A Framework to Facilitate Collaboration in Employability Ecosystem in Malaysia

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***Abstract*—To improve the labor market, solving the discrepancies between demand (industry) and supply (government, MQA, job seekers, students) is critical. Industry requirements frequently change from time to time, forcing the government, the MQA, job seekers and students to keep up with the current job requirement. The government, the industry and the MQA each has certain information kept isolated from the public, making it difficult to access and exchange the information between them. Citizens, especially job seekers and students face difficulties because it takes a long time to seek the information located in different web portals. Little research has been done on the possibility of collaborating via information sharing between four actors - government, MQA, industry and citizen by having a central standard online platform where each of them able to accesses, exchanges, and represents the information. However, their study only explores the concept of collaborative information system (CIS) among the four actors. This research is conducted to introduce and describe the components of employability framework with the basic principles in Collaborative Knowledge Management (CKM).**

***Index Terms*—Collaborative Knowledge Management; Information Sharing; Employability; Ecosystem.**

I. Introduction

Information and Communication Technology (ICT) has enabled the corporate intranets and the collaborative extranets to be shared using a web-based platform, and facilitated the collaboration with other organizations in handling the information and knowledge through Collaborative Knowledge Management (CKM) process. Most big organizations today have implemented CKM process where information such as contact lists, company news, and other relevant information in corporate intranet is shared on a web-based platform. The organizations also implement extranets to share information with the supply chain [1]. Although these technologies have been used widely in other ecosystems, they have yet to be practiced in employability ecosystem [2]. The government (Malaysia E-Government), the MQA (Higher learning institution) and the industries (SME Corporation) are the decision-makers responsible for planning or implementing the program that can help benefiter such as students and job seekers to improve employability [2]. The decision-makers mostly operate and work in silos, encumbering the access and the exchange of information among them [2]. Moreover, each actors store information in their own respective website, hindering efficient information seeking for job seekers and students. Having laid out this background, the necessity of sharing information via a collaborative knowledge management system has been noted, and the decision-makers can engage in a shared activity by working together towards a common goal usually from remote locations. This collaborative effort will bring forth the importance of sharing information and exchanging requests with each other in order to make informed decisions in improving human capital development. Furthermore, the effort will help to gather extensive information from an isolated information point within a single website portal. In order to have collaborative knowledge management system in employability, the components in facilitating employability ecosystem have to be identified before designing and evaluating the framework of CKM in employability ecosystem. [2] has performed an investigation, showing the possibility of collaborating via information sharing between four actors - government, MQA, industry and citizen by having a central standard online platform where each of them accesses, exchanges, and represents the information. However, their study only explores the concept of collaborative information system (CIS) among the four actors. This research is conducted to introduce and describe the components of employability framework with the basic principles in CKM.

II. Related Works

This section provides a brief background on the existing framework in Collaborative Knowledge Management (CKM) system, followed by the content of information sharing in employability, and the components required in CKM system for employability ecosystem.

A. Existing Collaborative Knowledge Management System

The first domain begins with the knowledge management in the domain of the institution of higher learning, which focuses on the content that manages the organization's explicit knowledge. Then, it is followed by the domain of new product development which proposes a framework at the intranet or the internet level knowledge flow that highlights the hierarchal nature and the bi-directional flow of knowledge. This research was performed for an auto-component supplier in India where the business was limited by the organizational culture, location, business model, and sector. Collaborative Management System was started to be implemented in the domain of Open Source Software Development Environment where this framework was only compatible in the Open Source Infrastructure. Table 1 shows that different domains have different components to be included in the framework. In the employability ecosystem, knowledge content is added to accommodate this domain.

Table 1
Existing Framework in difference domain

Domain	Higher Learning Institution	Supply chains	New product development	Open Source Software Development Environment	Employability Ecosystem
Item/ Framework	KMS framework [3]	CKMS framework [4]	Soft-system knowledge management framework [5]	CKMS framework [6]	CKMS framework
Psychological	Y	NA	NA	NA	NA
Culture	Y	NA	NA	NA	NA
Knowledge Management Process	Y	Y	Y	Y	Y
Application	Y		Y	Y	NA
Technology	Y	Y	NA	Y	Y
Infrastructure (Access level)	Y	Y	Y	NA	Y
Repository	Y	Y	Y	Y	Y
Knowledge Management Functionality	NA	Y	NA	NA	Y
Knowledge Conversion Mode	NA	Y	Y	Y	Y
Knowledge Content	NA	Y	NA	NA	Y
Actor	NA	Y	NA	Y	Y
Open Source Infrastructure	NA	NA	NA	Y	NA
Collaboration Tools	NA	Y	NA	Y	NA
Supply-Chain Configuration	NA	Y	NA	NA	NA

B. Actors in Employability's Framework

The two actors in employability ecosystem are the decision-maker and the benefiter. A decision-maker is the person who decides an action, especially at a high level in an organization [13] while a benefiter is the person who gains benefit [14] either directly or indirectly. Decision makers are from the industry (SME Corporation), the government (Malaysian E-Government), and the academia (MQA)[2]. Direct benefiters are students and job seekers who gain benefits in improving the employability. There are indirect benefiters required for their knowledge such as guardians and counselors. These communities have equal roles to play in stimulating the innovative human capital development in a country. A research [2] proves that each actor requires knowledge sharing as evident in Table 2. The table shows that each actor can provide and acquire information among other actors.

Table 2
Knowledge Sharing Information

Category	Decision Maker			Benefiter			
	Direct			Direct		Indirect	Indirect
Actor / Space / Knowledge	Industry (SME corporation)	Government Portal (Malaysian E-Government)	Academic Portal (MQA)	Job Seekers	Student	Citizen (Guardian, Recruiter, Educator)	Recruiter
Job offer (eg: number of job offers by recruiter A)	√	<required>	<required>	<required>		<required>	√
Job appointment (number of candidate being offered)	√	<required>	<required>	<required>		<required>	√
Job available (still have saveral vacancies to be filled)	√	<required>	<required>	<required>		<required>	√
Skill information	√	<required>	<required>	<required>		<required>	√
Expected Jobs	√	√					√
Corporate Information	√	<required>	<required>	<required>		<required>	√
certified training	√	<required>	<required>	<required>		<required>	√
Scholarship information	√	√	√	<required>		<required>	n/a
Available Grants Information	<required>	√	<required>	<required>		<required>	n/a
Tax Rebates	<required>	√	n/a	n/a		n/a	<required>
Course Detail	<required>	<required>	√	<required>		<required>	n/a
Student Enrolled	<required>	<required>	√	n/a		n/a	n/a
Graduates	<required>		√	n/a		n/a	n/a
Employed graduates	√	√	√ / <required>	√ / <required>		√ / <required>	n/a
Unemployed graduates		<required>	√/<required>	√ / <required>		√/<required	n/a
Detail University Information	<required>	<required>	√	<required>		<required>	n/a
Misplaced Graduates	n/a	<required>	n/a	√		√	n/a
Resume	<required>	<required>	n/a	√		n/a	<required>

√ – can provide the information
<required> – required from another communities
n/a – not available/not required

C. A generic employability framework

A study [7] integrates collaborative capabilities and knowledge management, and finally proposes the concept of "generic framework of Collaborative Knowledge management" as shown in Figure 1.

This study has extended the framework to suit employability ecosystem as shown in Figure 2. In this figure, the employability generic framework consists of three spaces: Collaboration Space (to manage and coordinate the cooperative tasks), Knowledge Management Space (to manage the collective knowledge manipulated within the cooperation) and Actors Space (to manage and represent the actors implicated into the cooperation). The generic employability framework adds a public knowledge base which appears to be three databases: Private, Shared, and Public Knowledge Based (KB). The differences rely on the security level of the information: The Private KB can only be accessed from the internal organizations, the Shared KB can be accessed among decision-makers, and the Public KB can be accessed by benefiters. The space remains the same with the existing framework as shown in Table 3.

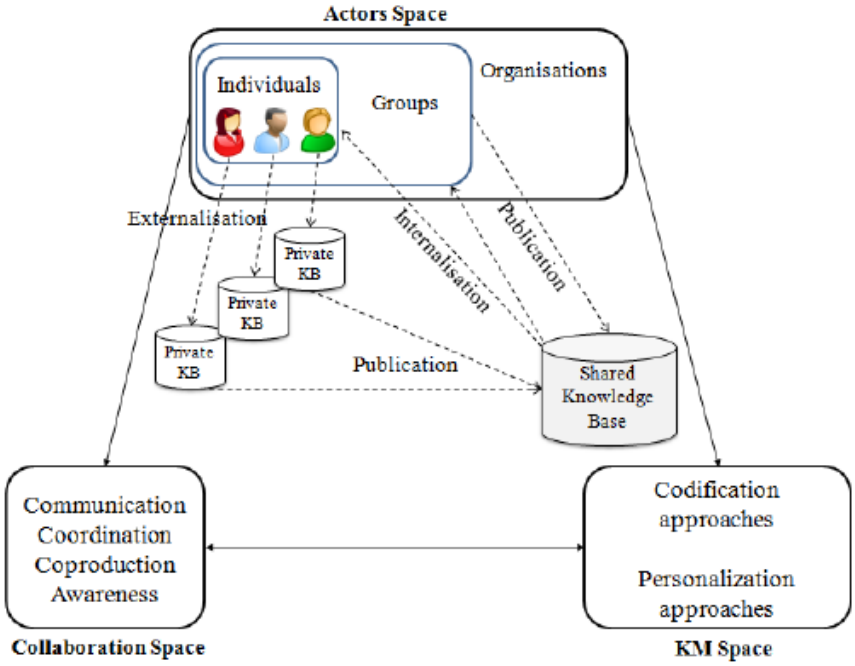

Figure 1: Generic framework of Collaborative Knowledge Management [7]

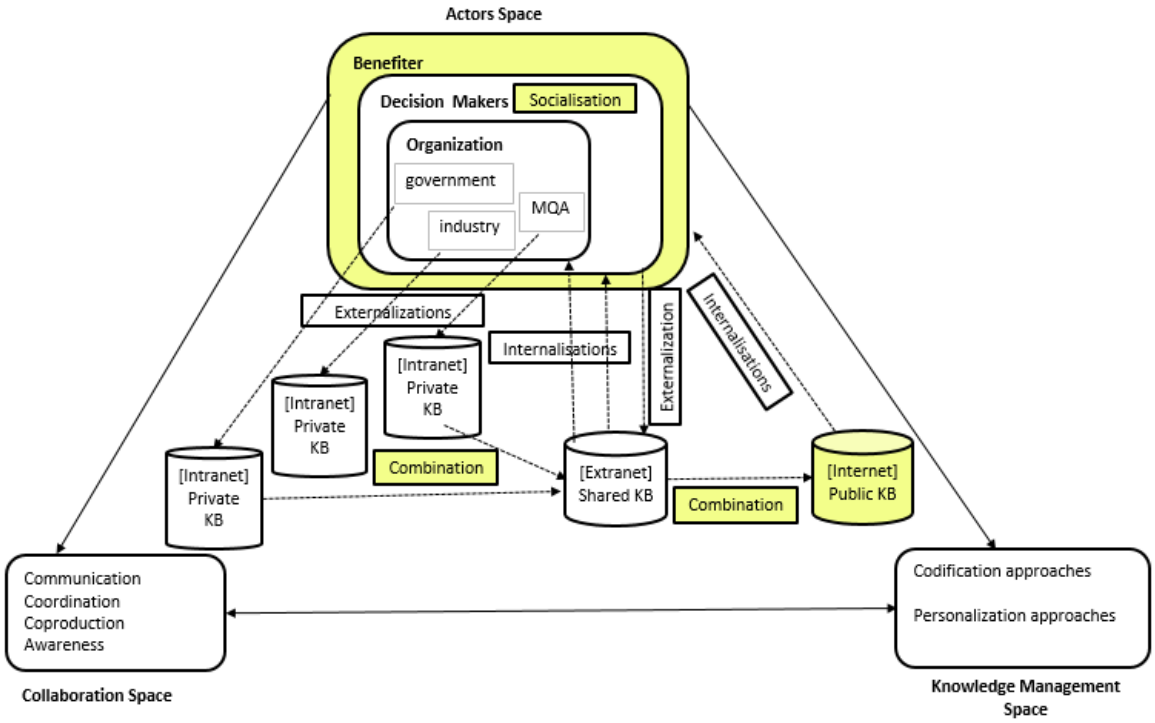

Figure 2: A generic employability framework of Collaborative Knowledge Management

Table 3
Collaborative Knowledge Management Space

CKM Space	Description
Actor Space	Consists of three types of actors and their roles focused in the management. Organizations: Individual/groups that collaborate to achieve the organizational goals. Decision-makers: groups that work collectively and collaboratively to achieve the organizational goals. Benefiter: Individual that accesses information provided by decision-makers.
Collaboration Space	• Focus in strategies of Knowledge Management for the purpose of collecting the knowledge. • Actors can manage three types of knowledge database: private database, shared database, and public database.
Knowledge Management Space	Personalization approaches (manage tacit knowledge) by controlling the social process. Codification approaches (manage explicit knowledge) by managing private KB, shared KB, and public KB.

In the organization level, when an individual or group stores knowledge in Private KB, this knowledge is converted from tacit to explicit in the private context (Externalization). An individual or group in organizations that share the information from Private KB to Shared KB, or from Shared KB to Public KB, converts the knowledge from explicit to explicit in the shared context (Combination). When an individual or group uses knowledge from the shared knowledge memory, the knowledge is converted from explicit to tacit knowledge (Internalization).

D. Social Media

SECI Model is a theoretical model of knowledge creation within organizations [8]. A study [9] has extended this model by adding social media as a new dimension of knowledge management, connecting the people (Facebook, LinkedIn), allowing communication and collaboration (SharePoint, Wikipedia) that encourage people to have social networking and to share information [7, 10, 11]. Figure 3 shows the added social media as a new dimension in SECI Model.

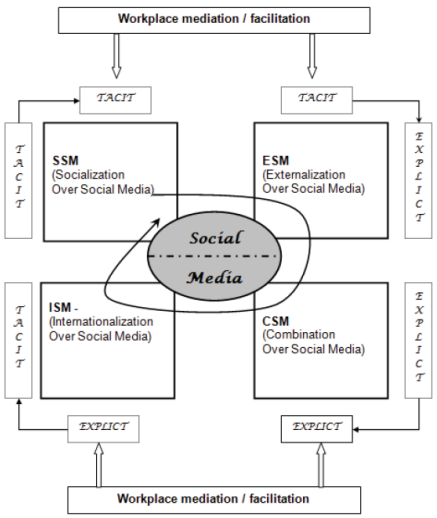

Figure 3: Social Media added as new dimension in SECI Model [9]

Connecting people facilitates a user to identify people who hold the information required by the user. Communication and collaboration will let the process of knowledge creation to be kept in Shared KB if the problem is resolved. Otherwise, it will repeat the process. Figure 4 shows the process of knowledge creation that was outlined by a study [1].

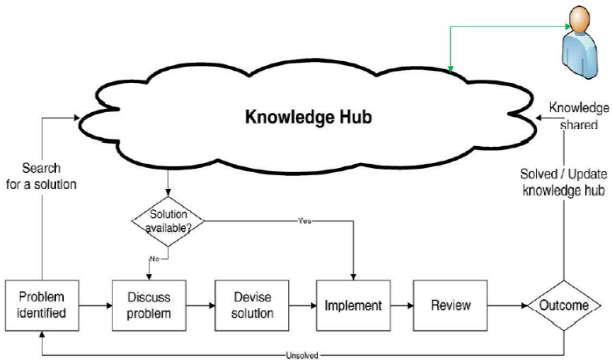

Figure 4: Knowledge creation process prior to implementation [1]

When devising a possible solution, they can also invite external people (benefiter) to discuss a specific topic that the people specialize in. This approach is based on conceptual framework shown in Figure 5. This conceptual framework was used for knowledge transfer which had been implemented in the South African public sector [12].

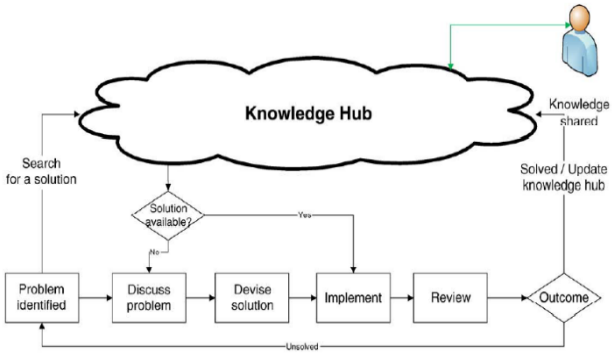

Figure 5: Conceptual framework for knowledge transfer in South African public sector [12]

In summary, the knowledge creation process in the employability framework begins with issues identified by one of the decision-makers. This issue is created, and the invitation for the discussion ensues. If there is a necessity to invite external people (benefiter), the decision-makers will invite them. Then, after executing the contrived solution, they will start to implement and to review the outcome. If the issue is resolved, the solution will be updated in the Shared KB. If unsolved, the process starts again by identifying the problem. The information within the Shared KB can be retrieved by the decision-makers to the Private KB or be publicized to a Public KB accessible by all citizens. Figure 6 shows the process from the knowledge management to knowledge sharing in employability framework.

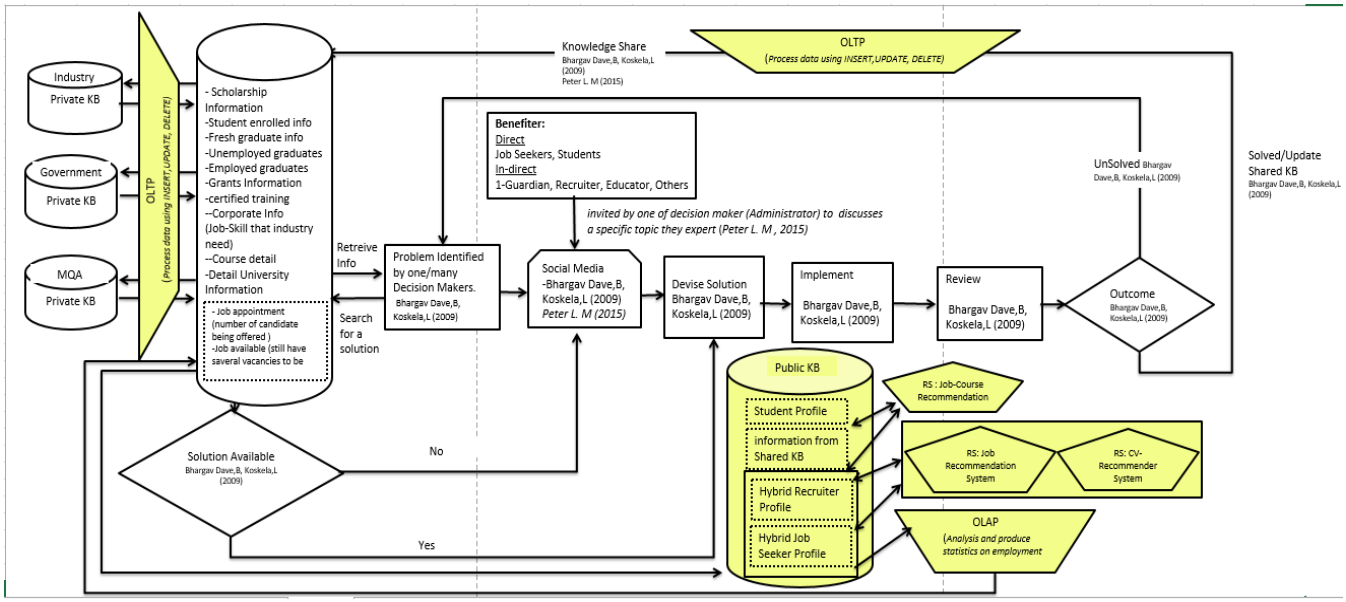

Figure 6: Knowledge process in employability framework

E. Recommendation Information

The proposed framework will employ a strong algorithm that able to relate the job to the skills required, then to the relevant courses that should be studies, and finally point at the universities that offer those courses. Through this framework, benefiter will be able to give a feedback to all decision makers about the details of unemployed graduates, and any other complaints and suggestions

III. METHODOLOGY

The aim was to identify the components involved in collaboration and knowledge management, and finally to provide a single website in the employability's domain. There were five phases: background research (secondary resources), design hypothesis framework and questionnaire, implementation, development, and testing.

A. Background Research (Secondary Resources)

The process began with an exploratory study acquired through literature review. The components that could facilitate the collaboration among decision-makers were identified through the concept of generic framework of CKM which was then added with other relevant components in order to solve two issues in the employability ecosystem. The first issue hampering the collaboration between decision-makers was the fact that the information was kept in their own databases. A shared database was required to allow decision-makers to access, to exchange, and to display the information among them. In order to reach an informed decision, a decision-maker needed a person who was well-verse in that particular field (expert). The expert could be among them (decision makers across organizations) or external people. In this situation, a social media had to be included to facilitate the communication among them. The second issue was to provide complete information for benefiter within a single portal by including a public database. The information published by decision-makers to the public database could finally be accessed by a benefiter. One central database with large information from three decision-makers required a recommendation information that was able to give suggestions of the related job, the skills required, and the relevant courses that should be studied.

B. Design Hypothesis Framework and Questionnaire

The hypothesis framework is designed based on the components identified from the secondary resources. Then, it was followed by designing questionnaires to validate the framework's design. The questionnaire consisted of two different sets which was given to decision-makers (industry, government, MQA) and benefiter (job seekers, students, citizens).

C. Implementation (Analysis respondent data)

Data are collected through quantitative methods. After the data collection was finished, the data was analyzed to observe the respondents' opinions, and the proposed components of the CKM in employability framework were finalized.

D. Development (Analysis respondent data)

A prototype of web collaboration and knowledge portal system was developed based on the finalized components. Web collaboration was developed to facilitate the collaboration among decision-makers, and the Knowledge Portal System was accessible by benefiters.

E. Testing

The prototype to evaluate the collaborative knowledge management system was tested by decision-makers and benefiters to identify the final components in this framework.

IV. EXPECTED RESULT

The proposed framework would help decision-makers to reach informed decisions through the collaboration in knowledge management. It would help the government to efficiently manage the current and the future graduates because the job opportunity offered by industries in the specific time frame is known. The MQA would know which subject area they should focus on to improve the academic syllabus, and to prepare students with the skills required by the industry. Furthermore, it would reduce the number of students in fields that might not have any job opportunities for a particular time frame.

The benefiters, especially students and job seekers would be able to get free career guidance information. This would include information about the availability, the scope, and the benefits of each job category. Through this portal, students would determine the required skills, and the universities that offer the relevant courses, motivating students to set the goals for their future career. The proposed framework would include the recommendation information that would be able to associate a job to the required skills, then to the relevant courses that should be studied. This framework would increase awareness of all actors with extensive information provided by a single portal. This study would contribute in identifying employability components of Collaborative Knowledge Management System (CKMS) in order to design a framework that facilitates collaboration in employability ecosystem.

V. CONCLUSION

This study proposed a collaborative knowledge management system to facilitate the government, the industry and the MQA in knowledge sharing, and to make a cognizant decision in improving employability. The integration of information among the three actors would result to expanded information pool in a single portal. In turn, a single access point containing complete information would yield benefits to the benefiter, especially job seekers and students.

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