD31,363). Korea also outperforms Indonesia in several human capital indicators, including the human development index (0.85 vs. 0.54), labor productivity (USD72,000 vs. USD26,000), percentage of high-skill employees (40.33 percent vs. 11.91 percent), percentage of the workforce with an advanced education (56.15 percent vs. 12.7 percent), as well as performance on Programme for International Student Assessment (PISA) assessments in all three domains—math, reading, and science. In addition, the penetration of information and communication technology (ICT) in infrastructure and information technology (IT) literacy are different in these countries. While 95 percent of the population in Korea use the internet, only 40 percent do so in Indonesia.

The framework in chapter 1 outlines five key characteristics that define advanced LMISs: relevance, reliability, efficiency, clients-at-the-center, and comprehensiveness. Several key elements underpin these characteristics. The next section presents a benchmarking exercise and gap analysis of AyoKitaKerja for each of the following key elements in an advanced LMIS:

1. Data collection
2. Data validation
3. Accessibility and user experience
4. Targeted service delivery
5. Strategic marketing to users
6. Interoperability with other systems
7. Human resources serving the system and its users
8. Technical infrastructure
9. Data management systems
10. Information security
11. Additional functions beyond job matching.

Given the differences between Korea and Indonesia, the gap analysis should be seen as a systematic review of areas that need to be considered to strengthen the job-matching platform in Indonesia. The areas highlighted here characterize other advanced job-matching platforms—and LMISs more broadly—

although the specific “how-to” could differ between countries. Ultimately, Indonesia will have to design its reform process in accordance with its own development objectives, opportunities, and challenges.

## Data Collection

Sufficient jobs data are the foundation of high-quality job-matching services. A well-functioning LMIS needs a critical mass of data on both job vacancies and job seekers. To achieve the volume needed requires information from various sources.

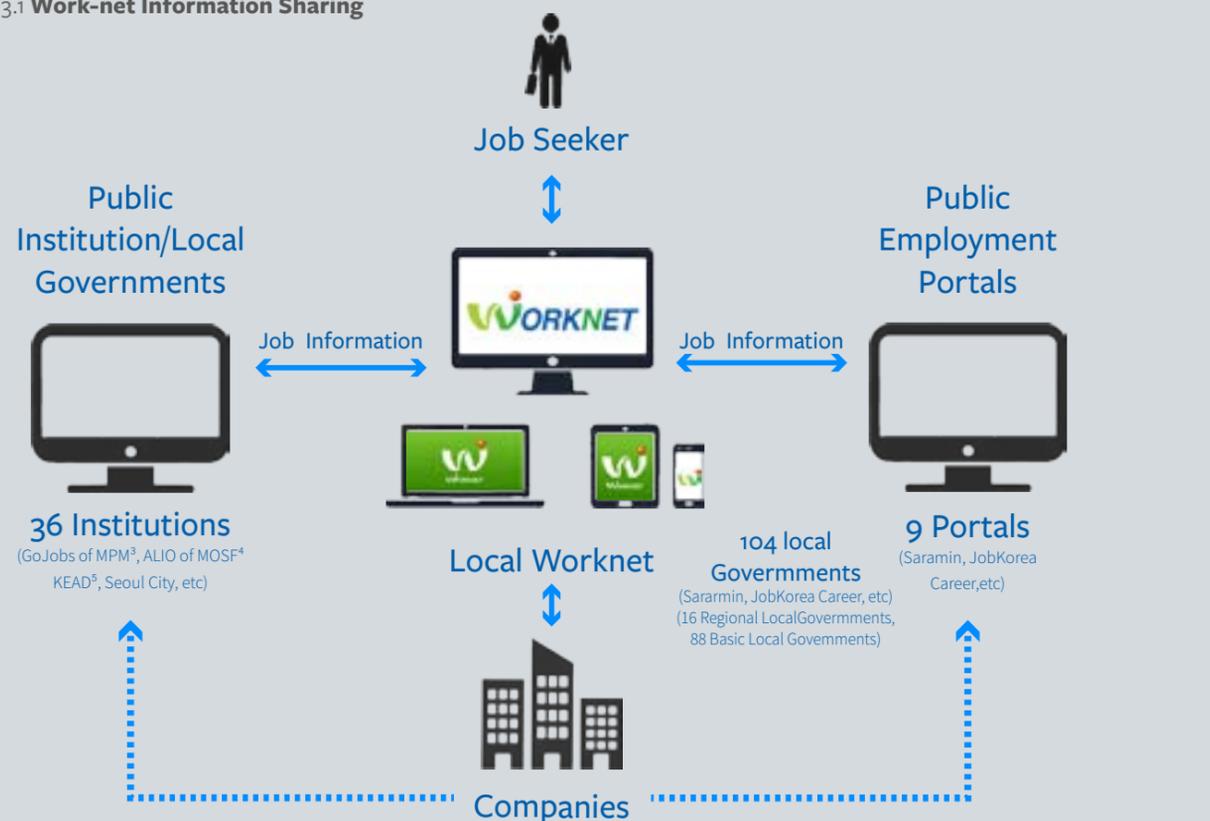
### Job-Vacancy Data Collection

#### Work-net

Work-net collects information on job vacancies through three sources:

- *Direct postings from firms.* By far, most vacancies in Work-net come from companies directly posting job openings on the system.
- *Public employment service (PES) support to small and medium enterprises (SMEs).* SMEs with limited human resource management capabilities are often unfamiliar with Work-net as a recruitment service. PES offices provide services to assist SMEs with registering vacancies on Work-net by e-mail, by fax, or by direct visits to PES offices.
- *Job postings collected from other platforms and private job portals.* Since 2011, Work-net has increased the quantity and improved the quality of posted information on job vacancies by fostering partnerships with other public and private job portals. Currently, there are 172 aligned organizations: 25 public institutions and local governments (ministries, the Chamber of Commerce and Industry), 11 private job portals, and 136 local Work-nets. Since

Figure 3.1 Work-net Information Sharing



Source: Korea Employment Information Service.

2013, Korea has provided regional Work-net services by building regional versions of Work-net for local governments.

Institutional arrangements allow Work-net to obtain information on job vacancies, including partnerships with 172 organizations (figure 3.1) comprising national and public providers of job information, private providers, regional (provincial) governments, basic local governments, and public employment centers under the MoEL. In addition, Work-net gathers detailed information on firms and corporate reviews through the private sector and other agencies. Because of these strong institutional arrangements, Work-net has a comprehensive source of information on job vacancies.

### AyoKitaKerja

AyoKitaKerja collects information on job vacancies through the following sources:

- *Direct postings from firms.* Less than 20 percent of posts come from direct postings. Most companies, especially local ones, prefer to submit vacancies to PES offices, which post them on the system.
- *PES support to firms.* Firms that visit PES offices to submit vacancies are registered on the platform by PES officers. PES office staff also visit the private sector to identify and collect information on job vacancies. PES offices are charged with reaching out to,

Table 3.2 Data Collection Gap on Job Vacancies

Desirable sources	Work-net	AyoKitaKerja	Gap
Direct postings from firms	Yes	Yes, but limited	✓ Share information with private job portals
Public employment service support to small and medium enterprises	Yes	Yes, but service is not very active	✓ Foster partnerships with the private sector and portals to increase the registration of job vacancies
Postings from other platforms	Yes, 172 aligned organizations, including public institutions, private, and local Work-nets	No	✓ Provide a link to civil servant job postings ✓ Provide a link to civil service human resources management system

and supporting, SMEs with registering job postings. Due to the limited number of PES offices and staff in each office, however, support for SMEs is scarce.

### Job-Seeker Data Collection

#### Work-net

Work-net collects job seekers' information primarily from the following sources:

- *Direct postings by job seekers.* By far, most job seekers' data come from individuals who post their profiles and use Work-net to apply for jobs.
- *PES support for job seekers.* Vulnerable job seekers and those who are unfamiliar with Work-net may need support for registration. PES offices assist members of these groups with registering profiles and uploading job application documents to Work-net by e-mail, by fax, or in person.
- *Compulsory registration for participants in active and passive labor market programs.* KEIS provides many active and passive labor market programs, including unemployment benefits and vocational training. In order to claim unemployment benefits, an unemployed person is required to register at Work-net as a job seeker. Similarly, an unemployed person wishing to participate

Table 3.3 Data Collection Gap on Job Seekers

Desirable sources	Work-net	AyoKitaKerja	Gap
Direct registration	Yes, covers all official unemployed	Yes, but not validation and reaches a small part of the workforce	✓ Provide a link to future unemployment insurance system
Linked to active labor market program (ALMP) and unemployment benefits	Yes, through compulsory registration	No	✓ Provide a link to ALMP participation
Support for vulnerable groups	Yes	Yes, but limited staff at public employment service offices	

in vocational training or an active labor market program (ALMP) also needs to register with Work-net. Consequently, all individuals who are registered as unemployed in Korea are registered on Work-net.

### AyoKitaKerja

AyoKitaKerja collects job seekers' information primarily from the following sources:

- *Direct postings by job seekers.* Individuals can register online, but those applying for jobs requiring a job-seeker card (AK1 card) need to present themselves in person at their local PES office.
- *PES support for job seekers.* PES staff can help job seekers to register on the platform.

AyoKitaKerja's services are not linked to ALMPs or to any other government support program. There is no unemployment benefit in place.<sup>4</sup> As described in chapter 2, the website caters to a small proportion of persons defined as unemployed in the labor force survey. See table 3.3.

4. The draft JOBS omnibus law (sent to parliament on February 12, 2020) proposes to introduce a job-loss insurance program that will have an unemployment cash transfer component.

### Data Validation

Job-matching platforms must provide updated, verified employment and recruitment information, as this will reduce search costs, improve job matching, and build trust in the platform's effectiveness. The PES should verify whether the content of vacancies and profiles posted violates laws and regulations and whether it has discriminatory elements. In addition, users need to trust that the information is up-to-date, that vacancies have not been filled, and that job seekers have not found employment and are still interested in finding a job. With a large volume of information, an efficient means of weeding out irrelevant information or updating information is needed, including technical tools. A user-friendly design and interconnectivity with other systems can also reduce errors related to user-generated information.

### Work-net

Work-net provides reliable job information authenticated by the government. Because of Work-net's thorough monitoring system, only 60 percent of all job vacancies submitted are posted, which means that the government guarantees high-quality jobs that fulfill legal requirements.



Work-net's validation system monitors and verifies information through four key steps, using both artificial and human intelligence.

- *First step:* monitoring and verification by local PES offices. The local PES office is responsible for verifying the legal validity of job vacancies and job seekers' information. When PES officers find suspicious information as a result of the verification process, they inform employers and job applicants of the issue and guide the user to correct the problem and register again. PES staff review vacancies for authenticity as well as discrimination (whether gender, age, resident registration number, religion, and nonrecruitment occupation are included in the job title and job description), working conditions (violation of minimum wage, working hours, or other labor rights prescribed by law), and goods or services that are prohibited by law from production, distribution, and consumption.
- *Second step:* monitoring and verification by computer. Work-net also runs a special computer algorithm to check systematically the reliability of the information.

The algorithm verifies the legal obligations of employers such as minimum wage, work hours, dispatch work, and industrial safety, among others. All data that Work-net receives from other public employment portals or private job portals are automatically checked and verified by the computer algorithm program.

- *Third step:* additional monitoring and verification by experts at the KEIS call center. KEIS manages a call center, which checks Work-net's job-vacancy information and corrects any violations and errors that the first and second steps missed.
- *Fourth step:* verifications through system linkages. The PES office periodically checks and updates the status of users. The connectivity with other systems is vital. When a registered job seeker finds employment, he or she is registered in the employment insurance database, which is connected with the PES computer system. This connectivity allows PES offices to confirm offline the new employment and recruitment and to update the person's Work-net status from job seeker to employee.

Table 3.4 **Data Validation Gap**

Desirable characteristics	Work-net	AyoKitaKerja	Gap
Data verification	Four-step information monitoring	Basic and infrequent	✓ Provide systematic and scalable device for monitoring and verification of information
Sources of verification	Human intelligence, computer algorithms, and interoperable government databases	Manual and in person through public employment service (PES) offices, accounts deactivated if not used within two years	<ul style="list-style-type: none"> <li>✓ Enable e-mail and mobile-based verification at registration</li> <li>✓ Ensure that job-vacancy registration is not discriminatory</li> </ul>

### AyoKitaKerja

AyoKitaKerja lacks a systematic quality control process to support the desired increase in the volume of applicants and job vacancies. Staff in regional MoM offices verify job vacancies and company profiles manually in the system. In order to validate job seekers' profiles, persons who register online still must visit their local PES office in person. Although this reduces the risk of invalid information, it is not consistent with attracting a high volume of applicants or vacancies and automating counseling services. Once job seekers register their job application in AyoKitaKerja, they are considered active for six months. Accounts that have had no activity (no log-in) for six months are asked to register again by e-mail; otherwise they are transferred to a pool labeled as inactive. There is no contact verification at registration, either automatically—for example, by e-mail or SMS (short message service) requiring verification of account—or manually by PES staff. The majority of enterprises posting job-vacancy information in AyoKitaKerja are SMEs, and no strict quality control system is in place on the enterprise side, as updates and checks are infrequent.

Moreover, in contrast to Work-net, some of the compulsory fields in the registration process for vacancies

include characteristics unrelated to an individual's ability to perform a job satisfactorily. For example, it is compulsory to fill out information on gender, marital status, age, and disability, information that would be grounds for discrimination. See table 3.4.

### Accessibility and User Experience

A well-functioning LMIS provides users with easy, continuous access to all available functions. The system needs to allow different users to access its services reliably through various channels suited to their individual needs. As such, a user-friendly, attractive design with well-organized content, screen interface, and tools for sharing information is extremely important. User-friendly services support the following functions: (a) customized support, (b) a "one-online-stop shop" for vacancies and labor market information and services that are comprehensive and easy to access and understand, and (c) a customer response system that can deal with the problems of specific users and draw attention to systemic problems.

Figure 3.2 **Responsive Web Design of AyoKitaKerja**



Source: Ministry of Manpower.

### Accessibility of Services and Information

#### Work-net

Work-net services are fully accessible on personal computers, smartphones, and tablets. The mobile job application service permits job seekers to handle the full job application on a mobile device. Job seekers can download job application forms onto their computer or smartphone and can upload application forms or résumés onto the system. Employers can similarly upload the job-posting information by computer or smartphone. Users who face difficulties registering or accessing information can request assistance by printing out the relevant forms in the system and submitting them to the PES office by fax, by post, or in person. Employers and job seekers needing assistance retrieving relevant information can receive assistance at the PES office.

Work-net's mobile services have many user-friendly features, including a "search within results" function based on job type or region, location-based services, and active push notifications (alerts for new applicants, questions for hiring companies, customized recruiting information, and job placements for job seekers). They also provide customized services such as the Mobile Work-net Youth

Service, which targets young job seekers. Additional features, such as the Mobile Employment Compass Service, use big-data analysis to provide job seekers with personalized employment information.

#### AyoKitaKerja

Mobile services can be a very efficient way of sharing information in a large archipelagic country with poor ICT infrastructure in some areas, such as Indonesia. AyoKitaKerja users find slow internet speed to be a critical problem. AyoKitaKerja has a web-based responsive design in which the contents are rearranged according to the screen size of the browser, so the content can be viewed on devices such as smartphones, tablets, and computers (figure 3.2). However, a collapsed view in a small screen seems impractical. A mobile web version also lacks the advantage of mobile apps such as a push service<sup>5</sup> and easy access.

At the same time, a multiprong approach to digital tools is needed, taking into account the characteristics of AyoKitaKerja's

5. A push notification is a message that pops up on a mobile device. App publishers can send them at any time; users do not have to be in the app or using their device to receive them. Push notifications look like SMS text messages and mobile alerts, but they only reach users who have installed the relevant app.

Table 3.5 **Accessibility of Services and Information Gap**

Desirable characteristics	Work-net	AyoKitaKerja	Gap
Interactive through different devices	Yes, accessible through computer, tablet, mobile web, and mobile app (iOS/Android). Anytime, anywhere, anyplace mobile service	Limited, accessible through computer, tablet, mobile web-version, but design needs to be improved. No mobile app service	<ul style="list-style-type: none"> <li>✓ Develop a light version of portal for slow-speed connections</li> <li>✓ Introduce mobile app service</li> <li>✓ Improve the design of mobile web and tablet access</li> </ul>
Interconnected system	Yes, prefills information (for example, job applications)	No	<ul style="list-style-type: none"> <li>✓ Provide personalized information and notification by text message</li> </ul>
Assistance services	Yes, at registration and when retrieving relevant information at public employment service (PES) offices	Yes, at registration at PES office, but PES staff is limited	<ul style="list-style-type: none"> <li>✓ Have an interconnected system</li> </ul>

main clients on the job-seeker side. The majority of job seekers are young, which augurs in favor of IT literacy. Whereas cellular penetration is high (70 percent of the population uses a mobile phone), access to the internet is limited (40 percent), and only 24 percent of the population own a smartphone.<sup>6</sup> As such, concentrating on app technology alone or depending on e-mail as the system’s main communication channel (as is currently the case) are not suitable approaches given the capacity and profile of AyoKitaKerja’s end users. AyoKitaKerja could consider developing SMS for communicating some of the key basic information and services provided, for example, job notifications. See table 3.5.

## User Experience

### Work-net

Work-net continues to enhance the design and convenience of the website. The Employment Service Promotion

Team and the User Experience Team of KEIS continuously analyze Work-net use and manage a user survey on UX/UI (User Experience/User Interface). Results from these analyses are applied to upgrade the system.

The Social Network Services identification as well as a single identification and password system are used to log onto Work-net, HRD-net, the Employment Insurance Network, and the Employment Permit Service (EPS) network.

By linking up with other public information systems, such as the employment insurance database, Work-net can prefill part of an applicant’s work history (job title, tenure) in job application forms, saving time and reducing opportunities for errors in user-generated information.

### AyoKitaKerja

AyoKitaKerja does not have a systematic UX development system for enhancing the configuration and design of the platform based on the needs of users. Test runs (not logged in) of the website by the report team

Table 3.6 **User Experience Gap**

Desirable characteristics	Work-net	AyoKitaKerja	Gap
Screen design, composition, and interface based on User Experience/User Interface (UX/UI)	Yes	Not systematically used	<ul style="list-style-type: none"> <li>✓ Develop interface based on UX</li> <li>✓ Create a feedback system (UX survey, client response services)</li> </ul>
Unified log-in	Yes, a single identification and password used for different subsystems	No, log-in information is specific to the platform	<ul style="list-style-type: none"> <li>✓ Coordinate system log-in as other systems are developed</li> </ul>
Feedback system	Yes	No	

suggest that the platform is slow in responding. Discussions with users of AyoKitaKerja confirm that they have difficulty logging in, registering, and searching for information. A large number of compulsory fields and slow speed are among the key weaknesses. The log-in/password system is unique to AyoKitaKerja and not coordinated with other public systems in Indonesia, with one exception. AyoKitaKerja is linked to population data of the Ministry of Home Affairs via the citizen identification number (NIK).<sup>7</sup> This allows AyoKitaKerja to retrieve individual data automatically from the population database. However, the information that is automatically entered is limited. See table 3.6.

## Customer Response Service

### Work-net

For Work-net, KEIS has a customer consulting team that incorporates recommendations from users and corrects and eliminates issues related to customer complaints. The team is responsible for managing and operating (a) an information system for customer feedback and user education; (b) an information system for customer

opinion (Voice Of Customer, VOC) and integrated management; (c) a customer support call center; and (d) chatbot system content.

Work-net’s chatbot service provides a 24-hour consultation service for customers with inconveniences as they arise. The local PES office responds to customer inconveniences by telephone or e-mail and PES offices receive regular Work-net training. KEIS operates a call center to respond to customers’ complaints by phone or e-mail. If local PES offices and call center consultants encounter difficulties, they contact the KEIS Work-net team, and KEIS experts will resolve them.

Work-net staff regularly make onsite visits to clients and users, such as PES offices, universities, businesses, municipal employment centers, and private employment service organizations. They also meet monthly with primary client agencies. Representatives of specific target groups are recruited to panels that investigate group-specific issues.

### AyoKitaKerja

PES officers are trained on AyoKitaKerja and provide registration services for AyoKitaKerja. PES offices provide useful feedback on AyoKitaKerja, although not in

6. International Telecommunications Union World Telecommunication/ICT Indicators database (cellular and internet) and <https://www.statista.com/> (smartphone usage).

7. NIK (Nomor Induk Kependudukan) is the unique citizen identification number provided to every citizen and registered resident in Indonesia.

Table 3.7 Customer Response Service Gap

Desirable characteristics	Work-net	AyoKitaKerja	Gap
24-hour call center and client support	Yes, chatbot service and Korea Employment Information Service (KEIS) call center	No	✓ Develop response system to resolve user inconveniences
Customer consulting team	Yes, job consultants at public employment service (PES) offices respond by e-mail, by telephone, or in person	No	✓ Develop feedback system to VOC, target specific groups
Customer complaint resolution mechanisms	Yes, KEIS experts and customer consulting team listen to Voice Of Customer (VOC) and correct and eliminate customer complaints	No	

a systematic manner. However, AyoKitaKerja does not have a systematic response system to resolve user inconveniences or receive general feedback on how to improve the system. See table 3.7

## Targeted Service Delivery

Defining job-search or job-candidate conditions can be complicated, which slows down the search process.

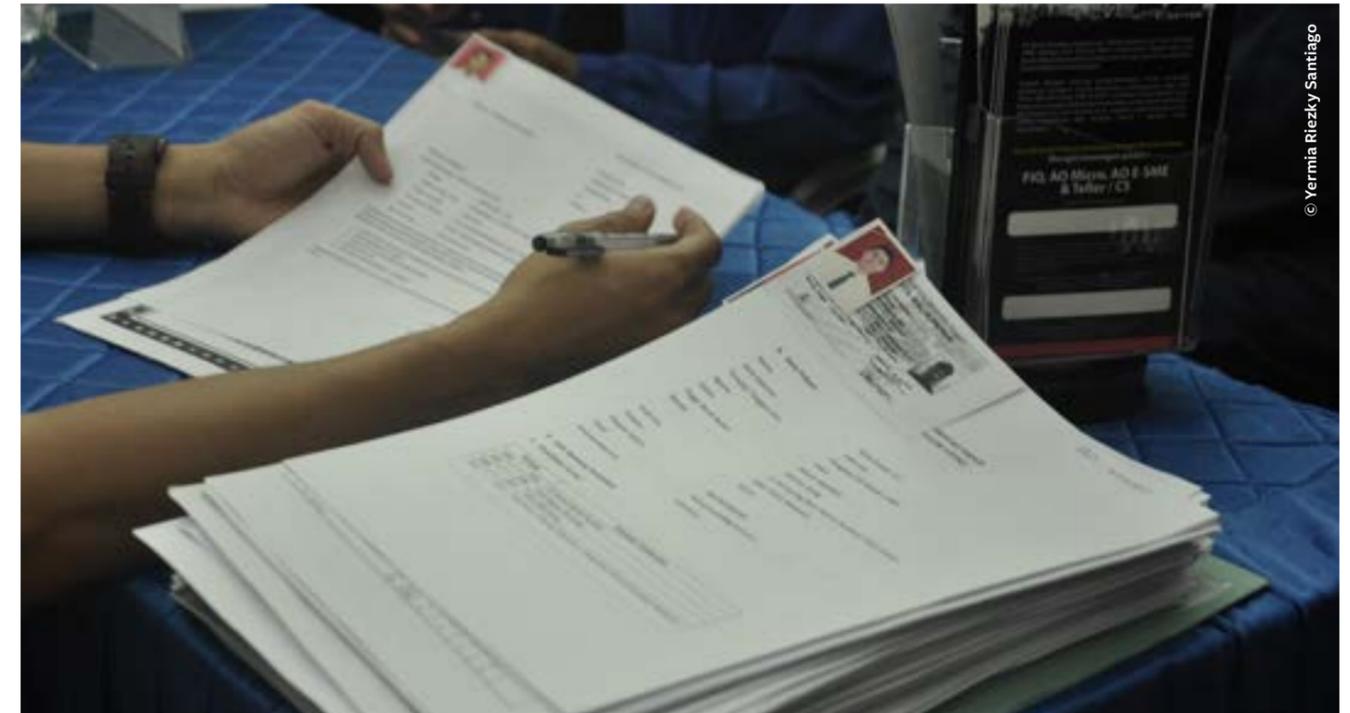
### Work-net

Work-net addresses this problem by systematically recommending jobs that are closest to the search conditions when a job-seeker creates his/her desirable job profile. If no job satisfies such conditions at the present time, Work-net notifies the person by smartphone or the Internet whenever a new job posting is registered

that matches these criteria. For recruiting companies, Work-net similarly recommends suitable job seekers and provides updated information.

In addition to the systematic job and candidate notifications, Work-net also helps job counselors in PES offices to provide customized services tailored to individual circumstances and needs, through a service called Baro-One. Baro-One applies big-data analysis of information on job training, employment insurance, qualifications, and more, using Work-net, HRD-net, the Employment Insurance Network, and the Korea Workers' Compensation and Welfare Service. Baro-One permits PES counselors to provide tailored advice on jobs, companies, and career paths.

The Employment Compass service is similar in design and objective to Baro-One, but job seekers can use it directly. When a job seeker provides key input (gender, age, academic background, and desired industry or career track), the Employment Compass provides wage information, certificate information, and employment cases according to the job-seeker's situation. Similar to



Baro-One, the system is linked to other data systems such as HRD-net and others. Employment Compass also offers a personalized service called The Work, which provides content and job information favored by similar groups derived through big-data analysis.

Work-net also provides differentiated services according to the characteristics of the users and provides specialized recruitment information, job guides, and job-related news for each target customer. Youth Work-net provides information on employment that may interest young people. For example, it selects job information suitable for young people according to certain criteria. Likewise, Work-net provides job information tailored to women such as programs on returning to the labor market for women whose career was suspended for personal reasons. It also offers programs related to personalized services and job-training programs by integrating various employment-related services. Services targeting the elderly also provide job information, programs for transfer and life-career support, as well as offline organizations to support their employment. The

elderly Work-net service was established to provide re-employment, start up, vocational training, and welfare information to middle-age and elderly persons.

Introducing AI in a job-matching platform reduces the time and cost to help job seekers find a list of available jobs matching their relevant work experience, skills, roles, and educational background. From 2016 to 2018, Work-net was reorganized into a national platform-oriented employment service hub, and a chatbot service was introduced in 2019. Work-net is currently developing a system based on the job data dictionary that uses AI to match job seekers' competence with job information and job requirements. The service is expected to launch in 2020.

### AyoKitaKerja

AyoKitaKerja still has to integrate advanced-technology tools such as AI and big-data analysis to provide tailored job/job-seeker recommendations in a systematic

Table 3.8 Targeted Service Delivery Gap

Desirable characteristics	Work-net	AyoKitaKerja	Gap
Tailored job recommendations	Yes, based on job seekers' profile	No	✓ Develop a tailored service system
Tailored services	Yes, based on job seeker and job-posting information	No	✓ Introduce AI job-matching service
Tailored information	Yes, based on job seekers' personal characteristics and circumstances as well as information that other job seekers with similar backgrounds were interested in or used	No	
Tailored services to vulnerable population	Yes, for youth, women, and the elderly	No	
Other	Expected to launch artificial intelligence (AI) job-matching service in 2020	No	

manner. It does not provide automatic job matching through the system (as would a PES counselor offline) and is limited to helping companies and job seekers narrow their search results by way of keywords and filters. See table 3.8.

## Strategic Marketing to Users

### Work-net

KEIS applies intensive strategic marketing and research activities for Work-net services to alert potential users. The payoff to doing so is significant: a marketing initiative launched in 2014 rendered a doubling in daily visits in 2015 compared with 2013. The following are major strategic marketing activities of KEIS:

- *Active advertising* in public places such as railway stations and bus terminals, active promotion of Work-net on the online portal websites that many people use, and a newsletter circulated through e-mail and SMS to Work-net members, detailing the availability of both basic and new services
- *Target group strategy*, with recruitment and selection of supporters for strategic promotion activities and specific target groups (youth Work-net supporters)
- *Promotion through events*, online and offline, to inform users whenever new content is launched on Work-net
- *Campaigns* to increase Work-net membership and provide customized information
- *Partnerships* through memorandums of understanding with various organizations and universities to expand the use of Work-net

Table 3.9 Strategic Marketing Gap

Desirable characteristics	Work-net	AyoKitaKerja	Gap
Marketing team	Yes, has a team dedicated to marketing activities and conducts active marketing activities through multiple channels (including public ads, educational institutions, research dissemination) and to different target groups	Limited to public employment service (PES) offices, ministerial websites, educational institutions, and job fairs	✓ Step up marketing activities to the general public and target groups ✓ Offer user trainings
User training	Yes, through PES officers	No	

- *Dissemination of research* focusing on high-quality, relevant analysis and research raising public awareness of KEIS and Work-net through media reports
- *PES officer user training*.

### AyoKitaKerja

AyoKitaKerja is marketed in the following manner:

- *In government offices and centers*, above all local PES centers but also in social security agency offices
- *With other partners*, in particular, marketing activities through university career centers, and business associations
- *Advertisements* placed on the MoM webpage, in public ministries, and on the Ministry of Social Security website
- *Local job fairs* conducted at the local and national level (local universities, national job fairs) under the supervision of the Directorate of Domestic Labor Market Development
- *PES officer user training*.

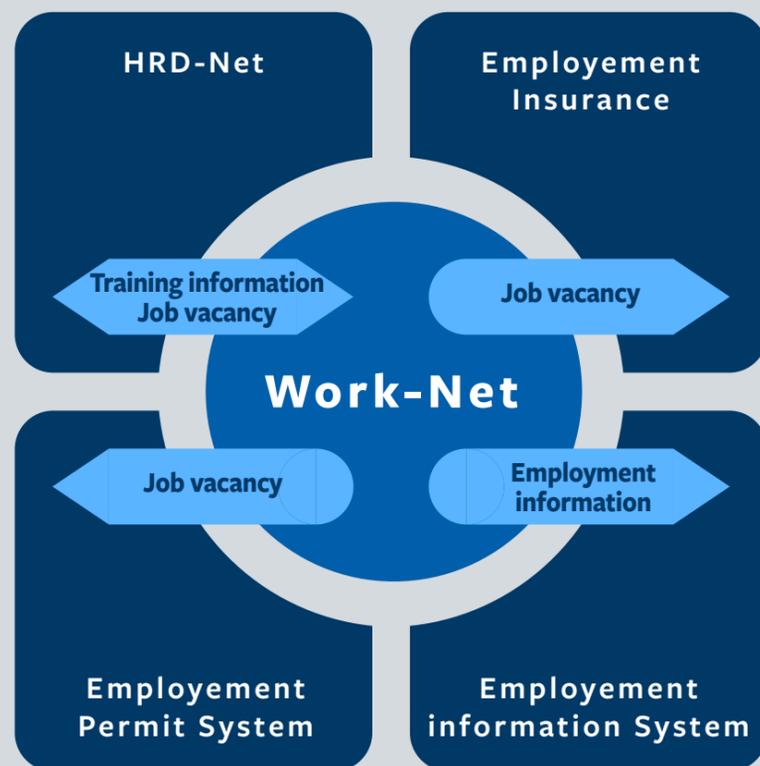
As these activities have limited and selective outreach, AyoKitaKerja is not widely known among the general

public. Interviews with private job-matching companies, job seekers, and employers confirm that potential stakeholders are not familiar with AyoKitaKerja. In contrast, potential AyoKitaKerja users are well aware of the different private job portals that market their activities broadly. As an example, Jobstreet, a leading company in this industry, hosts 60 job fairs annually for both employers and job seekers. These job portals also partner with top universities, and most regional office staff focus on the marketing and sale of services. MoM has no active sales or marketing activities for the AyoKitaKerja system. See table 3.9.

## Interoperability with Other Systems

The national job-matching platform can reach more users when it is linked with other systems, such as job information, employment insurance information, and vocational training system networks. Interoperability with other systems can also facilitate the verification of job-posting and job-seeker information.

Figure 3.3 Interoperability of Work-net with Other Systems



Source: Korea Employment Information Service.

### Work-net

Work-net was reorganized as a full-scale service in 2006 by connecting the platform with vocational training information and the EPS. The linkages currently in place are shown in figure 3.3.

### AyoKitaKerja

AyoKitaKerja is not linked to other employment, social protection, or human resource systems, partly because such systems are so rare in Indonesia. There are plans to develop linkages with the social insurance agency to verify employment status. AyoKitaKerja is linked with the population register at the Ministry of Home Affairs through the NIK, although registration provides only

limited benefits with respect to labor market information and services.

AyoKitaKerja also could be interconnected with several additional government initiatives. For example, job seekers using AyoKitaKerja could gain access to education and training platforms with either information on opportunities or e-learning platforms for capacity building and job training. They also could be linked to platforms with information on government support for training (for example, scholarships) managed by the Ministry of Education and Culture. Civil servants or those willing to become civil servants could be linked directly to the Civil Servant Selection System, avoiding duplication of profiles and information. Employers using the platform could be linked directly to MoM subsidiary platforms such as the Foreign Workers System (TKA) and Mandatory Employment Reporting

Table 3.10 Interoperability with Other Systems Gap

Desirable characteristics	Work-net	AyoKitaKerja	Gap
System linked to other subsystems	Yes, interlinked with vocational training, employment insurance, and migrant worker permit systems	No, few systems exist for linking the platform to  However, there are plans to link it to social insurance system	✓ Develop linkages with other systems to enhance relevance and validity of data

(WLKP). Training institutions could access AyoKitaKerja to promote their training services to job seekers and employers and be linked to the Indonesia National Work Competency Standards (SKKNI) platform. At the same time, AyoKitaKerja could partner with a broader set of job boards and big employers to post vacancies on the platform as well as share information with other agencies, such as MoM and the Central Bureau of Statistics (BPS) for labor market intelligence. See table 3.10.

(employing some 154 researchers as of July 2019). Researchers use the data in the overall LMIS to conduct research and provide labor market intelligence; the results of this research are transformed into various types of content and made accessible to the public through Work-net.

For continuous improvement and development of the LMIS content and user friendliness, KEIS employs more than 170 staff to operate the system. At the call center, 46 employees assist with customer consultation and with monitoring and verification of Work-net information.

## Human Resources Serving the System and Its Users

Sufficient human resources, with adequate skills, are necessary to ensure the active and effective use of the information produced on the job-matching platform and to improve services continuously.

### Work-net

For PES service delivery, Work-net is used by local job centers (232), by nearly 1,800 private agencies, by job centers on college campuses, and by job centers for various target groups.

For labor market research, KEIS draws on a significant pool of researchers to provide high-quality analysis

### AyoKitaKerja

AyoKitaKerja is used by about half of PES offices, but by very few staff in each office. Regional autonomy implies that local offices (PES/provincial offices) have their own regulations and that, while they provide information to MoM, the ministry does not have the power to regulate them directly.

There is no research infrastructure or significant pool of staff for developing and operating the system. In MoM headquarters, only four staff are in charge of operating AyoKitaKerja. See table 3.11.

Table 3.11 Human Resources Gap

Desirable characteristics	Work-net	AyoKitaKerja	Gap
System used by skilled counselors	Yes, widely used at different levels of local public employment service (PES) offices as well as specialized agencies and private agencies	Limited, only used by half of PES regional offices with only a few counselors in charge of delivering employment services	<ul style="list-style-type: none"> <li>✓ Extend use of AyoKitaKerja in PES offices</li> <li>✓ Enhance services to entice private offline agencies to use AyoKitaKerja</li> </ul>
Research team	Yes, Korea Employment Information Service (KEIS) undertakes research on key labor market indicators (national workforce and employment demand projections)	No, limited capacity	<ul style="list-style-type: none"> <li>✓ Consider how to develop human resources strategically to build up AyoKitaKerja and provide input to LMIS</li> </ul>
Labor market information system (LMIS) management team	Yes, KEIS is an independent central employment information management center to plan, implement, and manage LMIS	No, very limited staff and capacity	

## Technical Infrastructure

### Work-net

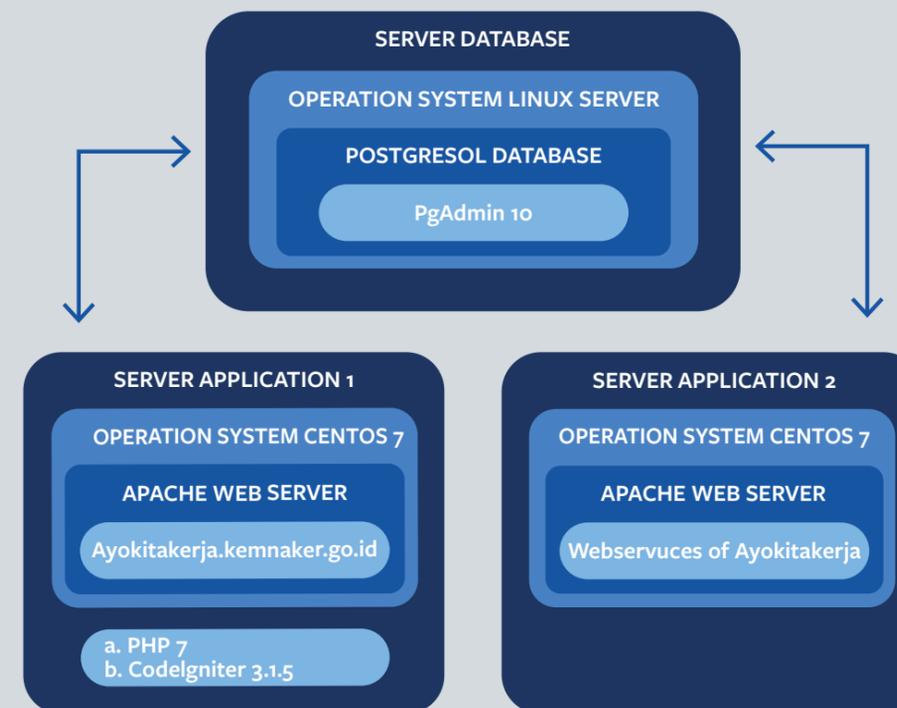
KEIS has a business continuity plan for Work-net to ensure continuous service 24 hours a day, 365 days a year. Work-net also runs a remote disaster recovery system for system monitoring and backup that addresses various types of disasters.

The Work-net system consists of a Java-based three-tier (Web-Was-DB) system, and its operating system is distributed redundantly. In case of failure, downtime, or excessive traffic at the primary server, a redundant server can take the primary server's place and continue to provide reliable services. In addition, the development system, test system, and operating system are managed separately. As developers extend the program through the development

system, the modified program is tested in a system similar to the operating system. The redundant server is intended to enhance test quality and minimize operational errors due to program modifications and revamps.

Through the traffic and server resource monitoring system, Work-net regulates usage and logs, such as network traffic, disk usage, central processing unit/memory, database management system status, and application errors. The Work-net data system is prepared to perform daily and weekly backups to prevent data loss and restore lost data occurring from, for example, failures or neglect in storage, transmission, or processing. A separate Hadoop system-based platform handles big-data analysis. The KEIS headquarters data center and the remote disaster recovery center are located separately, and the disaster recovery plan is established periodically and internalized through training.

Figure 3.4 Software Architecture of AyoKitaKerja



Source: Ministry of Manpower.

### AyoKitaKerja

The AyoKitaKerja system is not equipped with server redundancy safeguards in the case of service failure. Each system node has to be monitored separately (server, network, application). The system consists of one web server for web services, one application programming interface (API) server for data provision, and one database (figure 3.4). However, the AyoKitaKerja system only monitors traffic on the network, making it difficult to respond promptly to service failures. For immediate response, a monitoring system is needed for each system node, and it must be monitored regularly. There is no window for system users to alert AyoKitaKerja of difficulties or to receive assistance in the event of a problem. The system is backed up whenever changes are made to it. However, the data are backed up on a general MoM server.

Finally, AyoKitaKerja is not included in MoM's national disaster recovery center (figure 3.5), located an hour from Jakarta. In the event of a disaster, the AyoKitaKerja service may be discontinued. AyoKitaKerja does not have a disaster recovery manual to guide disaster recovery and response in the event of a disaster. MoM does not perform periodic disaster recovery training according to a disaster recovery manual. See table 3.12.

## Data Management Systems

### Work-net

To improve the use and openness of data, KEIS organizes data quality management committees at the

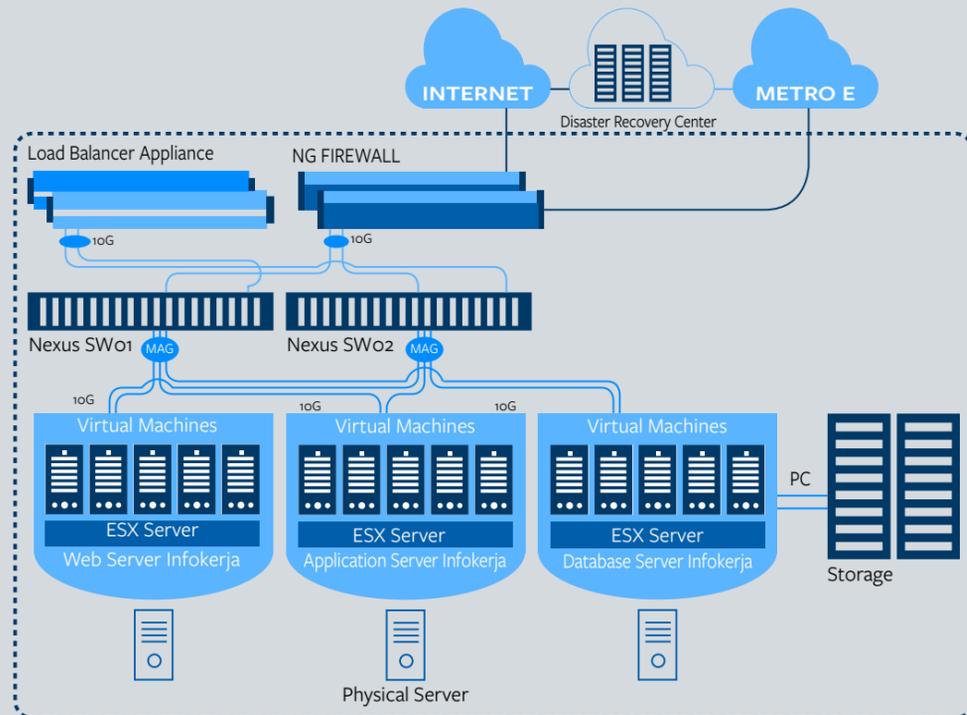
Table 3.12 **Technical Infrastructure Gap**

Desirable characteristics	Work-net	AyoKitaKerja	Gap
Round-the-clock availability of services	Yes, with a replication system that does not disrupt operations	Available, but services are slow	✓ Build a system redundancy, recovery, and backup system for stable operation of the system
Backup system	Yes, daily and weekly	Yes, but on the Ministry of Manpower's (MoM) general server	✓ Use a cloud system to expand the system and use resources efficiently in the future
Disaster recovery system	Yes	No	✓ Institute integrated control of server resources and applications for active response to a failure
Cloud system for resource utilization	Yes	No	
Integrated monitoring system	Yes, monitoring over network, server, and application	No, only monitors traffic on the network using the Network Management System	
Big-data platform for analysis	Yes	No	

Table 3.13 **Data Management Gap**

Desirable characteristics	Work-net	AyoKitaKerja	Gap
Data quality management systems	Yes, established systems in place to manage data quality and obtain quality data from job-posting and job-seeker information	No	✓ Establish a system for data quality management and for policy decision support
Data quality team	Yes	No	✓ Improve data quality control guidelines and tools
Data quality standards	Yes, established and enforced	No	✓ Code input data in a standardized format with menus
Data quality checks	Yes	No	✓ Provide a system user manual and a description of each information item
Big-data platform	Yes	No	✓ Encrypt personal information and create user privacy policies

Figure 3.5 **Hardware Architecture of MoM's Data Center Kemnaker**



Source: Ministry of Manpower (MoM).

organizational level, establishes enterprise data standards and quality control plans, and monitors and refines data quality through a data quality management system. It enforces database standards, considers them to be essential for database design, and periodically evaluates data standards, refinement, and quality. KEIS is continuing to expand Work-net's data openness. Currently, 16 types of Work-net data are open, including job-posting information.

A master data management system enables customers (firms and individuals) of Work-net, the Employment Insurance Network, HRD-net, and EPS to integrate information based on key personal identification information (resident registration number, business registration number). The integrated database is used for personalized employment services as verification of eligibility to receive certain benefits such as the Employment Success Package at the Employment Welfare Plus Center; it is also used to provide in-depth counseling for job seekers.

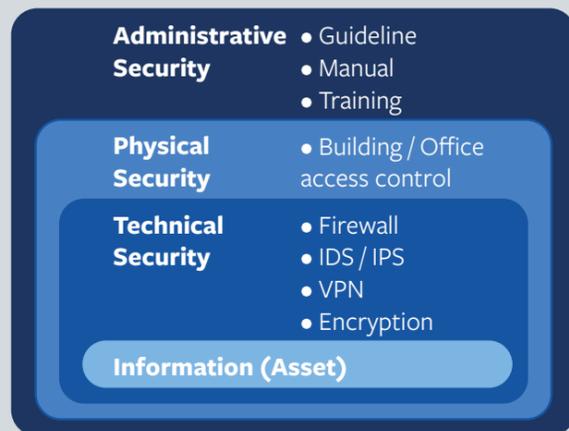
### AyoKitaKerja

The AyoKitaKerja system has no quality control guidelines for the data it collects or any data correction devices for evaluating data quality and providing feedback. Currently, input data (for example, skills) are free-text based, which increases the chances of errors and the completion of profiles and complicates analysis for job matching. Personal information is not encrypted. See table 3.13.

### Information Security

Cyberattacks remain a significant risk, posing intelligent, complex, and diverse threats to operations. Administrative, technical, and physical means for ensuring the security of information are required to protect information from cyberattacks and to ensure business continuity (figure 3.6).

Figure 3.6 Information Security Means



### Work-net

Work-net has measures for three levels of security: administrative, physical, and technical.

*Administrative security* requires the establishment of security guidelines for carrying out information security activities. KEIS conducts regular information security training and employee training, monthly security checks, and management and inspection of outsourced staff. Legal, institutional, and regulatory rules on the laws related to information protection, personal information and user protection, internal information security regulation, and encryption and deidentification of personal information are established.

*Physical security* protects facilities through the authority management and access control system for controlling building access. Major protection facilities have strong authentication systems such as fingerprint and vein authentication.

*Technical security* performs program operations and inspections from program source to network security, server security, and user (end point). In particular, it separates the internal network from the external network to prevent hacking and information leakage from

the outside. Also, a security check of developed program sources is essential, and security activities are performed from the program source.

### AyoKitaKerja

AyoKitaKerja security consists of firewalls to prevent intrusion on the network. There is no solution for the physical security of data center access, program source security, technical security for intrusion detection, and data exposure. In addition, there is no general guidance or control regarding security. Information security training is lacking. See table 3.14.

### Additional Functions beyond Job Matching

As discussed in chapters 1 and 2, an advanced LMIS has functions in place to provide information and services in several areas, not just basic labor market information or job matching, as in the case of AyoKitaKerja. Additional functions beyond job matching include career and skills guidance, government support, and

Table 3.14 Information Security Gap

Desirable characteristics	Work-net	AyoKitaKerja	Gap
System in place to protect information	Yes, strong system at the national level and internal	Limited to firewall	✓ Enhance awareness, education, and training for officers' and employees' security as a whole
Security measures in place	Yes, administrative, physical, and technical	No	✓ Build a security solution for each node
Information security training	Yes	No	✓ Establish user privacy policies as the system develops

labor market information and analysis. These additional functions can be provided by the job-matching portal itself or by other subsystems in Indonesia's LMIS that are integrated in the portal.<sup>8</sup>

### Career and Skills Guidance

#### Work-net

Korea's Work-net provides job information using information from KEIS, which publishes various types of occupational information, including occupational outlooks and occupational dictionaries. The annual survey of the employed provides information on 800 or so jobs, including current information on working conditions, capabilities, education, training, and qualifications.

8. As explained in note 13 in chapter 1, MoM launched a new online platform, Siskaker, on September 29, 2019. This platform is more comprehensive than AyoKitaKerja and includes information on the supply of training by BLKs (which is part of the career guidance function) and entry points to other government support programs. While this is a move in the right direction, Siskaker still does not integrate information from other line ministries (like the Ministry of Education and Culture) and would benefit from further developments based on recommendations in this report.

In 2003 the Korea Network for Occupations and Workers (KNOW) was established and linked to Work-net. KNOW provides information in various areas, including jobs, college departments, job search, career counseling, and others to help Work-net to enhance the job search and career design of youth and job seekers. Lifelong career guidance and employment support for both young and older adults have been integrated into Work-net services. For example, Work-net provides 23 vocational psychological tests for adolescents (10 test programs) and adults (13 test programs) to help to match an individual's personal preferences and aptitude with jobs and training.

KEIS operates a separate job training site called HRD-net to provide vocational training courses, qualification tests, and key statistics related to vocational training, which are provided in conjunction with job information on Work-net. This information includes the content of training courses, training objectives, application requirements, related qualifications, training period, training costs, government grants, training personnel, training facilities, and employment outcomes after training. People can search vocational training information at Work-net and apply for support for their training by computer or smartphone. The systems and data of Work-net and HRD-net are connected and interoperable.

Table 3.15 Career and Skills Guidance Gap

Desirable information	Work-net	AyoKitaKerja	Gap
Vocational and career information	Yes, information for career exploration (reports and videos), vocational psychological test for youth and adults	Basic job search guidance	✓ Develop occupational and career guidance information and link it to other sources of information
Detailed occupational outlooks	Yes	No	✓ Develop a vocational training information system and link it with AyoKitaKerja
Vocational training information	Yes, links to HRD-net containing the content, objectives, and information on training courses, online application and information on requirements, related qualifications, government grants, and employment rate after training	Very basic. Indonesia plans to introduce a preemployment vocational training voucher system (e-card system) and manage the e-card through an app that can be linked to the AyoKitaKerja system	<ul style="list-style-type: none"> <li>✓ Introduce e-card application and management system at AyoKitaKerja</li> <li>✓ Link AyoKitaKerja to the Critical Occupation List (COL)</li> </ul>

### AyoKitaKerja

AyoKitaKerja provides a basic career guidance service menu (Layanan Bimbingan Karir). As discussed in chapter 2, the services provided are limited and lack the inputs and technology to provide relevant, updated information. Existing information systems on vocational or educational training institutions are not linked to AyoKitaKerja. The government is planning to introduce a preemployment vocational training voucher system through an e-card (Kartu Pra Kerja). This could provide an impetus to strengthening career guidance services overall and linkages with other services. In addition, the launch of the 2018 Indonesian Critical Occupations List (COL) and other initiatives represents a positive step toward creating infrastructure that can provide relevant stakeholders with information on the skills in demand (box 3.1). See table 3.15.

### Government Support

Employment and welfare policies are closely linked in Korea, and PES offices have been operating under the name of the Employment and Welfare Plus Center since 2014.

#### Work-net

Work-net also provides information that enables job seekers to search for employment and welfare policies. Through Work-net, 15 employment policies and 558 welfare policies can be reviewed. A simulation service enables users to identify e-services appropriate to them. By entering personal characteristics and job status, as well as basic information on income and wealth, users can identify whether they qualify for different benefits or supportive policies such as retirement payments, parental allowances, unemployment benefits, basic living

Box 3.1 Indonesia's Skills Monitoring System

Initiatives, supported by the World Bank, are under way using complementary labor market information techniques—traditional and nontraditional—to provide a thorough understanding of Indonesia's supply of and demand for skills:

Indonesia's Critical Occupation List (COL). This initiative was implemented in coordination with the Coordinating Ministry for Economic Affairs. The 2018 COL draws on international best practice from Australia, Malaysia, and the United Kingdom to develop a list of shortage occupations that can be used to inform labor market policies and programs. To be included on the list, an occupation must meet two criteria: (a) it must be in shortage and (b) it must be strategic for the Indonesian economy. The 2018 COL contains 35 occupations, which represent jobs from sectors such as manufacturing, telecommunications and IT, accommodation and food services, construction, ICT, and other professional scientific services. These occupations are derived through both top-down analysis (national survey data indicating changes in supply and demand) and bottom-up analysis (evidence collected from enterprise surveys and consultative processes). Internationally, COLs have been used to create targeted education and migration policies that address critical skills gaps.

Occupational Employment Outlook. This initiative is currently under way. It analyzes the pilot of the Occupational Employment and Vacancy Survey (OEVS) carried out between December 2019 and March 2020. The OEVS is a firm-level survey that collects information on the structure of employment, the roster of occupations in firms using 2014 Indonesian Standard Classification of Occupations (Klasifikasi Baku Jenis Pekerjaan Indonesia [KBJPI] 2014), and occupational dynamics, including shortages, hiring attempts

and constraints, current and expected vacancies, and planned occupational growth and declines. The questionnaire was designed based on two well-established surveys carried out by the US Department of Labor: the Occupational Employment Statistics and the Jobs Openings and Labor Turnover Survey.

INDO\*NET. This initiative is at the design stage. It consists of a pilot survey of selected modules of the US O\*NET survey adapted to Indonesia's context. The pilot will collect information on tasks performed and skills needed in 15 occupations. Selected occupations will be based on COL and OEVS work.

Online Skills and Vacancy Outlook. This initiative is in the data collection stage and is based on real-time labor market information techniques. The initiative collects online data on vacancies and skills demanded at the occupational level available on up to 25 job boards and 100 employer sites in Indonesia. The data collection started in November 2019 and will continue until December 2020. Data collected for each vacancy will include job title, location, classification into KBJI 2014 and O\*NET scheme, required education, skills, and experience, as well as the employer's name and sector. This survey was designed to complement, not replace, other initiatives, since more highly skilled, formal jobs are more likely to be found online.

All of these initiatives can serve as a platform for monitoring skills imbalances and helping policy makers in Indonesia to determine where investments should be made in training programs, how incentives should be adjusted for apprenticeship programs, and which skills job seekers should try to develop to increase their value in the labor market.

Table 3.16 Government Support Gap

Desirable services	Work-net	AyoKitaKerja	Gap
Information on government support	Yes, links to employment and welfare programs	No	✓ Map employment and welfare program information and make available online
Application to programs	Yes	No	✓ Enable online application

pensions, and single-parent family allowance. Work-net also offers information on welfare policies provided by local governments. In order to provide this information, Work-net partners with ministries and public agencies such as the Korea Workers' Compensation and Welfare Service and the Information Openness Unit of the Ministry of the Interior and Safety.

### AyoKitaKerja

AyoKitaKerja does not currently provide information on employment policies and labor market programs. There is no separate online portal providing information on employment policies and labor market programs. There are no links to welfare policies or services. AyoKitaKerja is planning to link up with the social welfare agency to coordinate information. See table 3.16.

## Labor Market Information and Analysis

### Work-net

KEIS uses the information in the LMIS for evaluation, analysis, and forecasting, with the objective of helping to design, monitor, and evaluate public policy at the national, regional, and local levels. KEIS also provides high-frequency employment data on its webpage (employment trends, labor supply and demand, vocational training) for other users such as active labor market participants, firms, and researchers. Sources include, among others,

national statistics, the integrated networks database (Work-net, Employment Insurance Information Network, HRD-net), and KEIS-administered surveys in areas related to employment and skills. The Work-net data, specifically, provide input to analysis of, for example, labor market imbalances, emerging skills gaps, and job-search activity.

The Employment Information Integration Analysis System is an IT system developed for the purpose of analyzing data collected in the national employment information networks in real time. Aside from Work-net data, the system includes data from the Employment Insurance Information Network and HRD-net, among others.

Work-net also allows a wide variety of users to access its information through open APIs. As of December 31, 2018, Work-net provides information on recruitment, career tracks, labor market outlook, job fairs, and other relevant employment information to 1,036 institutions, including 312 schools, 327 public institutions, and 397 private institutions.

### AyoKitaKerja

As part of a basic-to-intermediary LMIS, AyoKitaKerja does not have the technological tools, infrastructure, or platforms needed to integrate AyoKitaKerja data with data from other information systems or to analyze, evaluate, and disseminate this information. For

Table 3.17 Labor Market Information and Analysis Gap

Desirable services	Work-net	AyoKitaKerja	Gap
Data used for providing labor market information and analysis	Yes	No	✓ Integrate data systems as the quality and quantity of data improve
Data used for designing labor market policies	Yes, including for specific target groups	No	✓ Establish strong monitoring and evaluation system for public employment services and labor market policy broadly
Real-time analysis	Yes, information technology (IT) system analyzes data collected on the labor market information system (LMIS) in real time	No	✓ Use integrated data for policy evaluation and for dissemination to other actors
Sharing of labor market information	Yes, from Work-net to 1,000+ institutions*	No	✓ Share information through open application programming interface (API)

\* As of December 31, 2018.

example, while BPS produces labor market data (as shown in table 2.2), it does not present information from AyoKitaKerja on its website or vice versa. Additionally, AyoKitaKerja currently serves too few users to provide a representative view of the Indonesian labor market and, as such, is not yet suited to provide input to policy making. Building the capacity to identify sources of data, integrate them, and use them for analysis and evaluation of labor markets and labor market policies will be a major step toward creating a more advanced LMIS. Box 2.1 in chapter 2 provides a detailed description of data sources for an advanced LMIS.

AyoKitaKerja does not provide information through open API. As the volume of data increases and becomes more relevant (by virtue of volume and validation procedures), sharing information with other actors would provide a vehicle for expanding use of the platform's

services and for disseminating labor market information and analysis more broadly. See table 3.17.

## 4. Toward a World-Class Labor Market Information System



### Going Forward

With growing demand for job-matching services and interest from policy makers in strengthening labor market functioning, there is strong support for AyoKitaKerja to increase its relevance and evolve from a relatively underutilized job-matching platform into a world-class labor market information system (LMIS). Despite its short existence, AyoKitaKerja already has some of the basic foundations for an effective job-matching portal. Nonetheless, the benchmarking exercise shows that handling a modern jobs platform and processing large amounts of information require a more ambitious setup. In AyoKitaKerja, the amount and quality of information for job matching is still limited, and links to relevant information are insufficient, including career and skills guidance, government support, and labor market information and analysis. AyoKitaKerja has many potential users but is currently caught in a vicious circle: it has too few users to provide good-quality job matching, which discourages potential users from accessing the services. There is a need to revamp AyoKitaKerja quickly to achieve a critical mass of users, including current and future job seekers, firms, policy makers, and practitioners.

Reforming and stepping up the outreach and quality of AyoKitaKerja's services are crucial not only for strengthening the job-matching platform but also for laying the foundations for an advanced LMIS. Clearly, this effort will require significant human and financial resources for reform.

Benchmarking against the Republic of Korea's Work-net system provides excellent insights on aspects of an LMIS beyond the job-matching function. Based on these insights, the government of Indonesia could identify a way forward that is best suited to its own objectives, opportunities, and challenges. Developments in global technology and the experience of other countries are important assets to facilitate the reform process. This concluding chapter presents a vision and action plan for Indonesia to consider.

## Vision and Action Plan for Reform

The proposed vision is for Indonesia to move from a basic-to-intermediate LMIS to an advanced system involving public and private actors, integrated services, and data provision. While at the moment AyoKitaKerja is mainly a job-matching platform, the two-prong strategy proposed in this chapter would allow AyoKitaKerja both to improve its performance as a job-matching platform and to lay the foundations for an advanced LMIS.

To remain relevant and operate efficiently, AyoKitaKerja would benefit from establishing a platform for continuously innovating and improving the services available in response to changing client needs and in accordance with changes in international, national, regional, and global labor markets. The reform will also require AyoKitaKerja to integrate current advances in technology into the system in order to raise both its efficiency and its effectiveness. Finally, broadening services and reaching out to a more diverse set of clients will be a transversal theme.

Five key characteristics are at the core of the vision that could lead Indonesia's LMIS to reach an advanced level. Figure 4.1 presents a vision for what Indonesia's LMIS could aspire to be.

The vision highlights five key characteristics of a world-class LMIS:

- **Relevance.** It attracts, collects, and coordinates large volumes of trustworthy data, actively gathers data, both qualitative and quantitative, from a variety of sources, and transforms them into relevant, reliable information for diverse users.
- **Reliability.** It has strong data management and information technology (IT) and security systems that guarantee the validity, relevance, and continuous accessibility of data.
- **Efficiency.** It applies technology to connect users to the system, improves the services provided across

various dimensions, and monitors outcomes to improve services and policies.

- **Clients-at-the-center.** It responds to client feedback, is targeted to individual needs, and is easily accessible, navigable, and user friendly.
- **Comprehensiveness.** It forms part of, and feeds into, broader development policies, serves a wide variety of stakeholders, and attends to their diverse needs.

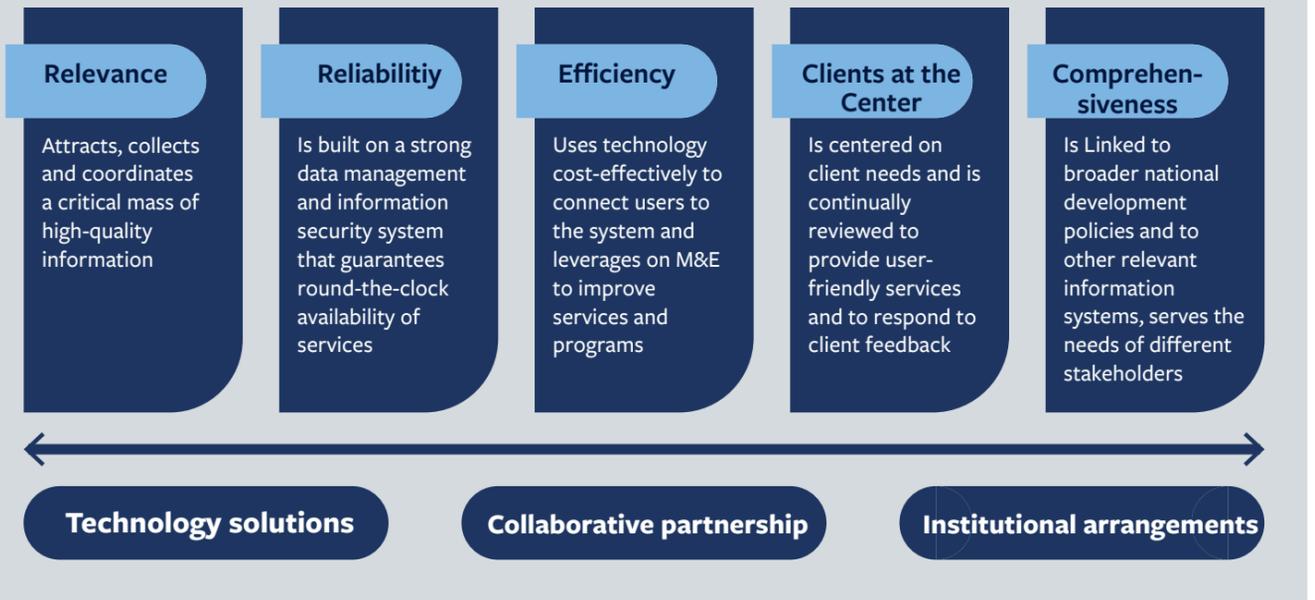
These five key LMIS characteristics are strongly interlinked. For example, a user-friendly system will increase access and respond better to client needs; this improvement will attract more users, which, in turn, may improve the relevance of the information in the system.

The entire system needs to be underpinned by the smart use of technology, collaborative partnerships, and institutional arrangements. The system should rely on advanced-technology solutions (including advanced algorithms, artificial intelligence (AI), and big-data techniques) and integrate traditional and non-traditional sources of data. The system should foster collaborative partnerships with both public and private sector actors (workers, firms, policy makers, researchers, and practitioners), who will use information from and produce information for the system. Finally, the system should have institutional arrangements in place (policies, systems, and resources) to manage the LMIS and coordinate effectively with all stakeholders. These essential features will increase the availability, coherence, and use of data needed to inform key decisions and to ensure coordination of the overall system.

Partnerships should not be limited to collaborations with public sector bodies but also should include the private sector. A well-functioning LMIS managed by the government does not crowd out privately managed job portals; instead, it makes them active players. The most successful LMISs recognize that the private sector is uniquely positioned to communicate the skills needed, identify the skills in short supply, and help to formulate opportunities for human capital

Figure 4.1 Vision of a World-Class Labor Market Information System

### Five key characteristics of an advanced LMIS



development. By providing linkages to privately managed job intermediation portals, government-managed platforms reinforce those businesses. As such, the government plays an important role in coordinating information to ensure that all stakeholders in the labor market have accurate, timely information for decision making.

Achieving the proposed strategic vision will require following a set of concrete actions. The proposed action plan presented in table 4.1 is organized around three stages: short term, medium term, and long term.

Over the short term, actions should focus on attracting users, improving the efficiency of job matching, and setting the basis for a broader LMIS. These goals can be accomplished by the following:

- Establishing institutional arrangements with key public and private stakeholders
- Mapping and integrating existing labor market data (traditional and nontraditional), economic analyses,

information on ALMPs, and information sources that underpin the flow of information into the system

- Improving user friendliness and developing customer response services
- Using technological solutions and implementing AI techniques
- Improving and expanding the technical infrastructure of the platform, including server capacity, cloud system, and monitoring systems
- Strengthening the quality and security of data by encrypting personal information, controlling access, and establishing security protocols.
- Over the medium term, the LMIS could tailor services to specific labor market needs:
- Develop tailored services for specific groups, including small and medium enterprises and vulnerable job seekers
- Develop a career guidance function, including the introduction of new online tools
- Analyze and disseminate information on the labor market, future jobs, and skills needs.

Over the long term, the functions of the LMIS can be developed further. With accompanying infrastructure and IT upgrades, the LMIS should continue deepening the services and analysis available for all stakeholders. This effort would include introducing more in-depth information

on career guidance and labor market information in general, connecting with relevant information systems such as government programs, and using the LMIS to evaluate labor market policies and develop policy tools.

Table 4.1 **Action Plan**

Features and policy actions for an advanced LMIS	Key characteristics				
	Relevance	Reliability	Efficiency	Clients-at-the-center	Comprehensiveness
Short term					
1. Expand server capacity and establish redundant servers for backup		●			
2. Establish a functional disaster recovery system		●			
3. Establish integrated control of server resources and applications for active failure response		●			
4. Introduce validation procedure (e-mail or text message) for registration		●			
5. Establish quality assurance protocols		●			
6. Use a cloud system to anticipate system expansion and efficient use of resources in the future		●			
7. Build a monitoring system for each system node and monitor it regularly		●	●		
8. Implement measures to improve security, including control of access, training, and regular program inspection		●	●		
9. Encrypt personal information and create and maintain user privacy policies as the system develops		●			
10. Implement AI technology to improve job matching	●		●		
11. Improve the input system for job vacancies and job seekers, replacing free-text with predefined templates			●	●	
12. Ask for renewal of inactive vacancies after three months to remove inactive jobs (time period to be calibrated over time and in consultation with job seekers and employers)		●	●		

Table 4.1 **Action Plan** (continued)

Features and policy actions for an advanced LMIS	Key characteristics				
	Relevance	Reliability	Efficiency	Clients-at-the-center	Comprehensiveness
13. Develop user-friendly templates using UI/UX design and including tabs for different services, that is, job matching, career guidance, data analytics, government program (to be populated with information sequentially and/or in parallel and to be linked to one another later)				●	●
14. Design a light version of the portal for locations with poorer ICT connectivity		●	●	●	
15. Establish SMS as an alternative communication channel and provide personalized information through SMS				●	
16. Develop mobile applications and improve mobile and personal computer services simultaneously	●			●	
17. Establish an institutional arrangement for the LMIS					●
18. Map and provide links to relevant information and data sources developed by government and nongovernment stakeholders					●
19. Provide a subsystem or link to a list of existing training and education institutions with search filters by area and location					●
20. Provide a subsystem or link to the COL					●
21. Provide a subsystem or link to the preemployment card program (Kartu Pra Kerja)	●				●
22. Develop human resources strategically to build up AyoKitaKerja and provide input to the LMIS	●	●	●	●	●
23. Provide training to PES staff to intensify use and improve quality of inputs	●	●			
24. Raise awareness of job-matching services among target groups such as private sector employers, government institutions, and job seekers at different levels of qualification, including senior vocational high school students	●				
25. Sign memorandums of understanding with private job portals to share information	●				

Table 4.1 **Action Plan** (continued)

Features and policy actions for an advanced LMIS	Key characteristics				
	Relevance	Reliability	Efficiency	Clients-at-the-center	Comprehensiveness
26. Provide information and support services to SMEs to help them to register vacancies	●	●		●	
27. Strengthen collaboration with career guidance counselors and universities, schools, and training centers on use of the job-matching platform	●			●	●
28. Make enrollment mandatory for (unemployed) beneficiaries of government programs	●				
29. Provide information and support services to vulnerable groups to help them to register as job seekers in the system	●	●		●	
30. Develop a customer response service through several channels				●	
Medium term					
31. Ensure that public job postings at the central and local levels are posted on the job-matching platform	●				
32. Develop a feedback system to VOC and target specific groups	●	●			
33. Tailor specific services to SMEs	●			●	
34. Tailor specific services to vulnerable groups of job seekers	●			●	
35. Establish a monitoring and evaluation system to track key indicators			●		
36. Develop online tools for individual career guidance including tests, videos, and games				●	●
37. Develop an information base on future jobs and skills			●	●	●
38. Map existing social welfare programs and ALMPs by purpose and target group and provide information on how to apply and access benefits	●				●
39. Assist potential beneficiaries in assessing their eligibility for different programs	●			●	●
40. Share job information under open API					●

Table 4.1 **Action Plan** (continued)

Features and policy actions for an advanced LMIS	Key characteristics				
	Relevance	Reliability	Efficiency	Clients-at-the-center	Comprehensiveness
Long term					
41. Introduce more in-depth corporate information for assisting job seekers in assessing employer and workplace characteristics	●		●	●	
42. Introduce IT solutions to verify reliability of job vacancies and job seekers		●	●		
43. Introduce specialized surveys to monitor the quality of job matching based on administrative data			●	●	
44. Connect with other relevant information systems			●		●
45. Use job-matching and other information to evaluate the effectiveness of ALMPs					●
46. Develop other policy tools (besides the COL) tailored to policy makers					●

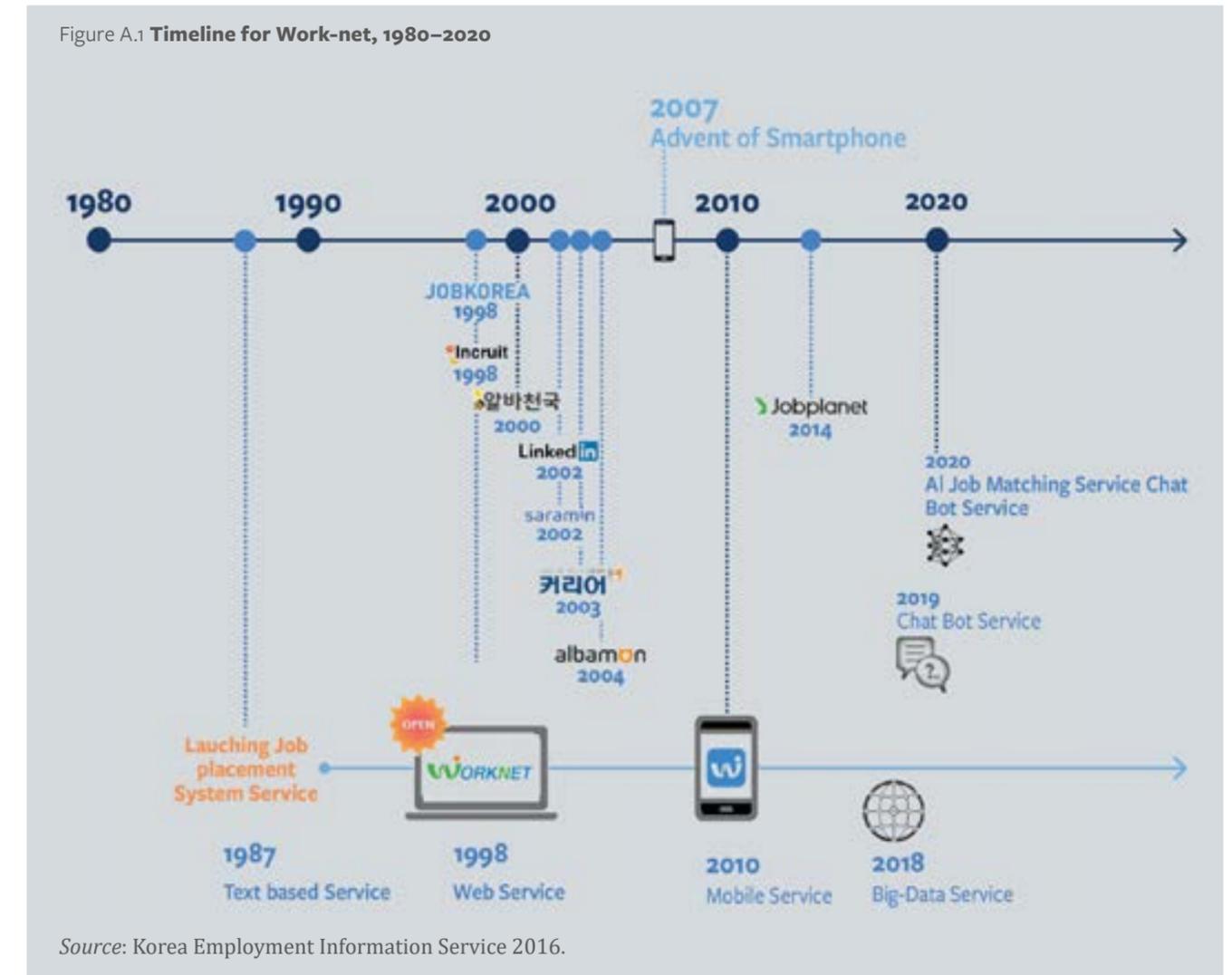
Note: LMIS = labor market information service. AI = artificial intelligence. UI/UX = User Interface/User Experience. ICT = information and communication technology. SMS = short message service (text messaging). COL = Critical Occupations List. PES = public employment service. VOC = Voice Of Customer. SMEs = small and medium enterprises. ALMP = active labor market program. API = application programming interface. IT = information technology.



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## Appendix: KEIS Materials

Figure A.1 Timeline for Work-net, 1980–2020

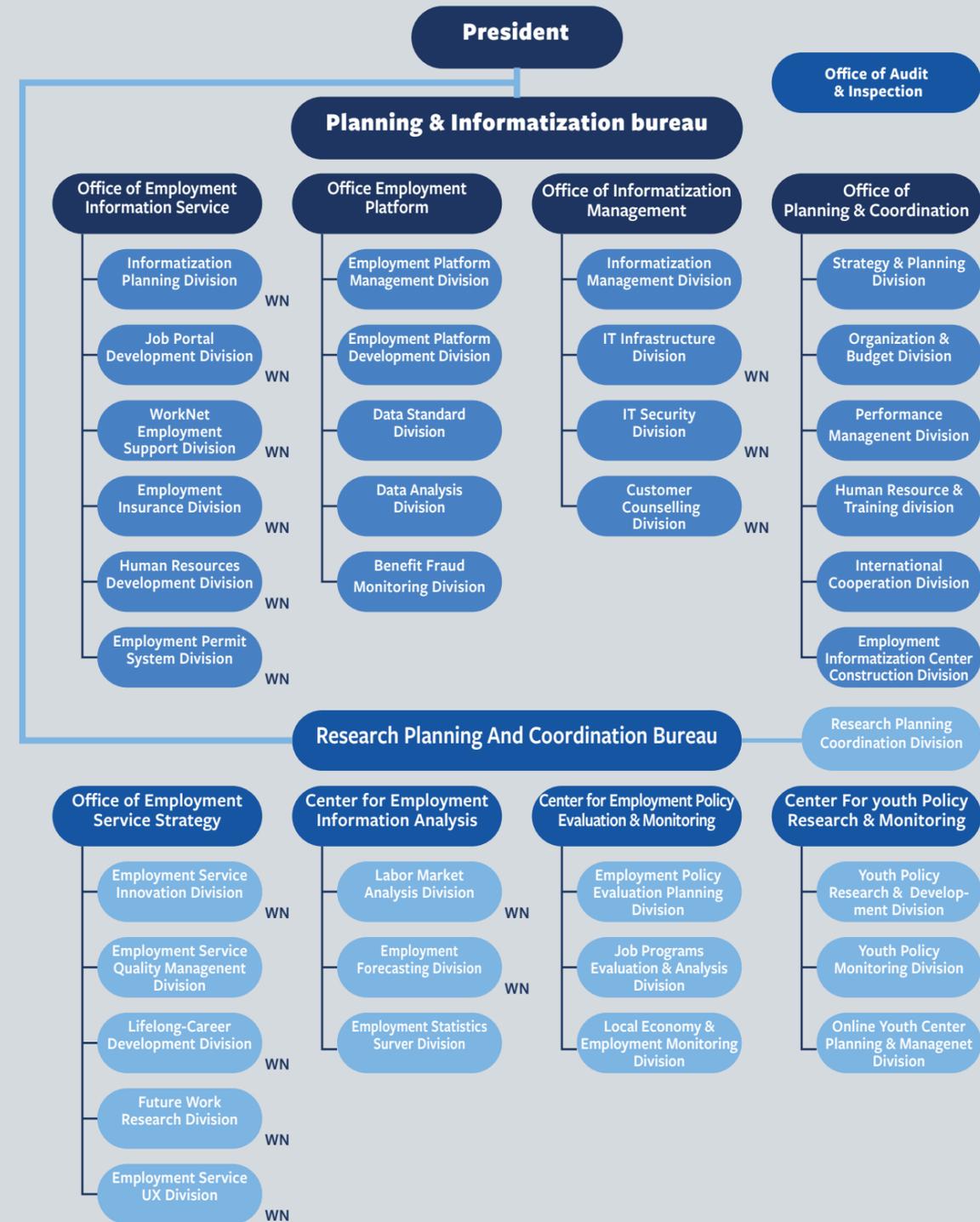


Source: Korea Employment Information Service 2016.

Table A.1 **Work-net Reform Projects, 2005–17**

Project reform and details	Year
<b>Establishment of comprehensive employment and recruitment services: information hub</b> <ul style="list-style-type: none"> <li>Strengthened job-matching by expanding services based on users' characteristics (age, gender, type of work, type of enterprise)</li> <li>Established a hub system in which job seekers could obtain job information distributed among various agencies. Applied content management system, integrated search, and web service technologies</li> </ul>	2005–06
<b>Work-net System Innovation Project: infrastructure, security, user friendliness</b> <ul style="list-style-type: none"> <li>Improved quality of the system on three areas: (a) improved quality of employment and job-search information; (b) improved information structure that allowed for customized search results and personalization of services; (c) improved system speed and established the foundation for quality enhancement</li> </ul>	2007
<b>Work-net Mobile Enhancement Project: mobile web and app services</b> <ul style="list-style-type: none"> <li>Improved user friendliness and accessibility, by (a) building mobile web and app services; (b) introducing recruitment information, search, and direct call services; (c) mapping jobs and linking them to public transportation information to provide localization services; (d) enabling notifications on job openings, closings, and placement; and (e) sharing job postings on social networking sites</li> </ul>	2010
<b>Next Generation Total Employment Service System Development Project: overhaul of services, interoperability, Baro-one</b> <ul style="list-style-type: none"> <li>Integrated and linked public and private sector job information</li> <li>Established a system for real-time monitoring of jobs</li> <li>Provided local governments with access to local job information on Work-net</li> <li>Established a master database by standardizing data on employment-related system management targets (for example, employment insurance, job placement, and job training) and establishing an integrated employment history database (master data management system)</li> <li>Introduced Baro-One, a customized employment service system that relied on the master database, and established an integrated employment and industrial accident analysis system</li> <li>Further improved Work-net's user friendliness by reorganizing internal and external network services</li> <li>Improved Work-net's mobile services and standardized the internal system</li> </ul>	2011–12
<b>Establishment of Job Portal Site Project: LMIS with full integration of systems, artificial intelligence, infrastructure</b> <ul style="list-style-type: none"> <li>Established a national job information platform that could integrate and manage employment information and labor services and provide analysis of results to the public. This required the integration of channels and the provision of online integrated employment information to the public through personal computers and mobile phones</li> <li>Carried out a detailed analysis of users' information using big-data techniques with the goal of providing personalized employment services. Specifically, the system categorization of information was improved to classify characteristics and personality types and employment-related content on Work-net and HRD-net</li> <li>Replaced outdated equipment and infrastructure needed for the national job information platform and established a new job portal site service</li> </ul>	2017

Figure A.2 **KEIS Corporate Organization and Divisions Related to Work-net**



Source: Korean Employment Information Service.  
 Note: WN = Work-net-related units.

Table A.2 **Work-net Staff within KEIS Corporative Organization**

a. Planning and Information Bureau

Division	Role	Staff	Educational requirements	Initial need
Job Portal Development Division	Work-net online and mobile system planning and operation	Engineer 17 PhD 1 Planner 2	Information technology (IT) developer and related license owner IT major	Essential
Informatization Planning Division	Informatization budget and organizational management	User Experience (UX) designer 2 Planner 2 Engineer 3	IT major UX design major	Optional Replaceable
Work-net Employment Support Division	Management of Work-net internal network operations for employment centers	Engineer 15 Monitoring 17	IT major For monitoring, no requirements	Essential
Employment Insurance Division	Planning and program development and management of employment insurance system services	Engineer 20	IT developer and related license owner IT major	Optional
Human Resource Development Division	Planning and program development and management of HRD-net	Engineer 19	IT developer and related license owner IT major	Optional
IT Infrastructure Division	Introduction and operation management of hardware network	Engineer 12	IT developer and related license owner IT major	Essential
IT Security Division	Establishment and management of information security policies for IT systems	Engineer 7	IT developer and related license owner Profession security major	Optional Infrastructure can be replaceable
Customer Counseling Division	Management of Voice Of Customer (VOC) system	Counselor	—	Optional

b. Research Planning and Coordination Bureau

Division	Role	Staff	Educational requirements	Initial need
Employment Service Innovation Team	Strategies for developing online and offline employment services	PhD 2 Master's 4 Administrative 2	Doctoral degree Master's degree	Essential
Lifelong-Career Development Division	Research and content development to support lifelong career development policy	PhD 5 Master's 6 Administrative 3	Doctoral degree Master's degree	Optional Replaceable
Future Work Research Division	Occupational research and job-related content development	PhD 5 Master's 4 Administrative 1	Doctoral degree Master's degree	Optional Replaceable
Employment Service UX Division	Online-offline employment service user experience and environmental design	PhD 1 Master's 2 Administrative 1	Doctoral degree Master's degree	Optional Replaceable
Labor Market Analysis Division	Collection and analysis of employment information	PhD 5 Master's 4 Administrative 1	Doctoral degree Master's degree	Essential
Employment Forecasting Division	Mid- to long-term employment forecast and model development	PhD 5 Master's 6 Administrative 1	Doctoral degree Master's degree	Optional Replaceable

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