Industrial Profiling for Job Placement and Market Demand Analysis Using eMOTIKON

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Abstract—During the pandemic and post pandemic era, securing a job is among the critical situation that affects the socio-economic development. Although many have claimed to lose their jobs and the prospects of occupations have changed to something known as new normal, the industry has yet to quit and determined to recover after the pandemic is over. This research is done to develop a system that is able to create and store industrial profiles. This profile will return specifications on market demand and job descriptions to match the learning and training institutions curricula so that the graduates would be able to meet the industrial needs. Simultaneously, this system is also able to deduce on the demand analysis to guide the supply institutions not to deviate on the real-time industry expectations. The system developed for this research is known as eMOTIKON which stands for (in Malay words) *e-MoU Tenaga Kerja Industri-KBS* Online which is translated to be the electronic-based data of developing workforce through MoUs between the industry and the Ministry of Youth and Sports, Malaysia.

Keywords—data analysis, data centre, eMOTIKON, industry profiling, job placement, post pandemic

I. INTRODUCTION

In 2014, the Ministry of Youth and Sports Malaysia (KBS) has undergone a transformation programme that manages, maintains and upgrades the training curricula, equipment and infrastructures of its 22 training institutions. This ministry is managing 8 higher youth skills training institutions known as IKTBN, 13 youth skills training institutions known as IKBN and 1 academy for golf trade occupations known as AKBG. Together, these institutions are known as ILKBS. Through transformation programme, the Ministry put emphasis on a good efforts and rapports with the industry partners [1]. This is not only for conformation with the industry requirements but also to ensure that the training institutions comply to the industry needs and that graduate employability rate improves each time [2].

Consequently, the ministry has initiated several strategies to support this transformation which includes the Public-Private Partnership Programme (PPP) initiative [3]. Through this initiative, it is expected that the youth skills training institutions will get benefits from the good relationship with the industries in the activities of: (i) industrial training placement, (ii) graduates job placement, (iii) training-of-trainers, (iv) industrial attachment for the trainers, (v) tools and equipment contributions, (vi) technical advisory committee, (vii) expert sharing, and (viii) teaching factory.

From the PPP initiative, the ministry has signed many Memorandum of Understanding (MoUs) with industries and organisations that match the occupation trades of the ministry's training institutions. The industries and organizations that have signed up MoUs with the Ministry of Youth and Sports Malaysia are from 14 technology programme clusters [4] namely; (i) Construction Technology, (ii) Automotive Technology, (iii) Electrical Technology, (iv) Electronic Technology, (v) Mechanical Technology, (vi) Marine Technology, (vii) Information Technology, (viii) Photography, (ix) Textile Technology, (x) Agriculture Technology, (xi) Hospitality, (xii) Sports Industry Technology, (xiii) Oil and Gas, and (xiv) Personal Technology.

Due to this ministerial requirement, the PPP is to be managed properly though systematic approach and active involvement of industries [5] through various MoUs mutually agreed, the coordinator of youth skills training institutions, namely the Youth Skills Development Division (BPKB) has taken the initiative of proposing and developing a system known as eMOTIKON. eMOTIKON is an abbreviation to a Malay acronym stands for *e-MoU Tenaga Kerja Industri-KBS Online* which translated to be the electronic-based data of developing workforce through MoUs between the industry and the Ministry of Youth and Sports.

II. EMOTIKON FRAMEWORK

A. The Concept of Industry Driven-Demand Driven

Through Malaysian National Youth Policy [5] and the needs for active industrial participation in skills and higher learning institutions in Malaysia, Ministry of Youth and Sports Malaysia has formed strategic partnerships with high-impact firms at the national level. The primary goal for this kind of collaborations is to provide ILKBS graduates with better career prospects within the industries.

To date, strategic partnerships formed were materialized through MoUs and joint statements. The coordination and monitoring tasks are managed through manual procedures. Hence, efforts have been made to create a systematic data centre to manage the enforcement and activities within the scopes of the collaborations. Hence, eMOTIKON was designed to accommodate this objective.

A systematic coordination and monitoring process using eMOTIKON especially with the industries that have bound MoUs are given priority to get quality ILKBS students according to salary scales, based on competencies and areas of certification agreed. Simultaneously, ILKBS graduates are ensured to be employed based on the salaries and incentives as per agreed upon in the memorandum. Other documents referred for the implementation of eMOTIKON include the National Occupational Skill Standard (NOSS) [6] and and National Skills Development Act (NASDA), Act 652 [7].

B. eMOTIKON Initiatives

eMOTIKON is expected to yield a high return of investment (ROI) to the Ministry in ensuring students' quality of learning is in parallel with the industrial needs and optimizing the marketability value of ILKBS graduates that are monitored effectively. There are three (3) types of users in eMOTIKON as per illustrated in Figure 1 and they are:
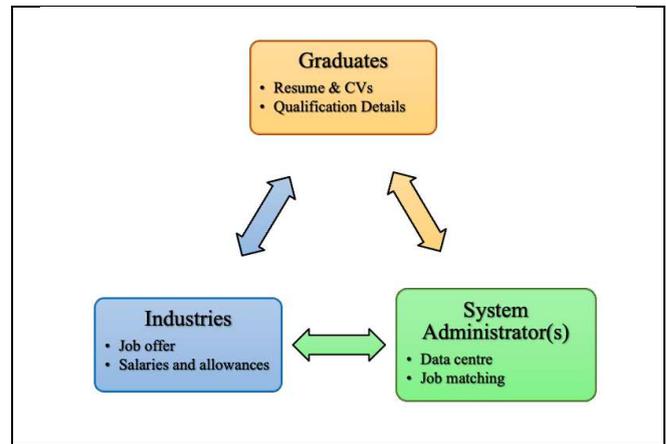
(i) Products - Graduates are the products of ILKBS. Similarly, they are the products of this system too. ILKBS provides supply to the industries. On the other hand, the industries will provide the demand to their economic activities. In this system, the graduates will provide their resumes and curriculum vitae (CV) for job application and placement. By using eMOTIKON, it is expected that the students' and graduates' data will be centrally managed, and employability matched to the demanded parties.

(ii) System Administrator(s) – The system administrators of this project will be co-managed by both the headquarters officers particularly among the officials of Strategic Partnership Section of BPKB and the officers of Industrial Relations at ILKBS. These officers will be responsible to:
   a. Oversee both the graduates and industry login details and accessibility;
   b. Coordinate the graduate's data centre;
   c. Monitor the activities of MoU; and
   d. Coordinate the notifications on the job placements and other activities with the industries.

(iii) Industries – The industry personnel will be given their own user interface within this system. They will upload the job offer notifications and request for data of prospect graduates. However, their accessibility will be subject to the system administrators that will analyze and properly provide the pool of data as per requested and as per deemed fit to the scopes of partnership agreed upon.

Figure 1. The 3 types of eMOTIKON users.

C. The eMOTIKON Framework

Designing and developing of eMOTIKON is based on the details of its objectives, user interface and types of users involved. Hence, a framework for this system was designed to specify the parameters and components and formulate the inputs, the process and the performance of the system.

The framework for this system is as illustrated in Figure 2. The data inputs of the system consist of industry's profile, applicant's profile and trainer's profile. The industry's profile comprises of its establishment background, job requirements, job openings, internship offerings, available experts, infrastructure and salary offer. The applicant's profile consists of the academic background, his skills and technology trade areas, his expectations and his qualifications that would enable him to match the job description offered by the industry.

The trainer's profile is an additional feature to this system that helps monitoring the active involvement of both parties in the MoU agreements. The trainer's profile is enhancing on the updates of the latest technological advancements in the industry growth that the knowledge out of sharing sessions between the industry experts with the trainers will help to scrutinize the latest occupational needs analysis to the students of the skills training institutions. The trainer's profile comprises of the trainer's existing qualifications, training needs analysis and his competency levels.

Basically, the eMOTIKON framework would have the sets of data inputs and contain diverse information that is carried within its variable handlers which we represent them as the profiles and returned a set of outputs that run the data of all the objectives required by the system as per represented by equation (1).

$$f(x, y, z) = \{a\,(p) + [b(p) \vee c(p)]\} \qquad (1)$$

Where.
x: internship values $\qquad$ a: industry's profile
y: industrial attachment values $\qquad$ b: applicant's profile
z: other activities values $\qquad$ c: trainer's profile
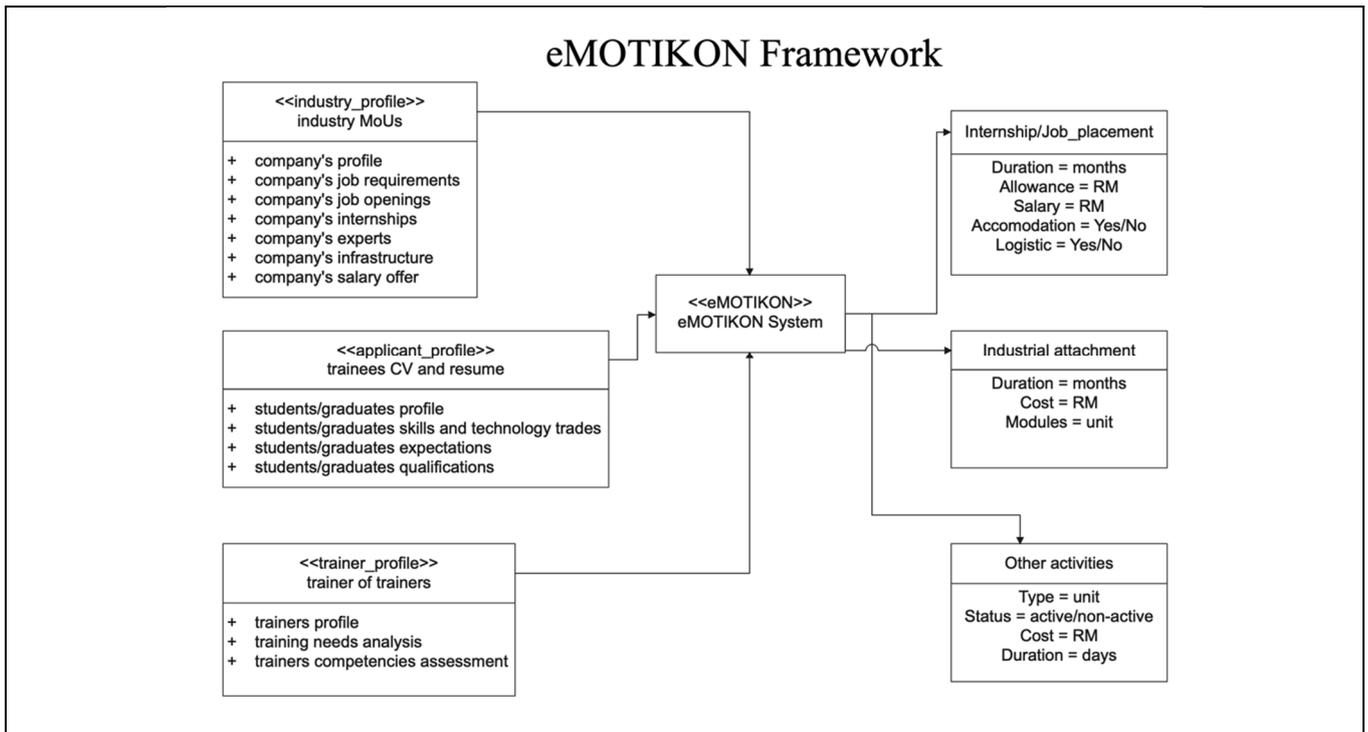$\qquad\qquad\qquad\qquad\qquad\qquad$ p: profile's variable handler

Figure 2. The eMOTIKON Framework

III. EMOTIKON DATA ANALYSIS

In essence, building the eMOTIKON system is to assist the government on PPP initiatives for job placement of the skills graduates to the industries. The data involves in these strategies include the management of the MoUs, the types of agencies involved, the status of active participation with partners and the types of activities performed between the two parties.

Figure 3. The percentage of National MoU in comparison to Institutional MoU

Figure 3 is illustrating on current percentage distribution of National MoU in comparison to Institutional MoU at KBS. As of 31st December 2020, the number of MoUs established between KBS and the industries are 259. Out of those data, 14% of them are mutually agreed at National level and 86% of them are within the control of ILKBS.

From this number of MoUs, the number of types of agencies were identified to fall under at least 4 categories: Federal Agencies, Statutory Bodies, Government-Linked Corporations (GLCs) and Corporate Bodies. The biggest number of industries are from the corporate bodies which contributed to 62%. While the other agencies contributed to the percentage of 27%, 7% and 4% respectively. This is as illustrated in Figure 4.
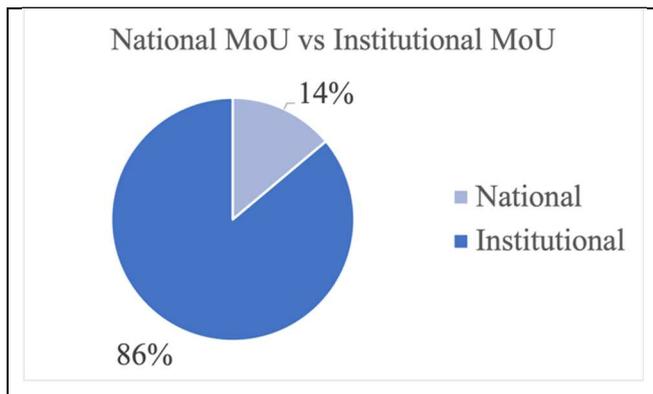

Figure 4. The Types of Agencies Involved with MoUs

The PPP initiatives at KBS have officially started in year 2014 with proper documentation on the scopes of partnership and the monitoring of the activities. The MoUs agreed were within stipulated period of understanding. The monitoring process includes on the active performance of the activities run between the parties and the requirement for further

collaboration if needed once the agreement is expiring. Hence, the status of agreement was clustered into groups such as (i) In-Force Active; (ii) In-Force Inactive; (iii) Lapsed-Active; and (iv) Lapsed-Inactive.
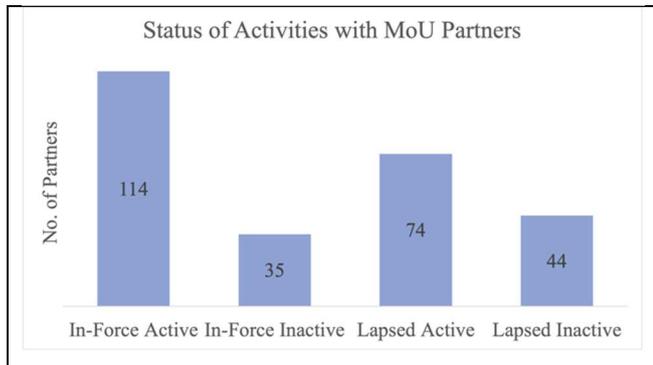

Figure 5. Status of Activities with MoU Partners.

Figure 5 is illustrating the status of activities between KBS with MoU partners on the enforcement of activities. Through this kind of monitoring, the office would identify the types of agreement that were signed and actively run compared to the industries that have partnership, but no activities have ever taken. The same goes to the status of validity of the agreement and its expiration date.
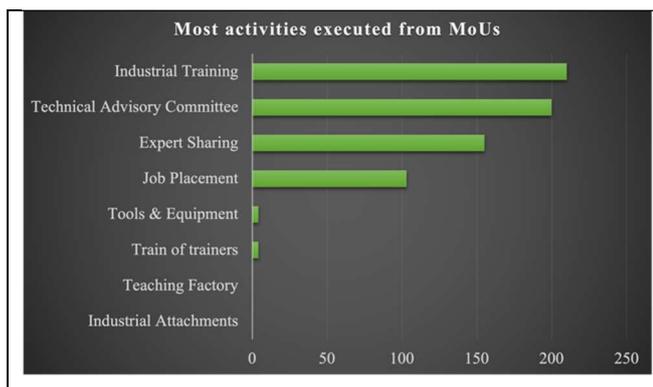

Figure 6. Most Activities Executed from MoUs.

As per mentioned in Part I of this study, there are 8 categories of activities performed through the scopes of partnership. Figure 6 is illustrating on the types of activities mostly performed during the active period of MoUs and the less popular activities. From the figure, it is learned that the main activity for this partnership programme is for the purpose of students' industrial training. Simultaneously, the ILKBS that established collaborations with the industries for the industrial training purposes have also appointed their partners as the Technical Advisory Committees (TAC).

More than half of the industries involved contributed to the activities of expert sharing and job placement. The less activities involved in this partnership programmes are contribution of tools and equipment, train of trainers, industrial attachment and teaching factory.

IV. TESTING EMOTIKON

The Government of Malaysia has started initiatives on enhacing the data centre of her offices through the utilization of cloud computing since 2015 [8, 9]. In efforts of performing digitalization in government offices, the approaches of consolidating the data centre through projects such as 1Gov*Net has been initiated ever since [10]. When the wave of big data hit the Malaysian industry, the government had also upgraded all relevant centralized system to accommodate this facility [11].

Testing eMOTIKON had also involved harmonization between the remote data of developers' architecture with the cloud server provided by the Government of Malaysia. To ensure that this system works accordingly, meticulous steps have been taken so that the user interface will fulfill the clients' requirements and needs. Figure 7 is illustrating the phases involved in eMOTIKON testing.

In order to integrate the system to the Government consolidated websites and servers, the following phases have been done: (i) Phase 1 – domain name registration and nameserver configuration. This includes technology research on client user experience and process flow confirmation; (ii) Phase 2 – continuous Application Programming Interface (API) system design and development with the clients. This includes the database design and security testing; (iii) Phase 3 – Gathering feedback , functional testing and bug fixing. This includes integration of user interface with the logic programming of the system; and (iv) Expected outcome is about the complete integrated system as a whole and the deployment of the Government's server.

The following Testing Algorithm 1 is illustrating on the process of testing the user interface of eMOTIKON. During the testing phase, the major inputs include the industry profiles, applicant profiles and trainer profiles were sorted and analyzed in accordance to the matching data within the industry and the applicants. If the process is for the applicants, the sorting will do prioritization to the variables. Unless the process is meant for the trainers, then the sorting will return industrial attachment instead.
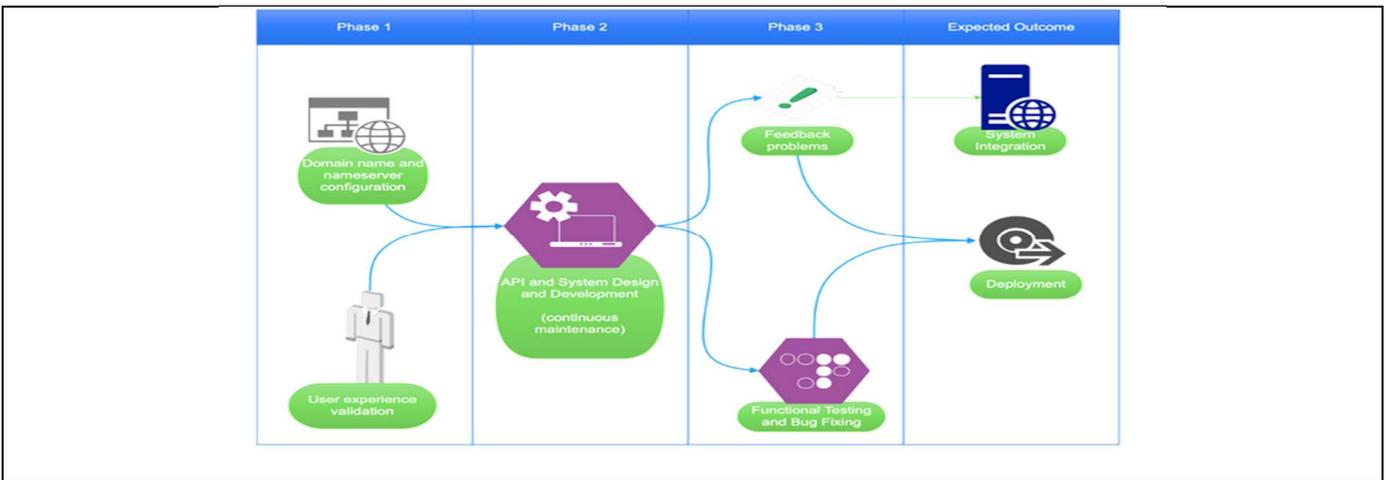
Figure 7. Phases of eMOTIKON Testing

Testing Algorithm 1: User Interface

Input: Set of industry profiles = A, applicant profiles = B, and trainer profiles = C

Output: Internship, industrial attachment and other activities

Definitions: A = set of industry profiles, B = set of applicant profiles, and C = set of trainer profiles

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1: Procedure PlacementProcess (B)

2: FOR B = 0.0;

3:       Do A = B++ ∨ C++;

4:       Return Internship (B);

5: ELSE Return IndustrialAttachment (C);

6: End

V. CONCLUSION

In efforts of running digital government and enhancing the cutting edge of data center within the central agencies, it is commendable to ensure that the intelligent systems and the computation that complements the initiatives are well-equipped and able to provide problem solving approaches. In many instances of executing PPP, the weaknesses of enforcement should not be the limitation for any partnership and collaboration mutually agreed. Rather the advantages of having the facilities of high-speed data provision within the government agencies can be utilized to run a systematic approach to manage the industrial profiling for the purpose of job placement and related training.

The design of development of eMOTIKON is a good yield to the manage the data within the organizations especially in ensuring the success of offering job for the prospects and help the economic growth to the nation. Both the socio-economy and technology trades are concurrently emphasized. Simultaneously, this system provides good platform for monitoring on the documents mutually agreed upon between the government agencies with the corporate bodies. The system also helps the users to study the market needs, the occupations on demand and the competencies that complement the latest technology.

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