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Electronic Portfolio Management System (EPMS) in Saudi Technical and Vocational Training Corporation (TVTC) Sector: A Conceptual Framework

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ABSTRACT

In the current times, the technical and vocational training corporation (TVTC) is facing their toughest problem in the form of inefficient information management. In relation to this, the OBE application calls for providing several portfolios to students, to produce daily information, with records documented for evidence of a transaction. The ICT dynamic development has brought about the shift of the TVTC operations to electronic-based from manual, in terms of handling works that relate to information. One of the systems that are of great consideration in this regard is the Electronic Portfolio Management System (EPMS). Nevertheless, such system has not extensively adopted as expected owing to the users' rejection of its use. In the present paper, the factors affecting the decision of adoption/rejection of EPMS are highlighted. The study is qualitative in nature and entails a critical review of the related literature concerning the topic, backed by the results of conducted interviews. EPMS experts hailing from high reputed institutions were interviewed, and 11 factors were focused on in light of their effect on the decision to adopt/reject EPMS as argued by the Technological Adoption Theories and literature review. All the factors were validated and placed in ranks by the experts. From the results, a novel conceptual model of EPMS adoption was developed for Saudi TVTC to bring about technology adoption and improved results.

Key words : E-portfolio, instructor performance, adoption, technical and vocational training, Saudi Arabia..

1. INTRODUCTION

Many countries have realized the need to adopt an outcome-based approach for the purpose of providing ongoing educational improvement in the face of the increasing unemployed graduates. In answer to this, higher educational institutions have responded by concentrating on sufficient professional and career preparation of students through the stress on market demands of specific outcomes or abilities. Such outcome-based approaches are directed towards assessing the students' performance and knowledge, mitigating the gap between university learning and practice in their actual careers [1-3].

However, the outcome-based academic model is still in its infancy level of introduction in developed as well as developing countries, initially developed to allow students and members of the faculty to cooperate and coordinate in promoting and enhancing learning. The model is indicative of a considerable shift from the traditional input model, within which the students accept and retain information. Contrastingly, the model's curriculum and teaching decisions are based on the optimum way that the expected and desired outcome can be achieved, leading to a specific planning process compared to traditional educational planning [1, 4].

Additionally, outcome-based education (OBE) is an approach that focuses on the changes in learning students' behavior as opposed to their process of learning. In the first step, the learning outcomes are defined and this is followed by the creation of a curriculum aligned with the outcomes realization. Overall, the decisions pertaining to the curriculum and teaching are reached according to the optimum way that the desired outcome can be facilitated. The planning process outcome is different from that of the traditional educational planning, as in the latter, the desired outcome is initially determined, following which the curriculum is developed on its basis. The identification of the

learning outcomes at the onset has its basis on different reasons, one of which is the fact, that learning outcomes are what generates the definition of explicit learning. In the lecturer's viewpoint, this helps in the preparation of lecturers for expected outcomes, and in the students' viewpoint, this helps in concentrating on performance enhancement, determination of the major goals to be measured for the purpose of assessment and evaluation [1, 4].

Educational institutions in various countries generally acknowledge the value of information in the management and decision-making processes, and this has paved the way of different systems development, computer hardware, software and internet usage. Also, information system refers to an organized coming together of people, hardware, software, channels of communication and data resources, functioning in tandem to collect, transform and spread information in the organization [5]. In this combination, TVTC institutions will find the OBE application and implementation, aided by its evaluation and special system, to be invaluable [6, 7]. In the e-portfolio system, information is furnished for OBE, for the purpose of making decisions and assessments, as well as for oversight and evaluation of educational activities.

In the context of educational institutions, adopting e-portfolio can minimize the education demand-supply gap [8, 9] and such notion has resulted in heightened awareness and investment in e-portfolio innovation in majority of nations for the purpose of enhancing their system of education [10-12]. Additionally, e-portfolio adoption that constitutes the education provision, has been considered as consisting of a set of processes to be implemented in order to enhance the effectiveness of TVTC in terms f its performance and objectives achievement. In literature, several barriers to e-portfolio adoption have been evidenced by studies in the context of developing countries including Garrett [13], Shroff, Deneen [14], and Alharthi [15] in the Saudi context. Such studies revealed that the adoption of technology and system, specifically e-portfolio, is still at the initial stages [11, 15-17]. Most studies of this caliber have stressed on three main barrier categories namely human-related, organizational-related and technological-related barriers (e.g., [18]; [19]. Heeks [20] related that information systems, in combination with technical, social, organizational and environmental factors have been successful albeit evidence backed by theory regarding the adoption of e-portfolio on the individual and environmental level is still scarce.

In the case of Arab nations, Gholam and Kobeissi [21] reported the absence of technology implementation for the purpose of evaluation that could support professional development. In this regard, Alfahadi, Qradi [22] and Alharthi [15] presented a critical look of the implemented evaluation process in Saudi Arabia that lacks tools and processes leading to an ambiguous view of the students' performance. Used evaluation procedures in Saudi institutions clearly need reformation for their validation, realism and authentic implementation and use [23].

The stress of the above discussion is the requirement of examining innovation and technology adoption to allow higher education institutions competitiveness and ability to transform into global leaders in the educational platform. A clearer picture into such adoption is thus called for in order to extend and promote learning innovations adoption and usage [24].

Moreover, e-portfolios use and adoption in educational institutions for their improvement are all part of the advancement of technology and research studies of this caliber have highlighted e-portfolios as a crucial tool in assessing the process of evaluation (e.g., Bartlett [25]).

1.1 what is the E-Portfolio?

To begin with, a portfolio refers to a set of evidence that shows the learning/teaching journey of the individual throughout time, illustrating his/her abilities. Both portfolio and e-portfolio is useful for either a particular discipline or a more general concept covering the lifelong learning of an individual. According to Kimball [26], without a reflection basis, the collection or selection of pieces to be included in the portfolio is meaningless.

In other words, reflection of the prior evidence use is the crucial element in using a portfolio as it is evidence of what the individual has learned from it, which justifies the reason behind the collection and use [27]. The primary belief is such that teachers will learn while reflecting on their contents during portfolio creation. In his study, Kimball [26] aimed to propose different tools and techniques of teaching used in the pedagogy and the way such tools are used in teaching, guiding and mentoring students. There are two major elements to portfolio use; measuring learning and development throughout time [28], and portfolio construction as where the learning happens, as opposed to where it is viewed as an end product [29].

According to Thomas, Pedersen [30], portfolio is useful for teachers and teacher candidates as a tool for accurate and ongoing assessment, reinforced by documentation that promotes learning, growth and development. Other researchers have provided definitions that are similar to the above. For instance, in Thomas, Pedersen [30], study, the authors extended the e-portfolio definition and described it as "a collection of evidence and artifacts and reflective statements, demonstrating intellectual and professional development in relation to competency-based education program outcomes in a multi-media format". Meanwhile, Abrami and Barrett [27] was influenced by the e-portfolio use design and method, and thus relating it to more of a process rather than an actual product. In the process, every creator requires viewing his/her portfolio as an actual representation of critical thinking and reflection used for goals-setting and continuous professional development. On the other hand, De Rijdt, Tiquet [31] indicated that the portfolio reflects individual growth as well as the growth and quality of the institution. They described the portfolio as a purposeful collection of evidence that consists of descriptions, documents and instances of teaching best practices.

In the current study, Kimball [26] definition of portfolio is adopted, which states that it is a medium or set of functions designed to deal with the students' documents, such as records of academic learning media and is used to document the learning of the student based on the curriculum, which is further stored for evidence.

The e-portfolio used in education has its basis on a web management system, creating a repository that stores the documents of students like academic learning records, project reports, essays, tasks, evaluations and personal and professional development related to the contents [32, 33].

Added to the above, e-portfolio is a structured data collection selected by the author based on certain objectives and this may not necessarily be relayed to others as it is primarily used for reflexive analysis of the author concerning his activities. Through the digital feature, a hierarchical structure is achieved, and hyperlink structure design is enabled to include changes – literature is full of studies concerning e-portfolios, their types and the benefits reaped from their use [34].

In other related studies [35, 36], e-portfolio is described as a collection of digital artifacts, illustrating the individual's knowledge and ability and is used to assess, plan careers and document and illustrate the academic learning and growth of the student over time.

There are different forms that an e-portfolio can take, according to Metz and Albernhe-Giordan [34] study, and they mentioned examples including presentation software (e.g., Microsoft Power Point), website, video, and clips, among others. Added to this, the approach is as complex as the selection of form, assisting in highlighting specific features. This may be exemplified by a presentation of a reflection on itself, a website presentation to others, and a video clip that includes creativity but enables no changes. Thus, there is a close relationship between content and form and as such, it is important to work upstream on personal goals when it comes to e-portfolio for the selection of suitable reinforcements.

Another take on e-portfolio came from Forster [37], who referred to it as a product of creative design process of the projects of students. It is a tool developed from several steps including problem formulation, forward-looking adapted solutions and their testing, and the use of creativity-promoting tools (e.g., mind-mapping). Moreover, e-portfolio enables analogies-making at two levels, the first of which involved thinking about personal project, which urges students to search for other projects. Second, technologies use for designing that would assist in representing the project of the students in its mental form, taking on several formats, to promote the information operational structure.

In the context of the Middle Eastern nations, e-portfolio has been given various labels through its translation into Arabic language, among them being documentary file, student electric file, learning file, delivery file, performance file and evaluation file. Abdul-Aziz [38] referred to e-portfolio as a systematic collection of the student's work that relates to content-based topics generated by the learner under the teacher's supervision. Meanwhile, Theodosiadou and Konstantinidis [39] described e-portfolio as a record of the learner's performance, highlighting his work and achievements, and documenting the growth level (naturally, socially, psychologically, academically, skillfully, creatively and culturally). The authors provided concepts demonstrating e-portfolio as a useful operational tool, specifically an evaluation tool that is learner-developed to assist in assessing and valuing individual work during the learning process, in order to meet the requirements of a knowledge-based society. Therefore, it is a necessity in Saudi higher educational institutions to develop plans in using e-portfolio to equip students in teacher education programs to tackle modern day challenges.

Furthermore, e-portfolios have been hailed as one of the top applications used in a large e-learning technology group that is currently extensively used around the globe. E-portfolios have been defined in different ways ranging from achievement compilation, personal collection space, to a student assessment process medium and supporting employee performance in terms of their contributions to the organization. In the U.K., the Joint Information System Committee (JISC) promotes using e-learning, along with e-portfolios in teaching and learning [40]. E-portfolios are digital presentations of the experiences, achievements and aspirations of a student for a specific audience, and is the digital equivalent of a paper portfolio that refers to the underlying used tools and systems.

In the present work, the author adopted Wang and Wang [32] definition of e-portfolio that describes it as a web-based medium or set of functions designed to deal with the students' documents, like records of academic learning media. It is also useful for the documentation of learning based on the curriculum and is afterwards stored for evidence.

1.2. Technical and Vocational Education and Training

Technical and Vocational Education and Training (TVET) represents formal, non-formal and informal learning, preparing the youth by inculcating knowledge and skills in them, which are needed for actual work. In relation to this, the United Nations Organization for Education, Science and Culture (UNESCO), reported that TVET has been labeled with so many names throughout the years including but not limited to, apprenticeship training, technical education, technical-vocational education, vocational education, occupational education, vocational education and training, professional and vocational education, career and technical education, workplace education and workforce education.

UNESCO defined TVET characteristically as involving general education, study of technologies and related sciences and acquisition of practical skills, attitudes, understanding and knowledge that relate to occupations in different economic and social sectors. Through such education, the youth is provided the opportunity to learn from fundamental to advanced levels throughout different institutional and work environments.

Added to the above, the Vocational Education and Training (VET) system is distinct from academic education based on

its characteristic features, with its primary elements oriented towards practical world, emphasizing on the curriculum and the employable skills acquisition [41]. Still another TVET characteristic is its delivery at different sophistication levels, indicating that it is able to respond to different industry needs and diverse training needs from various socio-economic and academic backgrounds, to lay the ground for their employment and career.

1. In this regard, TVET is the key towards the alleviation of poverty, promotion of peace, conservation of environment, enhancement of life quality and achievement of sustainable development [42]. Majority of the society's required technical and vocational needs are provided by relevant technical and vocational schools and institutions and according to Ndiwu [43], there are five reasons that the governments all over the world should consider when focusing and investing in TVET and they are as follows;

1.TVET increases the schooling relevance through its dissemination of knowledge, skills and attitudes to individuals, particularly those that are required to increase their societal productivity;

2.TVET minimizes unemployment as it provides employable skills to the youth and those who cannot ensure academic success;

3.TVET increases the development of the economy by enhancing the workforce's quality and skill level;

4.TVET decrease poverty by enabling participating individuals access to higher-income occupations; and

5.TVET transforms the individuals' attitude towards favoring occupations that are feasible in the future.

In other words, TVET has a key role to play in enhancing work quality and job satisfaction and boosting worker's motivation. In the current economic situation, TVET is a must to generate educated and self-motivated workforce.

TVET has also been described as deliberate interventions that facilitate learning to make product individuals (or adequately productive) in specific economic activity areas (economic sectors, occupations, particular work tasks) - this underlies the objective behind TVET. Nevertheless, it also has other additional purposes that are not distinct to it, and that can be applicable to different education forms (knowledge, skills, insights and mindsets), which are valuable for the learners. Such objectives are important for the youth's longer and full-time courses, contrasting to short and rare training events, in that it is for individuals who already have work positions in the concerned occupations. Also, TVET needs to be carried out based on the general social norms concerning the way learners are treated by institutions (i.e., with respect) and as such, work productivity is not the sole objective behind TVET but it is the core of its objective which distinguishes it from other education and training forms [44].

Lauglo [44] definition of TVET is adopted in the present study in that it perceives it as the education based on practical knowledge, which forms the evaluation base. The evaluation method is such that a decision is reached according to the documented information regarding the achievements of the students that is available in their portfolios.

1.3. Importance of Electronic Portfolio Management System for Education .

An electronic portfolio aims to provide a way to document personal progress of the organization in a scalable and comprehensive manner so that such progress is directed towards the goals and objectives, enabling the effectiveness of business operations, projects oversight, learning support, professional development, audit public firms and participation in assessments. Following the development of an e-portfolio, there are several benefits to be reaped considering it caters to various user types with different aims [45].

In the field of evaluation, overall demands of accountability have led to extensive expansions and in the past few years, the requirement for appraisal and qualified program evaluations have notably increased in the face of global commitments towards accountability in different fields (e.g., health, education and science fields) [46].

On the basis of the student's viewpoint, the academic e-portfolio development leads to learning management, autonomy in the learning process and promotion of decision-making with the guidance of the mentor. In relation to this, e-portfolios allow learning process regulation and promote the participation of students, which is why it is used as an evaluation system entrenched in the process of teaching and learning [47].

Considering the evidence presented by the student, reflection and justification is undergone laying down the relationship between what is provided and what is learned, enabling the consideration of how the student learns and his/her own establishment of a learning method. This ongoing reflection is why e-portfolios are useful as a tool for assessing and evaluating in the current formative and summative system of continuous assessment [47].

As mentioned, the student will be aware of the teaching-learning and assessment process, with the condition that he/she will become aware of his/her own progress and determine the aspects and issues that need improvement. It is thus important to keep into consideration that e-portfolios are frequently utilized to assess, which overshadows the reflection process. Both uses (assessment and reflection) should be leveraged to enhance the work of students and teachers and this covers choosing evidence/samples, providing a period of time for the student to respond to a certain goal, enabling the student to illustrate his learning, while the learning process is tracked by the teacher [40, 48, 49].

Speaking of student aids provided by the teacher during portfolio development, there are two types that have been identified, which depend on the kind of the information supplied. They are conceptual contents and procedural-strategic contents that are linked to the conceptual

of e-portfolio. Additionally, such aids can be categorized based on their appearance in the e-portfolio at the same time through contextual help, tutorials and/or preparation guides. It is essential to add that the aids can be divided based on their presented format (e.g., audio, video, documents, web pages) [50, 51].

In other words, e-portfolios are not online courses or content management system, instead it is a personal tool that is user-centric in terms of the e-portfolio owner. And although users are not the only actors involved but institutions hosting the tool hold the responsibility of certifying the users' achievements and those of the teachers, it is the owner alone who can decide the level of interaction with the outsiders [52]. More importantly, e-portfolios have been evidenced to be effective in all educational levels, with the inclusion of young students and pre-school, where the communication and interaction with parents have been known to enhance the process of learning [45].

The employment of such tools in some developed nations, UK, EU and Australia in K-12, indicated that learners using such tools had higher classroom participation. As for the teachers, their role is changed from speaker to a collaborative mentor/trainer or instructor. In universities, vocational training reinforces the assessment and achievement level of the students in light of the developed skills related to their courses [47].

Also, in the context of blended/distance lessons, e-portfolios have gained traction as an innovative tool to enhance ongoing monitoring of students' progress via mentoring. The existing educational e-portfolios can be divided into two major kinds and they are;

1. One that allows interaction among various agents and the level of reflection. Thus, the tools are created as an education, teaching and assessment tool that the teacher is responsible to manage.
2. One that is based on autonomy – self-management tools that make students the owners of their learning process.

Through assessment of learning, students become aware of their level of competence as they are provided with the evaluation conditions and achievement standards. In short, they will be more aware of measurable competencies. In this regard, one of the e-portfolios critical aspects is the external feedback received by the student in detail, which is automatically communication, driving enhancements in the student's progress.

It appears from the above discussion that e-portfolios pedagogical use from the perspective of the user is clear but the use of e-portfolios in the context of an educational setting can also be useful for teachers/instructors. In a related study, Himpsl and Baumgartner [53], e-learning is expected to promote a Personal Learning Environment (PLE), an environment that is supported by new Internet-based applications, built on the linkage of several information and communication environments that are daily used by people.

As a personal tool, e-portfolio documents learning evidence, with professional development being the central element that joins the system together in the context of virtual classrooms/distance classrooms.

On the whole, all e-portfolios are digital storage, requiring file uploads or form-based templates, but there are four major characteristics that have to be considered as they are defined by the purpose behind the tool. The four characteristics may exist in a single program, although their importance differs from one another, and they are assessment and evaluation, student learning, professional development and accreditation [54].

Added to the above mentioned four categories, the tools may also be categorized into other four major software system types that are as follows;

1.E-portfolio Management Systems – these are products created and developed for the purpose of using e-portfolio systems in the institutions.

2.Learning Management Systems (LMS)/Virtual Classroom – these are capable of providing e-portfolios or using them module-form.

3.Integrated Systems/Content Management Systems (CMS) – these provide indirect functions of e-portfolios.

Other systems like e-portfolio.

Learning portfolio is characterized by flexibility, evidence-based process combining reflection and documentation, engaging ongoing reflection, and collaborative learning analysis among students [55]. According to Barrett [56], the learner's growth and development in a certain period of time can be evaluated by using e-portfolio processes (i.e., reflection, goal setting and self-assessment). He proceeded to add that students should have the autonomy in their learning to include works that optimally presents their achievements and abilities.

Moreover, in Malaysia, SOM [57] introduced the Malaysian Skills Training Program (MSTP) as a sub-program under TVET that presently uses file-based portfolio, covering the paper-based competencies and evidence of the trainees. Such evidence may constitute reports, project papers, assignments or assessment sheets. As such, for the introduction of e-based portfolio, it is logical to boost the trainees' IT skills. Based on the MSTP qualification framework, the responsibilities of the MSTP are as follows;

1. Provide alternative and attractive career development path that is consistent with the academic-based certification;
2. Facilitate lifelong learning and upward mobility for the skilled workforce, particularly those who are already mainstream professionals;
3. Generate competent, qualified and skilled workforce;
4. Contribute value to the current vocational and academic initiatives for the purpose of increasing the graduates' marketability.

5. Provide a common basis for trainees through public and privately run initiatives in order to establish a unified qualification standard;
6. Improve the training institutions reputation and image; and
7. Improve the skilled workers' status in the nation.

On the other hand, in Van Merriënboer, Clark [58] study, the authors provided three CBT-based education aspects that play a key role and they are;

1. The learning tasks design forms the core of the competency-based learning or the competency-based curriculum;
2. Learning tasks will be increasingly conducted using technology-enhanced environments;
3. Competencies testing and assessment will be required, leading to the need for new approaches to learner progress diagnostics.

Hence, the advantages provided by the E-portfolio application could satisfy the above requirements as mentioned in the discussion of studies in literature. By applying e-portfolio, institutions can manage to enhance their reputation as high-tech institutions that keep up with the increasing development of ICT technology.

1.4 Methodology

In the methodology phase, the first step is the determination of the important variables to assessing behavioral intention towards e-portfolio use among the TVTCs in Saudi Arabia, following which the factors are reviewed by the field experts. The study methodology is comprised of four stages (see Figure 1), and they are; conducting a thorough literature review and identifying the important factors, consulting the experts' information on the e-portfolio factors, and stressing on the most significant of them, after which, they are used to develop the study framework.

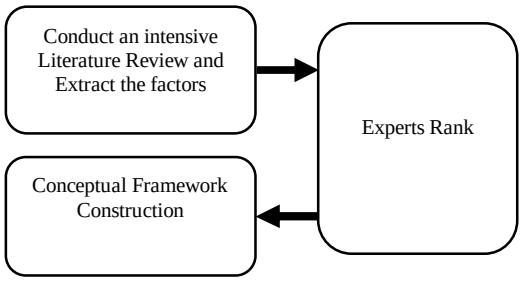

Figure 1.1 The methodology of the study as adopted from Mukred, Yusof [6]

Content Analysis of Literature Review for Factor Extraction

In this paper, literature was analyzed by using the terms e-portfolio adoption factors, factors for technology adoption in education, and e-portfolio and education productivity. A review of relevant studies regarding e-portfolio was conducted to determine the relevant factors highlighted by the authors. The factors were then grouped and classified into dimensions and provided to the experts for perusal and review. A total of 48 factors were identified, but the study limited the top-cited factors concerning e-portfolio and technology adoption specifically in the educational field.

Table 1 Cross-reference of factors exacted for content analysis in literature review

dimension	Factors	Total
Technology	Features Used, Trust, Compatibility, Security, Information Technology Challenges, Effort Expectancy, Personal Normative, Belief, Self-Identity, Perceived Consequences, System Quality, Perceived Ease of Use, Perceived Usefulness, Service Quality, Information Quality, Reliability, Technological Readiness, Privacy, Efficiency, Reliability, IT infrastructure, Interactivity, Responsiveness, Efficiency, Effort expectancy	26
Organization	Human resources, Motivation, Resources Available, Outsourcing, Social Influence, Facilitating Conditions, Training, Perceived Financial Cost, Information need, Competition, Top management Support, Standardization, Change Management, Effective Communication	14
Environment	Competitiveness Pressure, Clear Vision and Planning, Laws and Legislations, Policy, Government Role, Security Concerns, Cloud Computing Ability, Big Data Facility	8
	Total	48

From the 48 factors, 23 factors were obtained and they are perceived ease of use, perceived usefulness, trust,

compatibility, privacy, system quality, service quality, information quality, top management support, social influence, facilitating conditions, financial support, training, government role, cloud computing ability, big data facility, change management, effective communication, IT infrastructure, interactivity, responsiveness, efficiency and effort expectancy.

Experts' Consultation and Factor Classification

As the list of factors that affect e-portfolio use was forwarded to the experts (lecturers who use e-portfolio and are familiar with it), questionnaire copies were distributed to the respondents to gain their perception of e-portfolio in the field of education. A total of 11 factors were identified to be the top important factors regarding behavioral intention towards e-portfolio use and eventually its actual use. Recommendations provided by Hawking and Sellitto [59] and Ahmad and Cuenca [60] were followed when determining the significant factors. Moving on to the experts – ten experts working in higher educational institutions and are familiar with e-portfolio technology adoption were consulted for their knowledge. The experts are PhD holders working in different affiliations in Saudi Arabia, Yemen, Malaysia and Canada. The experts' profile is listed in Table 2. factors were dropped as the experts had mixed feedback about them. The list of factors ranked by the experts is provided in Table 3.

Table 2 Experts' Profiles

	Gender	**Specialist Areas**	**Year of Experience**
E01	Male	Information science and management	15
E02	Male	Technology and Education	14
E03	Female	Curriculum Development	8
E04	Male	Education	7
E05	Male	Computer Science	10
E06	Male	Technology Adoption and Engineering	10
E07	Male	Technology Adoption and Engineering	9
E08	Male	Technology Adoption and Engineering	15
E09	Male	Technology Adoption and Engineering	11
E010	Male	Adoption and Engineering	9

Based on the interviews, all 23 factors identified from literature were confirmed but following further validation, 12 factors were dropped as the experts had mixed feedback about them. The list of factors ranked by the experts is provided in Table 3.

Table 3 Factors' as ranked by experts

No	Factor	included Excluded	The rank of Experts and their numbers					Mean (out of 5)
			1	2	3	4	5	
1	Perceived Ease of Use	included			3	2	5	4.2
2	Perceived Usefulness	included			3	1	6	4.3
3	Perceived System Quality	included			2	4	4	4.2
4	Perceived Information Quality	included			2	3	5	4.3
5	Perceived Service Quality	included	1	1	2	2	4	3.7
6	Top Management Support	included			4	2	4	4
7	Financial support	included			2	3	5	4.3
8	Training	included			4	1	5	4.1
9	Government Role	included	5	1	3	1		4
10	Cloud Computing Ability	included	3	2	5			4.1
11	Big Data Facility	included			3	1	6	4.3
12	Trust	Excluded				6	4	1.4
13	Compatibility	Excluded	2	3	5			2.1
14	Privacy	Excluded	4	3	2	1		2
15	Social Influence	Excluded	4	3	2	1		2
16	Facilitating Conditions	Excluded	4	3	1	2		2.1
17	Change Management	Excluded	5	1	3	1		2
18	Effective Communication	Excluded	4	3	2	1		2
19	IT Infrastructure	Excluded	3	5	2			1.9
20	Interactivity	Excluded	4	3	2	1		2
21	Responsiveness	Excluded	4	3	2	1		2
22	Efficiency	Excluded	4	4	2			1.8
23	Effort Expectancy	Excluded	4	3	3			1.9

Table 4 Final list of Factors and their sources

No	Underlying factors	Dimension	Reference
1	Perceived Ease of Uses	Technology	[61]
2	Perceived Usefulness		[61]
3	System Quality		[12, 62]
4	Service Quality		[62, 63]
5	Information Quality		[12, 62, 64]
6	Top Management Support	Organization	[63, 65]
7	Financial support		[65]
8	Training		[65, 66]
9	Government Role		
10	Cloud Computing Ability	Environment	[67] [68]
11	Big Data Facility		
12	Intention to Adopt EPMS	Adoption intention	[61]
13	Instructor's Performance	Use	[61, 70]

Framework Construction

An important aspect in conducting any study is to examine and determine the theories/models underpinning the study topic so that they can be used for guidance in developing a premise of the constructs relationships during framework development. In a study of e-portfolio adoption, the level of adoption can be enhanced if the determinants of such adoption are determined and examined. Prior literature on the topic has thus proposed several theories and models [52, 71, 72] to examine the technology adoption in institutions. The major theories used and reviewed included Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT), Theory of Planned Behavior (TPB), Diffusion of Innovation (DOI) theory, and Technology-Organization-Environment (TOE) framework.

In this study, an e-portfolio framework is developed and proposed through the identification of five interrelated variables (technological dimensions, organizational dimensions, environmental dimensions, e-portfolio adoption intention and outcome performance of educational institutions lecturers (see Figure 2). The variables are examined and categorized under technology adoption factors in the study framework.

In a related study, Al-Gahtani [73]'s empirical study was conducted in Saudi Arabia to examine e-learning acceptance and assimilation in the academic environment, using TAM3. The findings showed a significant influence of image perceived ease of use, job relevance and subjective norm on perceived usefulness. The findings also supported a significant influence of subjective norm on image, and significant influences of computer self-efficacy, external control perceptions, computer anxiety and perceived enjoyment on perceived ease of use. Lastly, the findings revealed that perceived usefulness, perceived ease of use and subjective norm significantly influenced intention towards e-learning system use.

Therefore, this study reviews the suitable theories and models in order to choose the most suitable to be used to achieve the objectives of the study. Top extensively used models in literature in the field of education included TAM, TOE, UTAUT and DOI as mentioned by Alharbi [71] and Al-Jabri [72].

Accordingly, because TAM3 was validated in the reviewed literature as a robust model, its use, suitability, validity and reliability in examining technology adoption in different contexts [61, 73-75], the present study used TAM3 to examine the factors that influence e-portfolio adoption consistent with the suggestion by Abdullah et al. (2016) in the case of Saudi TVTC. Thus, the main TAM3 features include technological differences, characteristics of the organization, and environmental settings – these are all viewed as determinants of e-portfolio adoption behavior in TVTC institutions in Saudi Arabia. TAM3 is suitable to be adopted as the underpinning theory of the present study in light of its objectives and context.

2. DISCUSSION AND INTERPRETATION

The interviewed experts were of the consensus that perceived ease of use and perceived usefulness are significant factors that influence EPMS adoption. With regards to the users, majority of them are inclined towards using the system if they are convinced that it can enhance their work quality and is easy to use. Other factors such as, system quality, top management support and training were also included in the top-five listed factors. Furthermore, three experts (E2, E7 and E8) perceived that big data facility, cloud computing ability could potential influence EPMS adoption, while others proposed financial support for such adoption in the TVTC sector of Saudi Arabia.

Added to the above, experts E1 and E6 suggested that the government involvement level may also be considered as a new factor to be included in the conceptual model based on which successful and timely adoption can occur. Also, experts E3, E4 and E5 were of the agreement that government role is one of the top influencing factors of EPMS adoption in the TVTC of Saudi Arabia to get expected exceptional outcomes and thus, this factor was included in the present study. The experts were all in agreement as to importance of perceived system quality, perceived information quality and perceived service quality as essential determinants of EPMS adoption and thus, they were included in the study framework. Moreover, E9 and E10 stressed on the importance of testing the influence of the identified factors on behavioral intention towards adopting EPMS as the role of system adoption in improving lecturers' performance has yet to be confirmed.

The proposed study conceptual framework is displayed in Figure 3. The model was developed using eleven identified factors validated and ranked by experts in the field and the factors are arranged based on underlying theories.

The proposed model was examined in light of the influence of the factors on EPMS adoption - and the factors include those adopted from the TAM model (perceived ease of use and perceived usefulness), which directly determine behavioral intention to adopt EPMS. Other factors include system quality, information quality, service quality, top management support, financial support, training, government role, cloud computing ability and big data facility. These were adopted from the model proposed by DeLone and Mc Lean.

2.1 TECHNOLOGICAL VARIABLES

In any sector, the technology use provides the potential for enhancing service quality provided and the workforce efficiency and effectiveness, and for minimizing the costs of

the organization. Technology adoption is thus important in institutions as it has been evidenced and highlighted as a critical issue [76]. Despite the fact that several studies in literature revealed that technology adoption positively influences organizations, empirical works presented barriers and challenges to technology adoption in the context of educational institutions. Therefore, it is pertinent to examine factors that influence technology adoption for successful technology implementation and use.

One of the top factors that are crucial for adopting technology are technological factors and they include perceived ease of use (TAM), which is the level to which the individual perceives that using a certain system will be effort-free [77], and perceived ease of use (TAM), which is also referred to as effort expectancy (UTAUT). The current study defines perceived ease of use as the perception of the manger/employee of the lack of effort required in e-portfolio usage. According to Venkatesh and Bala [61], perceived ease of use significantly impacts intention to use as well as adoption.

Additionally, related studies (e.g., Arpaci [78]) indicated that perceived ease of use has a significant influence on intention towards system use and others (e.g., [79] evidenced the significant influence of the same on intention towards system adoption.

In Ahmed and Ward [80] study, TAM was adopted to measure the acceptance of e-portfolio use among employees working in academic and professional development department. On the basis of their findings, perceived usefulness has a significant influence on the intention of users. Meanwhile, performance expectancy, commonly referred to as perceived usefulness, and effort expectancy, referred to as perceived ease of user were explained by Venkatesh, Thong [81] as main predictors of behavioral intention towards adoption of IS.

In the same line of study, Lee, Cheung [82] related that the quality importance to systems ensures that information and kept and provided when needed. The authors proceeded to explain the quality relates to the ease in retrieving and acquiring information in a timely way. Also, system accessibility is one of the system quality components that are focused on accessing and storing information and data [12]. Thus, system quality appears to be significant because lack of accessibility bars the access to accurate data and information [83]. In the context of this study, e-portfolio system quality can be measured using appropriate educational reports/services access, with system accessibility measuring such provision and eventually enhancing the evaluation process in the education sector.

Moving on to service quality, it was covered in the updated IS success model by De Lone and Mc Lean (2003), as an indicator of adoption success. The present study measures e-portfolio service quality in light of timely services, accurate services, right services and complete services. Wang and Huang [84] highlighted the importance of service quality based on its influence on intention towards e-portfolio system usage.

In the same study caliber, Lin and Lu [8] indicated that information quality produced by the information system is a significant factor that convinces users of its usefulness, while Lee, Kim [85] revealed that information quality has a significant relationship with the adoption of e-portfolio. Thus, information system that produces high content quality would motivate users to use the system – in that information quality is a significant variable that influences the adoption of e-portfolio.

On the whole, the identification of content and context dimensions offers a suitable method to shed light on the current adoption state of e-portfolio in educational institutions and the barriers that prevent such adoption.

E-portfolio has been studied in several empirical works [40, 52, 85-88], each with their own objectives and conclusions but the general trend among the studies is that technological factors of perceived ease of use, perceived usefulness, system quality, information quality and service quality have the potential to influence e-portfolio adoption. On the basis of the above discussion and the importance of the factors in boosting e-portfolio adoption, this study proposes the following hypothesis for testing;

H1: Technological factors have a positive influence on the intention to adopt e-portfolio in TVTC organizations in Saudi Arabia.

2.2 ORGANIZATIONAL VARIABLES

Generally speaking, successful adoption of e-portfolio depends on the engagement of the whole organization and as such, there is a need for senior management to promote new records management system as part of the change management initiative. Added to this, organizational implementation methods of new e-portfolio vary, but the focus should not be on the IT alone. According to Binyamin, Rutter [89], organizational factors are equally significant as their technological counterparts when it comes to adopting technology in the institutions of higher learning. The authors found that organizational support plays a key role in successful IS adoption and use.

This was supported by Wang and Wang [32] and Al-Jabri [72], who revealed that top management support in the organization has a positive/negative influence on the adoption of technology. In the same way, there are many studies that evidenced top management failure to manage and support technology usage leading to failure in technology adoption. Also, lack of organizational support could hinder the users from using the system [83].

Top management support was also evidenced by several other studies to positively influence IT adoption and such support may take the form of direct/indirect support. In the

latter, vendors and consultants are employed to adopt the system within the organization, while direct support is displayed in the IS staff planning and developing the system [90]. Such studies also evidenced that top management support positively influence the functions and performance of technology.

Another organizational factor that has a key role in technology adoption is financial support [91]. Technology adoption has become increasingly dependent on financial support and as such, financial support has a positive effect on the successful adoption of technology towards enhancing future efforts in information [92]. Thus, in the present study, financial support is examined for its influence on e-portfolio adoption in educational institutions.

Also another factor that influences e-portfolio adoption is staff training as it is called for to tackle and handle risks relating to the adoption implementation [88]. In fact, Abuzaid, Elshami [93] revealed that lack of technical training and support prevents the successful adoption of system among users. Insufficient training contributes to the discomfort of the users concerning the system and technology and thus, this would eventually lead to higher chances for the adoption to fail [88, 93].

Factors related to the organization were the most often cited reasons for the limited e-portfolio usage and these factors include top management support, financial support, training and policy and thus, this study proposes the following hypothesis;

H2: Organizational factors have a positive influence on the adoption of e-portfolio in TVTC organizations in Saudi Arabia.

2.3 ENVIRONMENTAL FACTORS

Prior literature dedicated to e-portfolio adoption mostly studied organizational and technological factors along with human and individual factors. In the field of education, e-portfolio adoption should focus on technology, organization as well as environmental dimensions and thus, the present study takes into consideration such factors in the dimensions of government role, big data facility and cloud computing ability.

Studies that were conducted in the context of Saudi Arabia (e.g., Botta-Genoulaz, Millet [94]; Hartley and Seymour [95]; Kasemsap [96]) showed that government involvement and support in establishing regulations and the required infrastructure play a key role in the adoption of technology. The authors stated that insufficient laws and regulations on technology, specifically e-portfolio, can prevent its adoption. This may also be the result of lack of technology use among the users that are not assisted by the regulations. In Saudi Arabia, citizens tend to trust government initiatives and as such, government support is pertinent to their system implementation, adoption and use.

More importantly, Saudi Vision 2030 stresses on promoting economic growth via empowering entrepreneurial activities among its people (KSA Government Report, 2017). Online entrepreneurs and entrepreneurs in general need guidelines as to how e-portfolio should be adopted. Thus, the findings of this study contribute to the Saudi Vision 2030 by recommending the adoption of the system and by assisting in achieving the objectives towards building a progressive economy.

On the other hand, computers are viewed as strange assets that appeared in individuals' daily existence and lives and this is more prominent among senior citizens who spent their early years dealing with traditional methods, and among the youth living in rural regions [97]. Although the world has become familiar with ICT, there are some countries and areas in the world that have limited access to them, leading to the people within to lack knowledge and skills for technology use. As a consequence, this barrier needs to be eliminated through the provision of enough assistance and support as several prior authors have mentioned, training in the application, engagement and support from administrators, practitioners and peers are crucial for users to achieve the expected goal [55, 98, 99].

Another environmental factor that influence e-portfolio adoption is the cloud as mentioned and illustrated by Mohamad, Embi [100], Medvedeva, Martynyuk [101], and Dening, Holmes [87]. Prior studies also indicted the used software and hardware when implementing e-portfolio as among the factors. For instance, Barrett [56] and Felce [102] revealed that the system's user interface have to be practical and attractive to boost use of end-users.

Moreover, this issue has more to do with the development of the e-portfolio software with user interface that cannot be customized. Thus, an alternative solution would be to convert the present language package to a language that is understandable to users or to select another software package offering customized user interface. According to Peacock, Gordon [103], issues concerning technical system robustness and flexibility also influence the system survivability.

In other words, an effective e-portfolio system should be compatible with any platform, database and it should have ease of maintenance. This is because an inefficient system that hangs could minimizes users as they refuse to waste their time and effort to achieve their goal through it. Therefore, it is pertinent to select an appropriate and efficient technology that is consistent with the application and hardware to make it easy for the institution to implement the system.

In sum, environmental factors are crucial for successful e-portfolio adoption [86]. Based on the above discussion, this study proposes the following hypothesis for testing;

H3: Environmental factors have a positive influence on the adoption of e-portfolio in TVTC organizations in Saudi Arabia.

2.4 INTENTION TO ADOPT E-PORTFOLIO FACTORS

According to Al-Emran, Elsherif [104], intention or behavioral intention is the intention of the user towards adopting new technology. Intention is the level to which an individual has developed an intention to perform or refrain from performing a particularly behavior in the future [105]. Moreover, behavioral intention indicates the readiness of the individual to perform a specific behavior, and it is proposed to be an antecedent of behavior [106]. In the present study, intention is defined as the willingness of the individual to try or the effort they are willing to exert to perform a future behavior.

In relation to the above, Davis, Bagozzi [105]'s Technology Acceptance Model (TAM) posits that behavioral intention to use the technology is a major factor that influences actual new system use. Behavioral intention to use the technology or to adopt it determines actual system use. Based on the current studies, behavioral intention towards technology use is a mediating factor.

According to Venkatesh, Thong [81], behavioral intention towards technology use determines actual behavior, with the three factors predicting intention to use being attitude, subjective norms and perceived behavioral control.

In the same line of study, Ahmed and Ward [80] compared among competing technology acceptance models to examine personal, academic, and professional portfolio acceptance behavior. The authors revealed a positive direct effect of perceived ease of use on perceived usefulness. Furthermore, perceived ease of use was found to have a positive direct effect on intention.

Therefore, a need exists to examine intention to adopt based on the influence of technological, organizational and environmental factors in the case of e-portfolio adoption. This study thus proposes the following hypothesis for testing;

H4: Behavioral intention to adopt e-portfolio has a significant relationship with the performance of teachers in TVTC in Saudi Arabia.

3.CONCLUSION

In the present work, the author highlighted the lack of studies dedicated to examining e-portfolio management system adoption and the key role it plays in supporting and enhancing the performance of the educational institutions. The study also highlighted the limitations of extant studies when it comes to such examination and as such, it developed and proposed a conceptual framework. E-portfolio use in organizations and institutions requires a robust framework and accordingly, the present work carried out a review of literature concerning e-portfolio implementation and the factors included in the study model. The study conducted a thorough review of literature concerning e-portfolio implementation factors, proceeded to extract them and forwarded them to experts for validation. The factors were categorized into three dimensions, which are technological, organizational and environmental dimensions based on interaction level. The panel of experts perused the factors and recognized the significance of EPMS initiatives in the educational institutions. Based on the highlighted factors, the study developed a conceptual model that is appropriate to examine the factors influencing the adoption of EPMS in educational institutions although the model was based on the reviewed literature, which had its limitations. Thus, the proposed model was tested for validation and reliability prior to its adoption in the examined context. Following the validation of experts, 11 factors were found to influence the adoption of EPMS in the Saudi TVTC, with two adopted from TAM and nine adopted from a combination of the IS success model and literature review. The examined factors included perceived ease of use, perceived usefulness perceived system quality, perceived information quality, perceived service quality top management support, training, government role, cloud computing ability, and big data facility – all these factors were tested for their significant influence on EPMS adoption in TVTC in Saudi Arabia. The present study contributes to literature by identifying the factors that influence behavioral intention to adopt and use e-portfolio. Moreover, it contributes to practice by directing the appropriation of limited management resources to the major areas that would make a successful and smooth system implementation.

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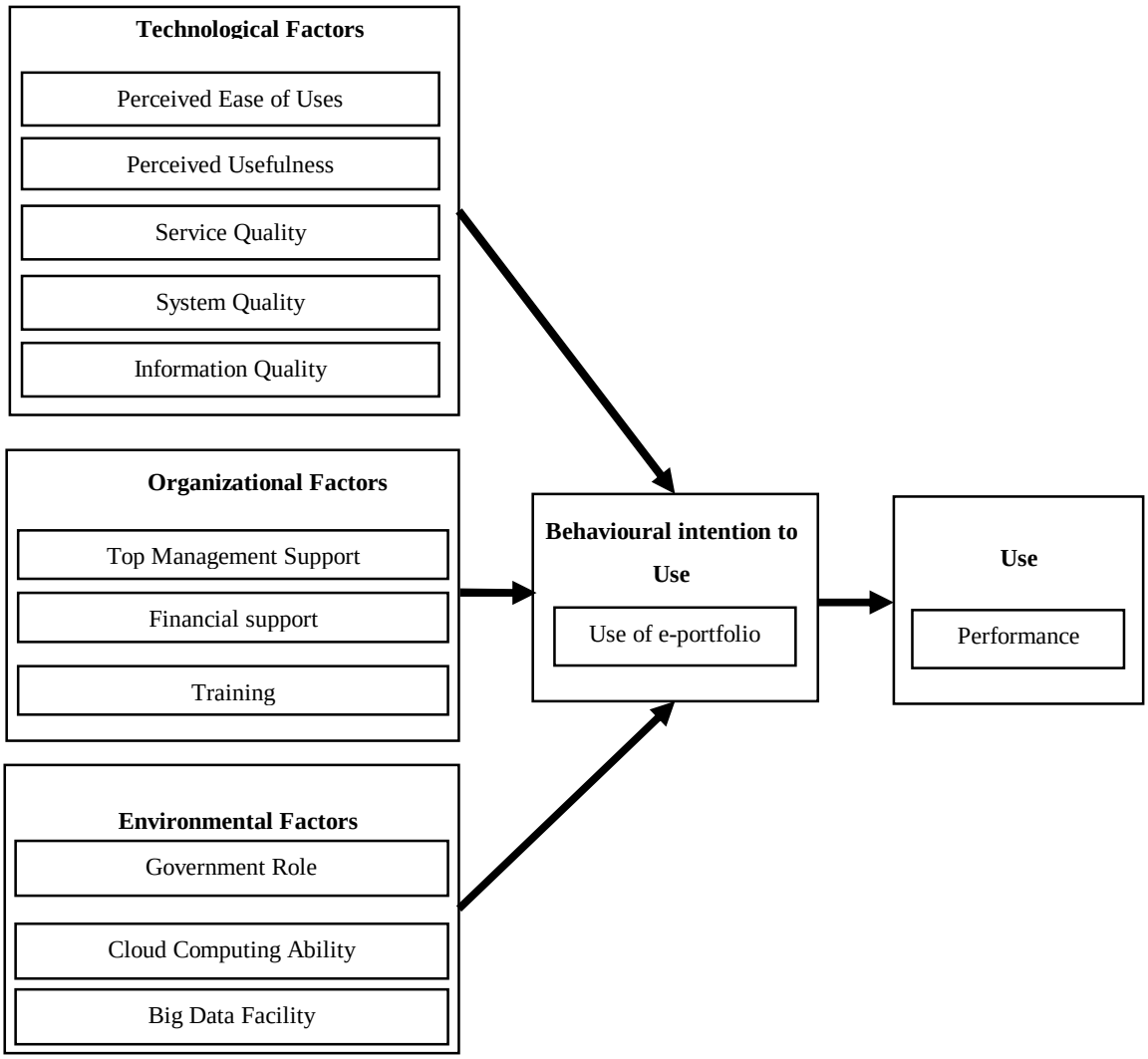

Figure 2. The Proposed EPMS adoption Model of the Study

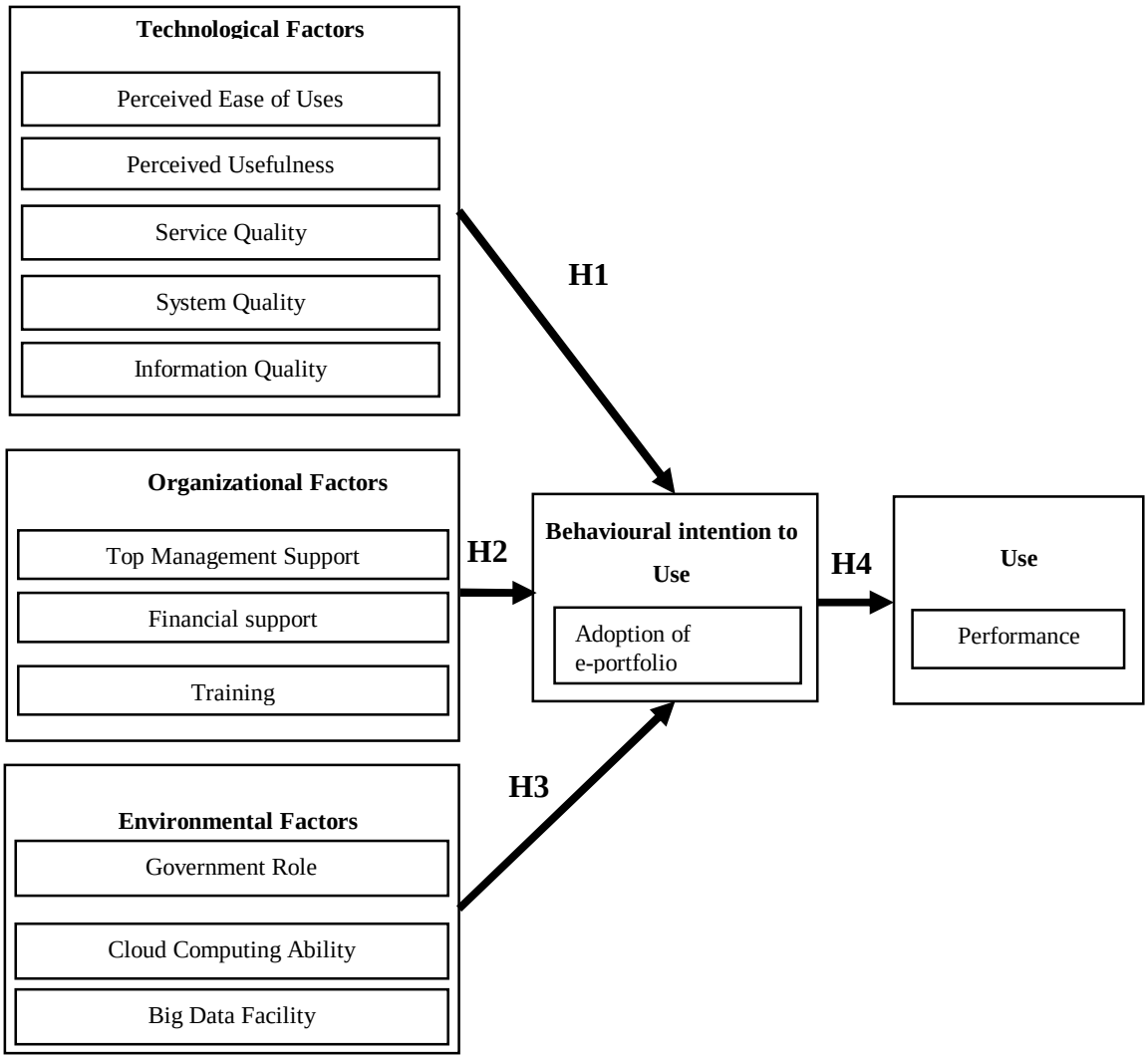

Figure 3 The Proposed Framework with the Hypotheses