The Study of Digital Transformation Skills and Competencies Framework at Umm Alqura University

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Abstract—The lack of digital transformation professionals could prevent Saudi Arabia's universities from providing digital services. The task of understanding what are the digital skills needed within an organization, measuring the existing skills, and developing or attracting talents is a complex task. This paper provides a comprehensive analysis of the digital transformation skills needed in the organizations who seek digital transformation and identifies the skills and competencies framework DigSC built on SFIA framework that is adopted by MCIT in Saudi Arabia. The framework adopted identifies the main digital transformation skills clusters, categories and levels of responsibilities for each job description to fill the gap between this requirement and the digital skills supplied by the Umm Alqura University.

Keywords—Competencies, digital transformation, framework, skills, Umm Alqura university.

I. INTRODUCTION

UNDER the expanding in digital world, artificial intelligence, cloud, and other technology, intelligent process automation will transform and change business as well as everyday life. Organizations are looking to merge the emerging technologies to drive business digital transformation (DT) growth. Those organizations that seek digital transformation in their operations and services, face a real challenge in ensuring that they have the necessary skills and competencies to achieve successful and sustainable DT.

The aim of this paper is to demonstrate the need for a structured approach to identify the main competencies and skills required for the digital transformation at Saudi universities, given that the concept of DT remains a modern concept in Saudi government institutions, especially in the field of higher education. A Digital Skills and Competencies framework (DigSC) build on the SFIA framework includes the skills and competencies related to Umm Alqura university where modern technology and digital operations are considered as enablers, is considered a starting point for validating the required skills and competencies. It identifies around 50 professional skills for DT among over 100 skills. Moreover, the DigSC framework builds skills and competencies in 6 categories with a number of sub-categories and describes them in 7 levels of responsibility in terms of generic attributes of Autonomy, Influence, Complexity, Knowledge and Business Skills.

The main research question of our study is how to define the digital transformation skills and competencies needed to perform the digital roles effectively? There are three primary objectives for this study. First, understand the DT and why DT organizations are falling short. Second, survey the skills and competencies needed in the DT organizations. Third, define the framework that UQU adopt to identify, develop and attract the best talent based on the required skills and competencies for managing the DT.

This paper followed a systematic literature review strategy since its main purpose is to illustrate the need for appropriately skilled and knowledgeable talents to achieve the UQU's digitization goal and demonstrate its skills and competencies framework.

II. LITERATURE REVIEW

Our literature review is to evaluate different research articles and study the research question and the related topics. The literature review offers evidence based on interviewing and surveying expertise regarding the DT skills and competencies. The method we use to address our objectives to narrow down the topic to identify literature of interest can be described as tasks. These tasks are described in the subsequent sections.

A. Identify the Digital Transformation.

The concept 'Digital Transformation' has often been discussed recently since the emergence of new technologies, such as IoT, augmented reality, virtual reality, artificial intelligence, and other technologies emerging in a very immense speed with high volume [1]. Although there are major challenges to the rapid and strong emergence of these technologies, they have brought many advantages that help transform into a digital world and e-government. While digitalization would mean the use of new technologies in the organization, digital transformation draws the map for successfully implement them [2].

Digital transformation is the adaption of destructive technologies in order to create value and increase productivity. It is an investment in creative ideas to significantly transform the traditional way of working to a method that adopts technologies to reach a digital and innovation business model [3]. Enabling innovation and creative in the cultural of work

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environment is the most important goals that digital transformation seeks.

The Kingdom has taken deliberate qualitative steps to ensure the rapid development towards the digital transformation, by enabling the latest technologies in the field of Information and Communication Technology (ICT) with the aim of transformation towards a knowledge economy and electronic commerce. These efforts eventually aim to achieve quality of life and increase satisfaction rates. To achieve this vision, the Kingdom has worked to spread awareness of the need to digitize government and the importance of automation of electronic operations in order to increase the degree of acceptance of technology within Saudi government institutions to improve the quality of life and ensure the transition towards sustainable development and global effectiveness in general.

To achieve these previous goals, a National Committee for Digital Transformation was established to draft legislation and policies related to digitization and automation at the government level in the Kingdom of Saudi Arabia, and to develop strategies and programs necessary to achieve enabling digital transformation in addition to overseeing the digital transformation program in general [3].

The Kingdom and others developing Gulf countries, are falling short to meet the growing need for digital expertise and experiencing a shortage of ICT skills [4, 5]. Other regions, such as the U.S., have already experienced the lacking in Digital skills and failed to achieve their goals because of the lack of the Competencies and qualified talent [6]. A survey done by Gartner 2018 [7] asked over 7,000 employees about their level of proficiency in demand digital skills. Respondents of 70% don't have the required skills for their today's jobs, while 80% lack of both the today's jobs and the future skills needed in the rapid digital world.

B. Define the skills required in the successful DT team.

The shortage of ICT and DT professionals must therefore be addressed in a sustainable way through the development of the Saudi university's talent pool. Collaboration between the talents, data, and technology with strong leader ensure the implementation of DT is successful and did not significantly interrupt operations. The next task deals with defining the skills requirements that are critical to DT.

Due to the new and emerging technologies, new combinations of candidates' skills are needed. In 2019 [8], CIO were asked about skills needed for DT. The top answers were 40% strategy building, 32% project management, then 25% for each of: business relationship management, user support/training, success measurement and risk management. The DT is no longer a job for just the IT department. Thus, when universities are recruiting for DT teams, technology skills are always going to be top of mind, but also business skills and soft skills are important. Therefore, they will likely need to

look and develop those three skills to translate technology expertise into business solutions that drive revenue and efficiencies. The study in [9] finds that 60% of survey respondents report difficulty finding and hiring talent with the appropriate mix of technical and soft skills. ***Deep technical skills*** are important such as: programming, project management, analysis of big data, information security, designer, …etc. Ropert Half in his survey [10] asked the technology executives and other IT hiring decision makers a question "If you could add new members to your team, in which areas would you hire?" their answers were as in (Figure 1).
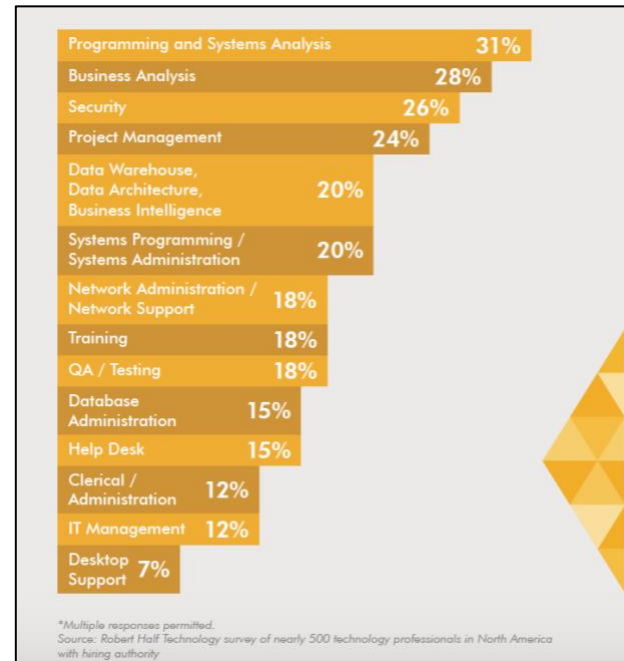

Fig 1: IT Roles in Highest Demand for Digital Teams [10].

A newer study done in 2018 [9] identified the most difficult technical skills to fill over the next three years where: Analytics and data science (64%), Cyber, privacy (54%), Innovation and merging technology (49%). According to the decision makers [6], in addition to the IT bottlenecks, the top challenges that slow digital progress are: Lack of interdepartmental communications strategies and insufficient training for line of business employees on new technologies. DT organizations/universities need experts who can go beyond they know to innovate and keep learning all the time.

In a study done by [11] in 2020, the IT executives agreed to the need of merging the technical expertise with the ***soft skills*** needed to bridge the divide between what business users want and the technology to make it happen. The 2019 DT survey [12] found the highest soft skills in demand are 74% teamwork, 70% leadership, and 67% communication. According to the survey [11], the most three significant soft skills expected to increase during the next three years are 61% Creativity, 52% Cognitive flexibility, 48% Emotional intelligence (Figure 2).
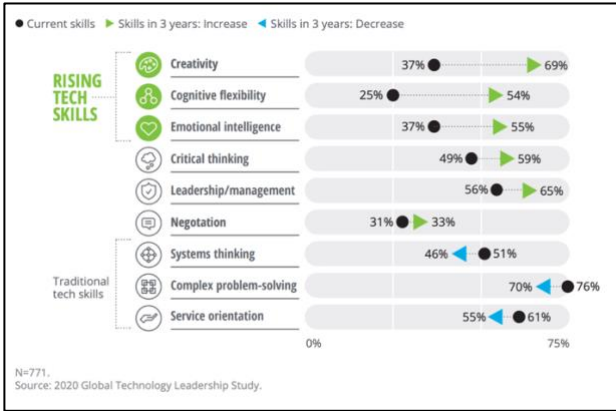
Fig 2: The most important technology soft skills today and in 3 years [11].

Thus, DT organizations/universities want people who can think creatively to solve problems, learn new skills and adapt to change, collaborate, communicate and influence. In fact, they look for highly skilled technical attributes and business-focused skills who through their strategic thinking and intellectual curiosity, are able to bring a fresh perspective to the table. The combination of technology, business, and human behavior (soft skills) sometimes called *hybrids skills* [13]. Thus, the future hybrids skills to deliver digitalization as in (Figure 3) [14].
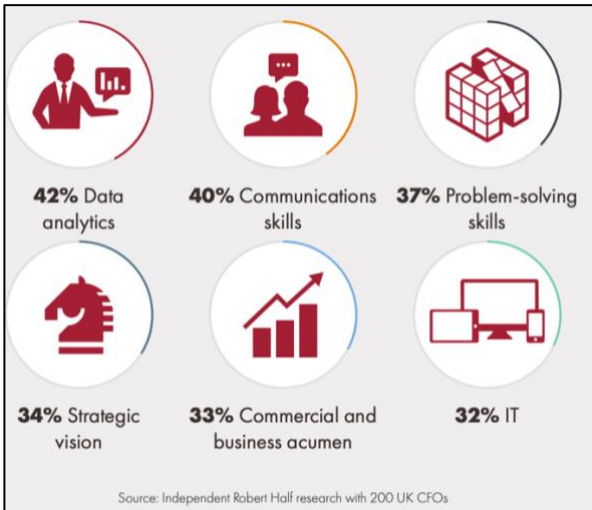
Fig 3: The digital transformation future hybrids skills [14].

III. SKILLS AND COMPETENCIES FRAMEWORK (DIGSC)

The task of determining the specific skills needed to perform a role within an organization is difficult, since each individual role has its own set of competencies needed to perform the job effectively. This process is greatly simplified by the development of a *skills framework* that defines and classifies skills. Creating and maintaining a good skills framework gives the DT organizations the ability to determine and define every single skill that could be applied or learned, at every level of

depth and competency. There are some skills frameworks such as: Skills and Competencies framework (SkiCo) [1], Digital Competence (DigComp) [15], Dictionary of Skills and Competencies (DISCO) [16], and Skills Framework for the Informational Age (SFIA) [17]. The last, the *SFIA 7 framework* is the easiest and more flexible resource that is adopted by MCIT in Saudi Arabia to describe professional skills of qualified Saudi's employees to occupy different positions in their organizations in different sectors of the communications and information technology (CIT) such as digital transformation, bigdata/data science, software engineering, and information and cyber security [18]. The aim of this paper is to determine the DT skills and competencies framework to become an active and effective contribution to lead the DT in the Kingdom's universities and strengthen the role of the digital sector in building a digital society, a digital universities, and a thriving digital management to enable the UQU to lead and excel.

The Digital Skill and Competency Framework (DigSC) is a framework for defining digital transformation skills built based on Skills Framework for the Information Age (SFIA), the framework for the global skills and competency for a digital world. The DigSC skills and competency management cycle (Figure 4).
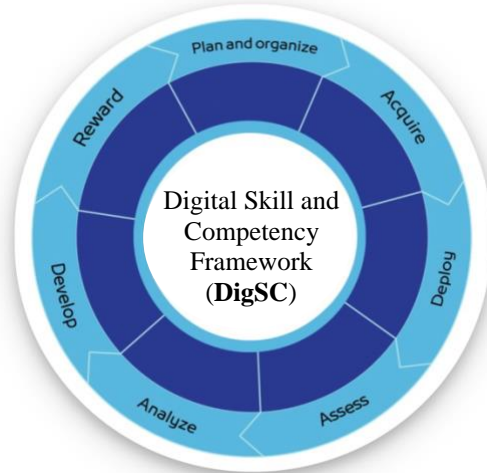

Fig 4: DigSC Framework.

It defines 102 professional skills and competencies, while 50 among them are specifically for DT skills. The skills are described by 7 levels of responsibility from Level 1, the lowest, to Level 7, the highest, where each level describes the characteristics that an individual should have in order to be identified as competent at the level [17]. These levels are described by five dimensions generic attributes called autonomy, influence, complexity, knowledge and business skills (Figure 5). The detailed information about each of the 7 levels (follow; Assist; Apply; Enable; Ensure & advice; Initiate & influence; and set strategy, inspire, and mobilize) are

described in [17].

Fig 5: Level 1 of the generic attributes [17].

The skills and competencies in DigSC are separated into 4 categories with a number of sub-categories. The categories are digital strategy, vision and investment; digital leadership, culture and skills; digital innovation, governance and change management; and Digital technology enablers (Figure 6).
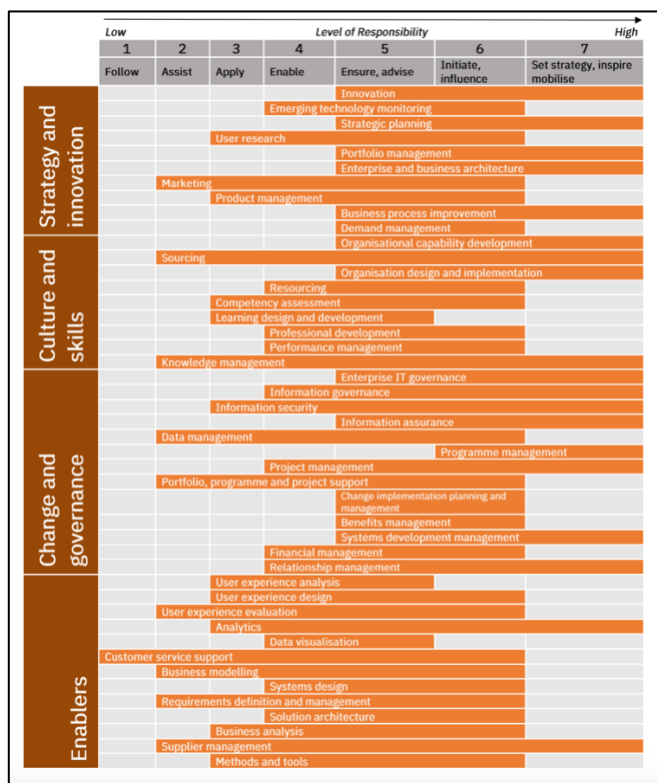

Fig 6: digital transformation skills in SFIA [17].

From Figure 4, we can find the job fields and title of each DT skills and competency. Each level of the DT skills has its own job description related to the responsibility associated with it, that include different jobs description related to deep, soft, and hydride skills as we discussed in the previous section. Applying the DigSC framework at The UQU's DT functions and roles when looking for the best candidates to hire, help the university to plan its workforce, precisely identify the skills and talents, assess its current employee skills, and attract the right skills when recruiting.

IV. CONCLUSION AND DISCUSSION

Real digital transformation demands a whole new approach to deliver IT services. The UQU's General Administration of Digital Transformation (GADT) looks for candidates who are able to adapt and excel in environments of shifting business demands with an accelerating flow of new technologies. The best DT team must include experts from many departments outside of the IT. The DT team, who is working with the GADT, should be cross-functional team with technology and functional experts, who complement each other and together deliver an excellent outcome. Thus, creating diverse roles based on the technical and interpersonal/business skills are required to be effective and fill IT talent gaps.

Based on DigSC framework, candidates with IT, innovation and leadership skills; clear understanding of data transformation and change governance; and business strategy will be highly in demand for candidates at the GADT. Other universities can take advantage of this framework in defining and planning the career path of their candidates, by identifying the target job, then identifying the skills needed for that job and then working on acquiring those skills.

To be prepared for the digital future demands, the GADT needs a recruitment strategy that promotes and attract competences based on DigSC. The process of hiring is often a long and complex journey. Identifying best candidates with the right skills, either by external hiring by evaluating submitted applications, or by experts' referrals from different university's departments. Referral of candidates are known to reduce time-to-hire, improve quality of hire. The GADT invests the best skills and capabilities in the university's employees needed to enable the digital strategy. It assigns the best employees to lead the DT and give them direct responsibility for their respective roles in the initiatives. Thus, the GADT considers the following when recruiting. First, build a fitting culture by providing candidates with a well-defined vision and objectives for the GADT, that will ensure attracting employees. Fostering a culture where employees feel encouraged, engaged, and rewarding. Second, build talent balancing by creating diverse roles from deeply technical roles, who are highly specialized skills, to strategic and operational roles, who are less technical. Third, seeking diverse of different experience, perspectives and background by considering the individual's learning agility, critical and analytical thinking, viewing/solving the problem and other soft skills. Fourth, upskilling and reskilling by training the employees to fill critical high-demand roles. Fifth, enhancing collaboration and team work to work in a team environment whose members are working towards an objective to drive the digitalization agenda. At the end, finding the right

talents who are attracted, fitted to the workplace and have the right skills will significantly help the GADT.

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