QATAR UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

THE IMPACT OF CORPORATE E-LEARNING USE ON JOB PERFORMANCE:

A META ANALYSIS

BY

SARA SULTAN AHMED AL-MULLA

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COMMITTEE PAGE

The members of the Committee approve the Thesis of
Sara Al-Mulla defended on [Defense Date].

_____
Prof. Karma Sherif
Thesis/Dissertation Supervisor

_____
Prof. Khaled AlShare
Committee Member

_____
Prof. Bana Abuzayed
Committee Member

Note: the empty committee member names should be removed and for the projects paper the approval dean's line should be removed.

Approved:

_____
Dr.Rana Sobh, Dean, College of Business and Economics

ABSTRACT

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Title: The Impact of Corporate E-learning Use on Job Performance: A Meta-analysis

Supervisor of Thesis: Karma, S, Sherif.

This research aims to understand and validate the factors affecting the use of e-learning and its consequences on the employees' performance within organizations. The COVID-19 era highlighted the effectiveness of e-learning. However, findings of relevant articles are inconsistent. Therefore, a meta-analysis is conducted to examine the validity of corporate e-learning antecedents and outcomes within the framework of DeLone and McLean Model (D&M) & Technology Acceptance Model (TAM). Twenty-five studies were selected to analyze the relationships proposed by the D&M and TAM framework. The findings concluded that all relationships studied were significant with the relationship between user satisfaction and e-learning adoption and use having the highest effect size. The results call the attention of corporate and decision makers on the importance of technological, organizational, and individual factors identified to positively enhance e-learning adoption and utilization. The main limitation of this study is the exclusion of moderators that may affect the main relationships examined in this meta-analysis. Future research needs to include moderators such as the position level of the employee and years of experience.

Keywords: Corporate e-learning, e-learning use, job performance, meta-analysis

DEDICATION

This thesis is dedicated to my parents, who were the first supporters in my life and kept motivating me to achieve my goals. I love you.

Also, this thesis is dedicated to my family, who believed in me, encouraged and pushed me forward whenever I doubt my capabilities.

Lastly, I dedicate this thesis to all my friends who loved me and motivated me during my MBA program and encouraged me to overcome the challenges. Thanks for being there for me.

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CHAPTER 1: INTRODUCTION

1.1 Motivation for The Study

The government enforced lockdowns during COVID-19 compelled organizations and universities around the world to digitally transform their learning processes to maintain their knowledge development plan and ensure the continuity of their operational processes (Wolor et al., 2020). The switch to corporate e-learning, known as the utilization of digital tools to virtually provide learning materials, vocational education, and developing skills courses, is vital for companies to guarantee ongoing advancement and development of their staff members (Ichsan et al., 2020). Considering the remarkable utilization of corporate e-learning during COVID-19 era, e-learning enabled learners to acquire the necessary digital skills required to work effectively from home. Additionally, it facilitated personalized learning through the use of analytics and artificial intelligence (add Mankins & Gottfredson 2022). Online educational tools also enabled real-time monitoring of staff progress, which delivered useful information to managers on how to improve the efficacy of training programs (Wang & Wang, 2004).

As a result of the ongoing development of technology, digital skills currently receive a greater level of attention in the workplace. For that, businesses are increasing their investments in corporate e-learning programs that concentrate on developing digital skills such as data analytics, cybersecurity, and artificial intelligence (Marr, 2022). Accordingly, online training is now the official method of training for corporate learning and development (L&D) (Tyce Henry, 2021), making up 40% of North America's $50 billion corporate L&D market. Since 2020, corporate e-learning grew exponentially with no indications of slowing down in the future with Statista research projecting an annual increase of 10.5% ("Market size of the global corporate e-

learning industry in 2021 with a forecast for 2028," 2023).

Despite the importance of corporate e-learning, majority of studies conducted examined use among students in schools and universities. Statistics showed that 70% of students are willing to use e-learning even after the COVID-19 era (Parker, 2023). Students' evaluation of the technology focused on its impact on grades, with notably, 81% of students in higher education believing that online learning improves grades (Howarth, 2022), which highly affected e-learning adoption and its outcomes (Lanning et al., 2012).

Given the difference in motivation, behavioral and cultural tendencies between employees and students towards e-learning, we restrict this meta-analysis to corporate e-learning to understand the factors that motivate employees to learn using the technology and assess the effect the technology has on employee job performance. As markets become complex, corporate e-learning adoption plays a critical role in developing employee skillset to successfully cope with the intricacy of fast-paced change occurring in the corporate environment (Iris & Vikas, 2011). According to LinkedIn learning, around 800 million learners are using the online course actively (*LinkedIn Facts and Statistics 2022 Edition*, 2022). Firms utilizing corporate e-learning tools will become more effective in capitalizing its potential "human capital" by offering its staff members the necessary information, talents, and capabilities needed (Njuguna, 2009).

While having sufficient studies explaining the factors affecting e-learning adoption and use in universities, there is no clear understanding on the factors affecting e-learning adoption and use within organizations. In addition, there is inconsistency of findings between the effectiveness of corporate e-learning and the traditional learning. Thus, it is important to understand and validate the factors affecting usage and

expected outcomes related to job performance and organizational net benefits. On one hand, it is reported that adoption of corporate e-learning for employees' training showed significance impact on job performance (Buch et al., 2020; Wolor et al., 2020) as a beneficial and convenient tool for gaining knowledge related to job tasks (Buch et al., 2020) . In contrast, some learners expressed negative perceptions toward adopting corporate e-learning (ragab et al., 2022). According to a study by Mohammed and Hasan (2022), participants preferred the traditional training courses over e-learning due to several technological, organizational, and individual factors (Mohammed & Hasan, 2022). Technological challenges such as system complexity and connectivity deterred use, while perceived potential benefits did not warrant a shift to e-learning. Accordingly, we conduct a meta-analysis to assess and validate the factors affecting e-learning adoption and use and its impact on performance and net benefits within organizations.

1.2 Antecedents of E-learning Use

To maintain users' benefits, there are several factors that affects the corporate e-learning adoption and utilization, that in return, will impact the job performance and net benefits overall. The antecedents affecting corporate e-learning use include technological factors, organizational factors, and individual factors.

Technological factors play a critical role in corporate e-learning adoption. The (EdTech) market is expected to reach $680 million by 2027 (Marr, 2022). Differentiation within the market is based on the level of user satisfaction, the accuracy, and capability of delivering high-quality training material.

The influence of organizational support on online learning utilization is also essential for numerous reasons (Tarhini et al., 2013). From a strategic perspective, organization may take the initiatives to adopt corporate e-learning platforms, however, staff

members might be less likely to utilize the technology if the organization fails to promote the solution or provide assistance for use.

At the individual level, employees may resist the adoption and usage of corporate e-learning based on their perception of its benefits related to job performance (Lin et al., 2013). When individual perceptions are assessed, companies can generate plans to positively shape these perceptions and develop and implement more efficient and appealing corporate e-learning experiences that would result in higher levels of adoption.

1.3 Consequences of E-Learning

The use of corporate e-learning is expected to have positive impact on employee job performance and overall organizational net benefits (Caudill, 2015). Corporate e-learning is expected to lower the cost of training due to its scalability and to flatten the learning curve (Hamidianpour et al., 2016), allowing employees to develop job specific skillsets in shorter periods of time. Training can be targeted to fill gaps that the organization lacks at the convenience of an employee without disrupting work schedules (Allen, 2016).

1.4 Research Outcomes

As such, job performance is likely to improve after the completion of corporate e-learning training. While corporate e-learning cost is non-trivial, the net benefits that can be realized are likely to offset the cost.

1.5 Research Purpose

This meta-analysis will aggregate the results to understand what organizations should do to enhance the acceptance rate of corporate e-learning and get positive outcomes. Hence, this research will validate the following relationships:

- The technological factors affecting adoption and usage of corporate e-learning.

- The organizational factors affecting adoption and usage of corporate e-learning.

- The individual factors affecting adoption and usage of corporate e-learning.

- E-learning use outcomes.

1.6 Research Structure

The structure of the research will start with the literature review in chapter 2. In chapter 3, theories will be highlighted and reviewed to select the hypothesis and model framework. methodology of the research including the studies search and selection, coding and meta-analysis process will be in chapter 4. Chapter 5 will include the finding of the meta-analysis. Chapter 6 will cover the discussion, implications, conclusion, limitations, and future research.

CHAPTER 2: LITERATURE REVIEW

2.1.E-learning in organizations

E-learning is recognized as the development of knowledge through electronic resources (Kahiigi et al., 2008). It entails acquiring knowledge and skills using digital systems and the internet. Similarly, Fernandes (2019) defines e-learning as a training program delivered to a learner via a personal computer, logged into a computer network. It is used in staff training to improve their skills, knowledge and competencies (Mohammed et al., 2017). Therefore, corporate e-learning is a tool that focuses on improving employee performance and satisfaction through enhancing workforce productivity and competitiveness. It also provides organizations with the resources capable of improving learning activities like virtual classes, problem solving cases, and collaborative discussions. Some organizations utilize systems such as Learning Management Systems (LMS), which is a system (application) designed to administer online educational programs and share educational content, self-paced courses, blended learning programs, and permits collaboration between users (Foreman, 2017). Organizations primarily implement corporate e-learning systems for reasons such as maintaining their employees' skills, achieving better performance, and realizing overall net benefits in productivity and efficiency.

2.2.Types of corporate E-learning

There are different types of corporate e-learning that organizations can use for training sessions. According to Hrastinski(2008), asynchronous online learning is the most common form of e-learning, which includes pre-recorded lectures, videos, interactive quizzes, and other digital resources (Hrastinski, 2008). It became very common in organizations as learners access course content at their own leisure and convenience. Asynchronous online learning is favored by employees for its convenience and

adaptability to an employee workload (Fadde & Vu, 2014). Also, having digital training programs create a more structured learning environment with scheduled materials to be covered, which increases the training's effectiveness and efficiency. A case study carried out by de Jong assessed the effectiveness of a regular classroom versus asynchronous online learning and found that the latter had the same effectiveness of the regular classroom (de Jong et al., 2013). The limitation could be lack of engagement and inability to pass ad-hoc inquiries to instructors, and live discussions (Perveen, 2016). The other type is synchronous online learning. In this type of e-learning, learners attend live online classes through webinars or video conferences through web-based e-learning such as Webex, Zoom, or Microsoft Teams. Synchronous online learning enables live instructor-student interaction (Hrastinski, 2008). It also gives learners the opportunity to stay engaged with course activities and be more connected to their peers and instructors (Yamagata-Lynch, 2014).

A survey was distributed to assess the difference between the effect of asynchronous and synchronous and found that asynchronous is more beneficial and convenient to employees as it provides flexibility in conducting the training considering job workload (Ogbonna et al., 2019; Perveen, 2016). Also, trainers are able to think before answering and take breaks without restrictions (Ogbonna et al., 2019). However, it lacks the interaction that synchronous online learning would offer to increase employee motivation and engagement in the learning experience. As such, blended learning combines both online and offline learning, where learners attend physical classes and complete online coursework. This allows for a more flexible and personalized learning experience (Tayebinik & Puteh, 2013).

2.3. Factors Affecting E-Learning Adoption

As a method of learning and development, corporate e-learning has grown in popularity within organizations. However, the effectiveness of corporate e-learning programs in organizations is not well documented and factors affecting its success have not been validated through a meta-analysis. Systematic reviews of corporate e-learning categorized significant factors into technological, organizational, and individual factors, which hare explained in the following sections.

2.3.1.   Technology

Technological factors have a critical role in corporate e-learning adoption. According to Seta, when corporate e-learning system is effective, and its content is structured well, adoption is facilitated and users are motivated to use the system (Seta et al., 2018). Technological factors include information quality and system quality.

2.3.1.1.   Information Quality

Information quality refers to the precision, completeness, and suitability of the data given in online learning courses (Achmadi & Siregar, 2021). An effective corporate e-learning system provides comprehensive, training-relevant information that is accurate and pertinent in a timely manner (Chang et al., 2011). Systemic literature review conducted by Giannakos demonstrates that information quality is a crucial success factor for e-learning courses, as trainers need to be able to trust the information they are receiving (Giannakos et al., 2021).

Moreover, user satisfaction is significantly influenced by the quality of information, which in turn has a substantial impact on system use (Giannakos et al., 2021). System use has a significant positive effect on employee and organizational performance (Wijaya & Eppang, 2021). If a system has rich content, simple navigation, and well-

structured functionality, participants are a greater probability to employ it (Seta et al., 2018)

In line with the TAM, a study by Gao found that information quality has a substantial impact on perceived usefulness and perceived ease of use, indicating that high-quality information can increase users' perceptions of the usefulness and ease of use of corporate e-learning technology (Gao, 2019). Further, Gao investigated the effect of information quality on corporate e-learning effectiveness in a Chinese financial services company (Gao, 2019). The study found that the accuracy, completeness, and relevance of the learning materials significantly affected learners' perception of the usefulness of the corporate e-learning system. Specifically, learners who perceived the information quality as high reported higher levels of satisfaction and better learning outcomes compared to those who perceived the information quality as low (Kumar et al., 2021).

2.3.1.2. System Quality

System quality relates to the performance and reliability of the corporate e-learning system, which includes factors such as ease of use, availability, and instant response (Giannakos et al., 2021). A study conducted by Al-Fraihat demonstrates that aspects related to the technical quality of the system, such as the user-friendliness of the corporate e-learning system and the system's capacity to meet individuals' needs, influence acceptance of e-learning (Al-Fraihat et al., 2020). To adopt the corporate e-learning system, firms require adequate technological infrastructure, including broadband connectivity and suitable applications and hardware (Marjanovic et al., 2015). In contrast, inadequate technological infrastructure may also lead to technical complications that make it difficult to access corporate e-learning systems. Technical obstacles include lack of technical support, infrastructure maintenance and update,

and difficulty in accessing course materials. Technological issues and obstacles such as insufficient software, poor connectivity, limited bandwidth, and system failures may cause significant problems to users leading to low adoption and discontinued use (Barros Martins et al., 2019). When employees lack technical support for using corporate e-learning systems, they are likely to become less interested in using corporate e-learning (Cheng, 2012). In order to eliminate difficulties to corporate e-learning adoption, it is crucial for employees to have a thorough understanding of the technologies used (Lee et al., 2011). According to the IS success model, system quality is an essential aspect in determining the success of an information system as it entails trustworthiness, usability, and functionality (Giannakos et al., 2021) . Further, system quality has a positive influence on user satisfaction, which consequently has a substantial positive influence on e-learning usage. Corporate e-learning use has a substantial influence on the individual impact and organizational impact.

System quality can affect both perceived usefulness and perceived ease of use in line with the TAM (C.-Y. Lin et al., 2019). As per their study, they found that system quality has a significant positive effect on perceived usefulness and perceived ease of use, indicating that a high-quality system is more likely to be perceived as useful and easy to use, which can increase user acceptance and adoption of corporate e-learning technology.

In addition, Marjanovic found that system quality directly and positively affects corporate e-learning use (Marjanovic et al., 2015). Once the organization implements a consistent e-learning application, it is more likely to be used by personnel (Abrego Almazán et al., 2017). A high-quality system can, directly and indirectly, improve performance by increasing users' perceptions towards its performance-enhancing

capabilities.

2.3.2. Organizational factors

Organizational support is critical for the success of corporate e-learning and technology adoption (Stoltenkamp et al., 2007). It represents the degree of support and assistance provided by the organization to its employees for using the corporate e-learning system (Wang & Wang, 2018). When personnel perceive that their employer is taking substantial steps to apply innovative technologies, an environment arises that affects how they act by altering their views and mindsets within the organization.

Corporate e-learning success is contingent upon the company's policy and structure, including company plans, rewards mechanisms, funding and spending resources for employee growth, and a decision-making structure. Wang & Wang presented a theoretical framework for the study of human resource development (HRD) learning participation and indicated organization support as significant factor influencing corporate e-learning use (Wang & Wang, 2004). Organizational social support influences both learning engagement and the likelihood that an employee will complete an HRD program. In addition, since e-learning content should be timely, relevant, and aligned with training goals and goals of the company, an accessible learning management system (LMS) needs to be utilized to administer the content, monitor the employees' progress, and provide feedback (Sabharwal et al., 2018).

In a study by Čevra et al (2022), organizational support has had an important effect on corporate e-learning adoption intentions (Čevra et al., 2022). Individuals' decisions about using a specific technology are directly influenced by organizations through providing sufficient resources, such as setting goals, providing education, and offering favorable feedback to assist staff in achieving organizational objectives and enhancing

technology usage (Wang, 2016). Furthermore, organizations should provide learners with timing, pace, and accessibility options that enable them to carry out training at a pace that suits them (Chrysafiadi & Virvou, 2013). Learners should receive adequate support, including technical assistance and access to relevant matter experts, to resolve their questions and concerns.

Regarding the TAM model, organization support can be considered as a determinant of perceived ease of use, as it represents the degree of assistance provided by the organization to its employees for using the digital learning. However, according to studies of Mohammadyari & Singh & Weng (2015), organizational support didn't have a major impact on willingness to use (Mohammadyari & Singh, 2015; Weng et al., 2015). Moreover, Kimiloglu et al (2017) stated that the majority of organizations are doubtful of the advantages of corporate e-learning (Kimiloglu et al., 2017). There are conflicting views in organizations of the importance of corporate e-learning programs (Mohammadyari & Singh, 2015). Enterprises with a strong stand against corporate e-learning tend to rely on traditional methods for learning (Kimiloglu et al., 2017). The group has a completely negative view of corporate e-learning, indicating that they find it ineffective, whereas other companies believe that it is effective and efficient. Lastly, other organizational barriers that affect corporate e-learning adoption include awareness, management support and commitment, and strategy alignment (Stoffregen et al., 2016). Management plays a crucial role in facilitating the successful employment of corporate e-learning. Consequently, this phenomenon becomes a significant barrier when managers fail to support employees and commit to corporate e-learning adoption.

2.3.3. Individual Factors

Individual factors refer to the users' belief, perceptions, and behavior. Individual

factors can favorably and unfavorably affect corporate e-learning adoption (Stoffregen et al., 2016). Positive perceptions toward corporate e-learning and motivation to use it will facilitate the adoption of e-learning (Okazaki & Renda dos Santos, 2012). Otherwise, negative attitude toward corporate e-learning, personal preferences that are incompatible with corporate e-learning, conflicting values and personal background among learners can also be a significant barrier to corporate e-learning comprehension and adoption. Individual factors include perceived usefulness, perceived ease of use, and user satisfaction, will be highlighted below.

2.3.3.1. *Perceived Usefulness*

Perceived usefulness is the degree whereby learners think that corporate e-learning could improve their learning process and assist them in achieving their learning objectives (Davis et al., 1989). Perceived usefulness is an important indicator of whether users will employ and maintain using corporate e-learning systems (Moreno et al., 2017). Consistently, research has demonstrated that a favorable view of perceived usefulness has a substantial influence on corporate e-learning adoption (Okazaki & Renda dos Santos, 2012). Employees' acceptance of using corporate e-learning is very critical in order to guarantee its effectiveness (Fabito, 2017). When learners perceive corporate e-learning to be useful, they are more likely to implement it, continue utilizing it, and feel content with their learning experience (Cheng, 2011). Moreover, Barros Martins et al (2019) claim that employees' lack of interest in the corporate e-learning course content, and incorrect perceptions of the nature and complexity of corporate e-learning may hinder its effective implementation (Barros Martins et al., 2019).

A study of employees working in the banking sector found that perceived usefulness is favorably impacting intention to use corporate e-learning systems (Purnomo & Lee,

2013). When employees trust corporate e-learning as a booster to performance, it is more likely that they will continue using it.

Consistent with TAM, perceived usefulness of e-learning is affected by several factors including system quality, organization support, and self-efficacy (Alassafi, 2022). Hence, corporate e-learning platforms that offer convenient educational materials or user-friendly interface designs are more likely to be perceived as beneficial (Cheng, 2011). On the other hand, a study conducted by Chen & Kao on high-tech and government sector found that system quality has no significant relationship on perceived usefulness (Chen & Kao, 2012).

2.3.3.2. *Perceived Ease of Use*

Perceived ease of use is the extent to which an individual believes that utilizing a particular technology will be simple (Davis et al., 1989). Perceived ease of use is a crucial element for assessing whether people will adopt, utilize, and maintain working with corporate e-learning platforms in the framework of e-learning (Nayanajith et al., 2019). A positive perception of usability has a substantial impact on the adoption of e-learning programs (Weng et al., 2015) . On the contrary, if corporate e-learning is perceived to be challenging, employees are more probable to reject it and seek out alternative learning strategies instead. Also, corporate e-learning adoption and use may remain low among many organizations compared with traditional methods due to deficiency in employees' knowledge and capabilities related to the technologies utilized.

According to TAM, perceived ease of use is impacted by several factors such as organization support, e-learning quality, and self-efficacy, while, it has significant influence on corporate e-learning use. A research was carried out by Cheng (2012) concluded that users will be more likely to utilize corporate e-learning if the system

is user friendly, which is consistent with TAM (Cheng, 2012). Overall, it is crucial for corporate e-learning platforms to design applications that are straightforward simple to use, and simple to utilize to increase the perception of usability among learners.

2.3.3.3.   Satisfaction

Satisfaction is the impression of fulfillment that results from comparing observed results to anticipations (Anderson & Sullivan, 1993). Satisfaction theory is frequently employed in user behavioral literatures to explain consumer satisfaction and subsequent behaviors. In assessing the success of corporate e-learning, satisfaction is a crucial factor. According to Bain, satisfaction is positively influenced by factors such as information and system quality, and intention to use, actual usage, and perceived usefulness (Bain, 2019). According to the IS success model, user satisfaction is one of the key outcomes of information systems as it is influenced by several factors. Similarly, the TAM model posits that both perceived ease of use and usefulness have direct impact on user satisfaction. On the other hand, user satisfaction has positive influence on corporate e-learning use (Chen & Kao, 2012). If the personnel are satisfied in the context of the system overall interface and knowledge outcomes, they are more likely to use it for their professional development (Merlo, 2016).

2.4.System Use

Corporate e-learning use entails the actual utilization of the system by employees and is a measure of the effectiveness of the e-learning program (Lutfi, 2022). According to Mohammadi, actual use is referred as how frequent and how many times corporate e-learning is used (Mohammadi, 2015). Also, learning management system (LMS) can be used to record and document the actual use of learners (Raharjo et al., 2022).

Actual use is crucial because it enables learners and developers of corporate e-learning systems to determine obstacles to acceptance and use, as well as come up with tactics to enhance participation and educational outcomes (Wang, 2016). Numerous aspects such as the quality of the information provided, the quality of the corporate e-learning system proposed, the desire to utilize it, and the anticipated outcomes, positively affect the usability of an corporate e-learning program in the corporate environment. Even though Lambert & Yansone demonstrated that individuals rate corporate e-learning more favorably when they have actually participated in it (Lambert & Yansone, 2017), individual problems such as distractions and poor time management, hinder the implementation of corporate e-learning in modern organizations.

 The IS success model emphasizes that the use of information systems is influenced by several factors, including system quality, information quality, and user satisfaction (Vuckovic et al., 2023). Similarly, TAM also considers use as a key factor in determining the success of technology adoption (Gao, 2019). Additionally, when considering the TAM framework, the intention to utilize a particular corporate e-learning technology is largely dependent on the expected level of ease of use.

2.5. E-learning Outcomes

Corporate e-learning usage has impact on both the individual and organization overall. Corporate e-learning can result in enhanced performance of learners and improved competitiveness of organizations (Ahmed Alzaabi & Ghani, 2021). By exploiting the benefits of corporate e-learning, companies can increase the productivity and usefulness of their educational initiatives and accomplish improved results for the trainees and the organization (Henry, 2001; Rosenberg, 2005)

In the following sections, I review corporate e-learning outcomes tagged as net

benefits and job performance.

2.5.1. *Net Benefits*

The aspect of net benefits is an essential factor in evaluating the impact of corporate e-learning on performance and overall user experience. Net benefits can be defined as the balance between the costs and benefits of corporate e-learning (Wolor et al., 2020). According to the IS success model, net benefits is considered a key outcome of information systems. According to Hamidianpour et al, despite having high training cost related to the adoption of a system and assigning an experienced instructor to conduct the online training, training cost is likely to drop in the long run (Hamidianpour et al., 2016). The benefits realized from the usage of recorded sessions in terms of developing employee skillset, enhancing productivity, and reducing response period. In the context of corporate e-learning, net benefits can be influenced by several factors, such as system quality, information quality, service quality, and individual impact (Wolor et al., 2020). Similarly, the TAM model posits that net benefits are influenced by perceived usefulness and perceived ease of use, since higher perceived usefulness and ease of use can result in higher net benefits for the user.

Additionally, using e-learning in workplace has significant impact on improving staff productivity, increased sales and overall performance (Chen & Kao, 2012). Additionally, Marjanovic et al examined the aspects that effect the net benefits of corporate e-learning systems in the energy sector and found that corporate e-learning use is a substantial predictor of net benefits, which is consistent with the D&M IS model (Marjanovic et al., 2015).

2.5.2. *Performance*

In terms of performance, corporate e-learning can have a positive impact on both the individual employee and the organization (Zheng et al., 2023). As the use of

technology in the workplace increases, many organizations have begun to invest in e-learning programs to provide training and development opportunities for their employees. Corporate e-learning supports the learning process and achievements of the employees, which helps them to grow and develop in many corporate related aspects (Ilyas et al., 2017). It allows employees to adopt a life-long learning attitude which help them to further expand their skills and better respond to the changing world and its competitive environment (Hewitt, 2017). When employees exploit the opportunity to improve their knowledge and work skills, it is likely that learning will improve their productivity and overall performance (Czarnecka & Daróczi, 2017). Moreover, the corporate e-learning system guarantees employees' development by having access to experts and trainers across the world regardless of their location (Postelnicu et al., 2019). Allowing businesses to have the ability to provide their workforce with complete and diverse courses will definitely develop the employee skillset and capabilities (Ali & Alias, 2020), especially if the system is aligned with corporate values and strategies. Having an online learning system that is completely aligned and configured to the policies and strategies of the organization, will ensure improvement of the business performance. Such system can assist teams to develop shared thinking and unified business vision (Ilyas et al., 2017).

IS success model and TAM emphasize the significance of system and information quality, perceived utility, and perceived usability when assessing the success of corporate online education programs (Davis et al., 1989; DeLone & McLean, 2003). In D&M IS success paradigm, system quality, information quality, and the use of corporate e-learning tools positively impact employee performance. In the TAM model, the relationship between the actual utility and perceived ease of use of online educational platforms and workforce performance is controlled by user satisfaction.

The reviewed studies revealed that information and system quality, perceived utility, perceived ease of use, and organizational support beneficially impact corporate e-learning. As a result, the adoption of e-learning in the corporate world has significantly impacted organizational performance. Huang & Hung examined the effect of corporate e-learning on employee performance in a large Chinese telecommunications company and found that employees who received e-learning training had significantly higher performance ratings compared to those who received traditional classroom training (Huang & Hung, 2022). This performance is because e-learning allows for greater flexibility and customization of training content, which can better meet individual learning needs.

2.6. Meta-Analysis & Literature of Corporate E-learning

In the context of e-learning, numerous meta-analyses were conducted. However, most of them were limited to student learning in schools and universities. Franque et al. (2021) conducted a meta-analysis on 115 articles within the framework of Information System success and Technology Acceptance Model (TAM) on information systems and found that perceived usefulness has significant relationship to continuous intention to use any type of information system (Franque et al., 2021). Twenty one percent of those articles were related to e-learning impact on students, employees, and instructors. A meta-analysis conducted by Lahti on eleven randomized control trial articles on nurses comparing the impact of e-learning vs traditional learning environments (Lahti et al., 2014) found that skills and knowledge were slightly improved, however, no significant improvement on satisfaction was reported.

Jami Pour et al. (2022) conducted a meta-analysis to validate e-learning in the context of DeLone and McLean's (D&M) IS Success Model (DeLone & McLean, 2003). The study included the learning of students, employees, and teachers and found that all IS

success model hypothesis related to employees' e-learning are supported (Jami Pour et al., 2022). However, 20% of the total 44 articles related to corporate e-learning. Likewise, the meta-analysis conducted by Rahman to aggregate the influence of learner's satisfaction on continued intention to use educational technology comprised of 30 articles (Rahman et al., 2017). Only four articles were related to corporate e-learning. Lastly, using TAM, Rahmi conducted a meta-analysis of 203 articles to validate the TAM constructs of perceived usefulness and perceived ease of use of e-learning (Rahmi et al., 2018). Likewise, several other meta-analysis conducted in the context of D&M model and TAM made no specification on e-learning impact on employees' performance like the one conducted by Scherer, which validated the e-learning use by teachers using TAM framework (Scherer et al., 2019). Additionally, Yu conducted a meta-analysis to validate the factors affecting the online learning on university students (Yu, 2022). Hence, there is a gap in conducting a meta-analysis on corporate e-learning and confirming the validity of the D&M and TAM to employee-learning and its impact on job performance, especially in today's complex and turbulent business environment speared by the fast development of technology that employees need to rapidly master to sustain organizational competitive advantage. Therefore, this meta-analysis is conducted to address this gap as it aims to validate the factors affecting corporate e-learning use and consequently affecting job performance.

Table 1 A list of related meta-analysis studies

Study	Topic	Type	Number of studies
(Franque et al., 2021)	A meta-analysis of the quantitative studies in continuance intention to use an information system	Information systems	115
(Lahti et al., 2014)	Impact of e-learning on nurses' and student nurses' knowledge, skills, and satisfaction: A systematic review and meta-analysis	E-learning	11
(Jami Pour et al., 2022)	Meta-analysis of the DeLone and McLean models in e-learning success: the moderating role of user type	E-learning	44
(Rahman et al., 2017)	A meta-analysis study of satisfaction and continuance intention to use educational technology	Educational Technology	30
(Rahmi et al., 2018)	A meta-analysis of factors affecting perceived usefulness and perceived ease of use in the adoption of e-learning systems	E-learning	203
(Scherer et al., 2019)	The technology acceptance model (TAM): A meta-analytic structural equation modeling approach to explaining teachers' adoption of digital technology in education	E-learning	114
(Yu, 2022)	A meta-analysis and bibliographic review of the effect of nine factors on online learning outcomes across the world	E-learning	47

CHAPTER 3: THEORETICAL FOUNDATION

This research explores the impact of corporate e-learning on performance and overall net benefits, using DeLone and McLean's IS success model and Technology Acceptance Model (TAM). Also, constructs will be highlighted to formulate the hypotheses.

3.1.DeLone and McLean's (D&M) IS Success Model

DeLone and McLean's model is a framework for assessing the efficacy of information systems (IS) within organizations. The model was first presented in 1992, and its authors have since revised and improved it. The revised model also acknowledges the significance of various external factors, such as the personal characteristics of the user, the context of the company, and the framework of the system together with the execution process (DeLone & McLean, 2003). The model includes six dimensions categorized into technological and individual factors, system quality, information quality, use, user satisfaction, individual impact, and organizational impact (Vuckovic et al., 2023). D&M model framework is illustrated in Figure 1. According to the model, the success of an information system is determined by the interactions between these dimensions.

The updated model by DeLone and McLean offers an integrated and broad method for measuring the efficacy of IS in organizations. By examining several aspects of IS success and exterior variables, academics and professionals may obtain more precise and comprehensive knowledge of the factors that influence IS success, thereby enhancing the design, development, and implementation of IS within organizations.
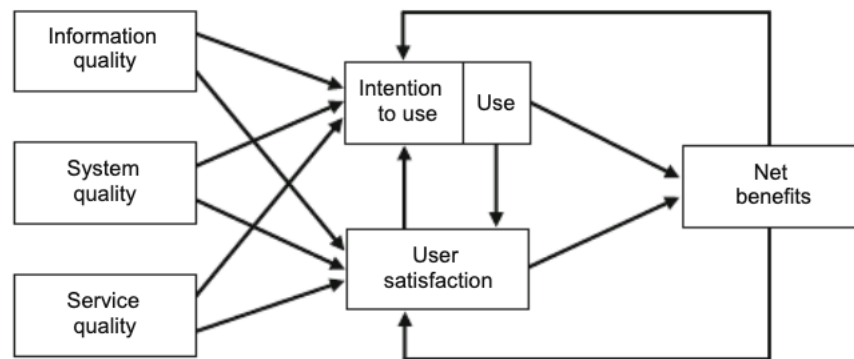
Figure 1. The updated IS success model.
(DeLone & McLean, 2003)

3.2.Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) suggests that perceived utility and perceived simplicity of use influence users' intentions to adopt technology (Gao, 2019) . The TAM has been extensively utilized for studies to clarify and anticipate the implementation of emerging technologies, and it has been found to be highly predictive. By employing the TAM, academics and professionals may determine the elements that impact the adoption of new technologies while creating strategies for enhancing technology adoption and utilization.

According to the TAM, the user's intention to adopt a technology is influenced by two important individual factors: perceived usefulness and perceived ease of use. This implies that consumers are likely to prefer and utilize a technology that they consider more useful and easier to use. The TAM also assumes that perceived utility and perceived ease of use are influenced by external factors such as system quality, user training level, and user experience. In addition, the model implies that user attitudes and subjective norms influence the user's intent to employ the technology. The TAM framework is illustrated in Figure 2.
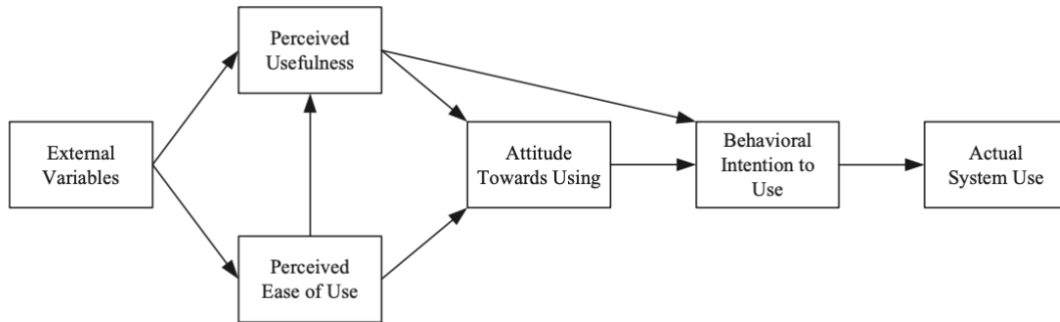
Figure 2 Technology Acceptance Model (TAM)
(Davis et al., 1989)

3.3.Technology-Organization-Environment (TOE) Theory

The Technology-Organization-Environment (TOE) theory as Baker states, is a theoretical structure that aims to provide insight into the acceptance and utilization of technology in organizations by considering internal and external factors (Baker, 2011). The constructs of the TOE may assist in explicating why certain businesses employ corporate e-learning technologies quicker than others. According to the TOE framework, three primary factors influence the utilization and implementation of technology: technology factors, organization factors, and environmental factors.

Technology factors of a company refers to attributes such as its characteristics, operation, and accessibility (Eze et al., 2020). Organization factors refer to the organization's characteristics, such as its size, form, cultural backgrounds, and resources. For instance, companies with greater resources and a more receptive mindset may be more willing to employ e-learning technologies. Moreover, environmental factor refers to external factors, such as market competition, laws and regulations, and societal norms, which could influence technology adoption. For instance, organizations are operating in industries with intense competition could be

more probable to adopt e-learning technologies to improve its productivity and overall performance.

Considering these variables, businesses may develop tactics to promote the acceptance and successful use of corporate e-learning platforms. This may involve investments in IT infrastructure, the development of training programs to teach employees how to utilize the corporate e-learning system, and the creation of a culture that encourages use of technology. The framework of TOE is shown in Figure 3.
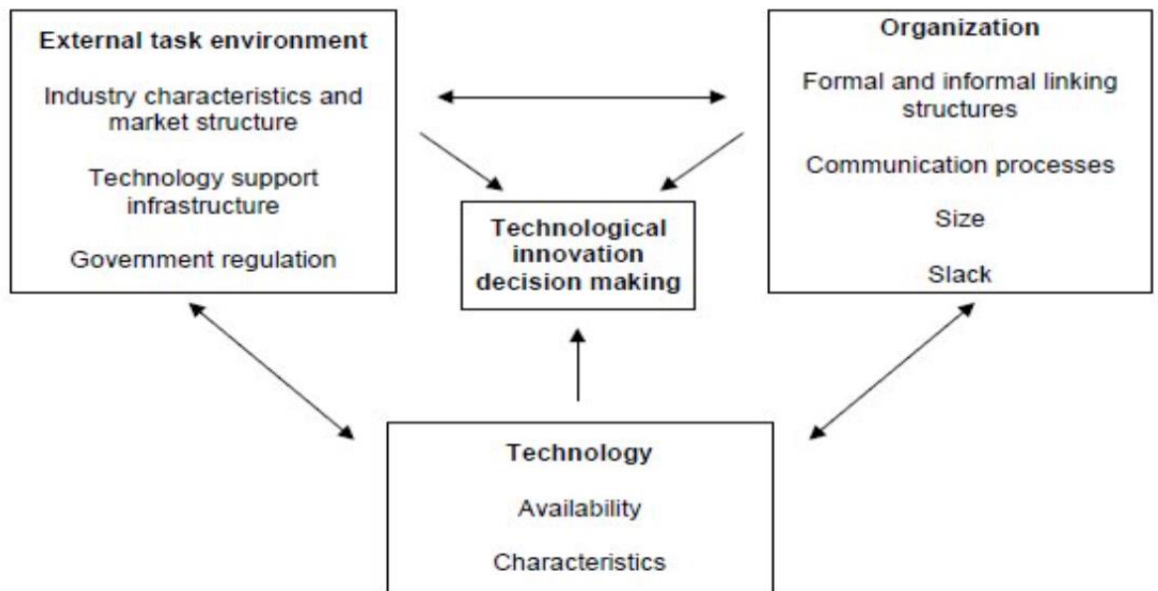
Figure 3 TOE Theory Model
(Baker, 2011)

While studies have extensively adopted TAM and D&M models to explain antecedents of e-learning systems, another theory that helps explain the consequences is absorptive capacity.

3.4.Absorptive Capacity Theory

Absorptive capacity can be described according to Lowik et al., as the ability to perceive the importance of externally acquired knowledge, assimilate, transfer, and leverage it to develop a realized capability (Lowik et al., 2012). When it comes to corporate e-learning, it requires major attention and support from the organization for new technology to be acquired (Martin et al., 2003). In the framework of corporate e-learning, absorptive capacity refers to a company's capacity to successfully gain, integrate, and implement new corporate e-learning-related skills and materials (Bakhsh & Aziz, 2023). Acquiring and assimilating knowledge is referred to as potential Absorptive capacity. Thus, during the phase of acquiring knowledge related to corporate e-learning, it entails externally sourcing technological elements like a high-quality system equipped with content designed to enhance employee skillset. Assimilating knowledge refers to the capability of integrating this new knowledge into their previously acquired knowledge. Realized absorptive capacity is influenced by potential absorptive capacity, which affects organizational innovation and organizational performance (Zou et al., 2019).

In terms of innovation and R&D withing the framework of absorptive capacity (Gebauer et al., 2012), corporate e-learning is utilized to be an alternative tool to facilitate scanning the required elements and competencies to acquire since scanning the environment is time consuming. A company's absorptive capacity is its capability to identify the importance of new external data, assimilate it, and implement it for business reasons, thereby exploiting its opportunities for innovation (Hattinger, 2014). Thus, corporate e-learning will facilitate the potential absorptive capacity. When it comes to realized absorptive capacity, the firm should focus on corporate e-learning quality to help to assimilate the knowledge and apply it individuals internally (OyeN.

et al., 2012). It will contribute to the company's innovation and maintain corporate e-learning to be part of their sustainable strategy (Ali et al., 2016; Alismaiel, 2021). Flexible corporate e-learning enhances personnel's' knowledge and net benefits added to his accomplishments and will increase awareness of sustainability.

Organizations might promote an environment that encourages continual education and information sharing, facilitate collaboration between trainees and trainers, and offer assistance and instruction to ensure that users efficiently use corporate e-learning resources in order to increase absorptive capacity (Martin et al., 2003). In addition, establishing feedback and evaluation mechanisms enables firms to continuously improve their choice and implementation processes, while guaranteeing the materials are aligned with the goals of the company and user requirements. By acquiring and utilizing corporate e-learning resources, companies can improve staff abilities, information acquiring, and organizational performance overall.

3.5.Review of The Theories & Formulate Hypotheses

The constructs examined in this meta-analysis are related to theories mentioned in chapter 3. The constructs related to D&M's IS success model includes information quality, system quality, intention to use/use, satisfaction, net benefits, and performance. Furthermore, the constructs related to TAM include perceived usefulness, satisfaction, intention to use/ use. Additionally, perceived ease to use is to be considered in this model as construct from TAM & TOE. Although absorptive capacity is an important theory in the context of e-learning as it will result in enhancing net benefits of an organization., however, we were not able to find studies to incorporate that in our meta-analysis. Thus, the collected studies in this meta-analysis didn't include absorptive capacity.

Nevertheless, intention to use and use are examined as one variable in this Meta-analysis as the scope of this analysis is to examine the effect of corporate e-learning use on job performance. Moreover, management support will be examined as an antecedent to corporate e-learning use to extend TAM's external factors. According to D&M model & TAM, considering the success factors such as corporate e-learning quality, management support while ensuring personnel satisfaction, companies may guarantee the effectiveness of their online training programs, resulting in enhanced performance, increased productivity, and enhanced employee engagement. The hypothesis list is formulated as shown in Table 2.

Table 2 List of Hypothesis

H#	Hypothesis
H1	System quality has significant & positive impact on E-Learning use
H2	Information quality has significant & positive impact on E-Learning use
H3	Organization support has significant & positive impact on E-Learning use
H4	Perceived usefulness has significant & positive impact on E-Learning use
H5	Perceived ease of use has significant & positive impact on E-Learning use
H6	Satisfaction has significant & positive impact on E-Learning use
H7	E-Learning use has significant & positive impact on Job Performance
H8	E-Learning use has significant & positive impact on net benefits

3.6. Meta-Analysis Theoretical Framework

The following diagram, Figure 4, displays the model of studies' constructs included in the meta-analysis. It contains three independent aspects affecting the adoption and use of corporate e-learning, including technological, organizational, and individual factors. This model scope is to examine and understand the factors that affect learners

use of corporate e-learning systems. The technological factors include Information Quality and System Quality. Organizational factors include organization support while individual factors include perceived ease of use, perceived usefulness, and user satisfaction. Moreover, it seeks to examine whether using corporate e-learning will influence job performance and over all benefits to the organization with no mediators or controlling variables. Thus, the output variables are job performance and net benefits.
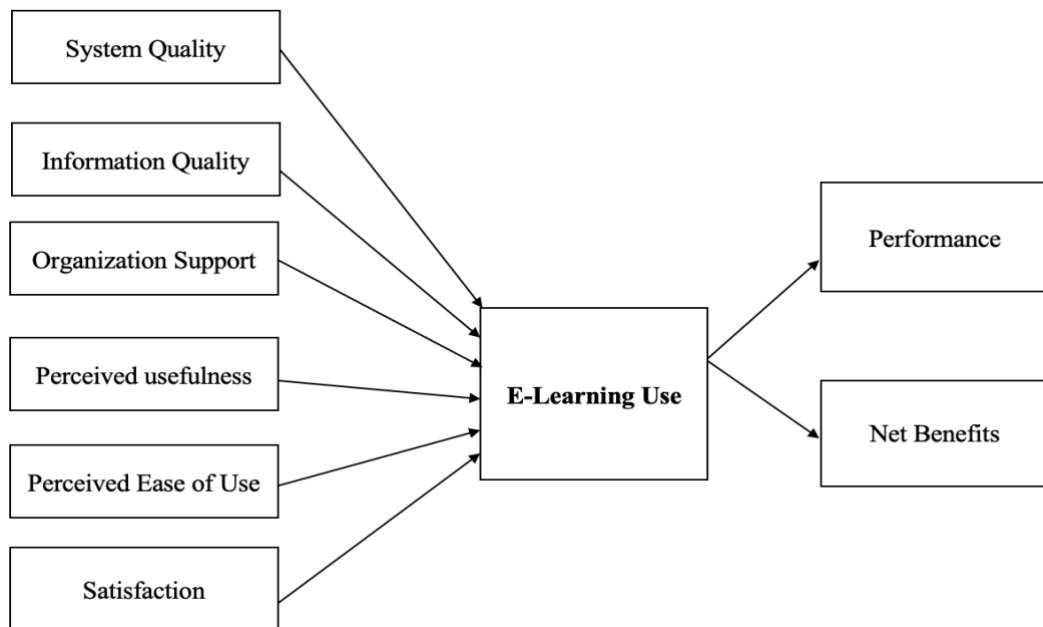
Figure 4 Meta-analysis Model

CHAPTER 4: METHODOLOGY

4.1.Meta Analysis

Meta-analysis became popular recently with significant impact on several scientific subjects, supporting evidence-based practice (Gurevitch et al., 2018). The goal of a meta-analysis is to provide a more comprehensive and precise estimate of the treatment effect than any single study can provide, by combining data from multiple studies, which can increase the sample size and statistical power. It also allows researchers to examine the consistency and variability of results across the selected studies, as well as identify potential sources of heterogeneity or differences in study design, population characteristics, or any other coding that may impact the outcomes. Moreover, it can also identify literature gaps and subjects for future research by identifying inconsistencies or limitations in the current evidence base.

Regarding corporate e-learning impact on job performance, there is a need to conduct a meta-analysis using constructs of D&M IS success model and Technology Acceptance Model (TAM) to estimate the overall effect size and assess a comprehensive effect of these systems on organizational performance. In this chapter I detail the search, selection, coding, and analysis of data used to conduct the meta-analysis.

4.2.Selecting Studies

The current review of studies was conducted using search for keywords related to corporate e-learning, satisfaction, and performance. Thus, keywords used in the search include "eLearning AND performance", "eLearning organization", "eLearning performance corporate", "eLearning employees", "online learning", "digital learning", "corporate eLearning", "corporate online learning", "corporate distance learning", "corporate online learning impact", "e learning and employee satisfaction", "knowledge management satisfaction". To increase the consistency and avoid bias,

search was done using different search databases. The online databases of Scopus, Science Direct, EBSCO, and ProQuest were searched for the identified terms. The studies selected were published between 2005 and 2022. The search resulted in 5,158 studies. In addition, studies were selected directly from journals such as Human Resource Development Quarterly, Behavior & Information Technology, Computers & Education, Australasian Journal of Educational Technology, Journal of Educational Computing Research, and International Journal of Emerging Technologies in Learning (iJET). This search resulted in 12 studies, which yield a total of 5,184 studies.

After studies search, several screenings were conducted to finalize the most relevant studies. First, studies were screened for relevance and eligibility based on title and abstract. Exclusion criteria included students as participants, which resulted in excluding 4,216 papers. Next, English only criteria filtered the remaining 968 studies to 329 studies were included in. Also, 244 duplicated studies were excluded. Lastly, 84 studies were individually screened for eligibility considering the followings; 1) at least two relationships related to D&M model or TAM are examined related to the selected outcomes of this study. 2) Empirical studies related to the mentioned theories. 3) Quantitative studies. 4) sufficient statistical data required to conduct meta-analysis. 5) sufficient sample size. Therefore, 25 studies were finalized as the relevant studies for this meta-analysis. The PRISMA flow diagram for studies selection process is illustrated in Figure 4 and the list of journals of the selected studies is shown in Table 3.

Database Search

5,158 Initial records were identified Through data base searching
- 2,326 Scopus
- 654 Science direct
- 679 EBSCO
- 1,498 ProQuest

12 Records were identified directly from journals publications

5,184 Were screened for relevance

4,216 Excluded that are not related to this study based on title and abstract

968 Were screened for language checking

639 Excluded that are not written in English

329 Were screened for duplicates

244 Excluded that were Duplicated

85 Were screened for eligibility

60 Excluded that were not having sufficient statistics

25 Articles met the inclusion criteria and were included in the review

Figure 5 PRISMA Flow Diagram

Table 3 Journals of Selected Studies in Meta-analysis

Journals	Count
Australasian Journal of Educational Technology	2
Computers & Education	2
International Journal of Emerging Technologies in Learning (Ijet)	1
Internet Research	1

32

Cont. Journals	Count
Human Factors and Ergonomics in Manufacturing & Service Industries	1
Cin: Computers, Informatics, Nursing	1
Australasian Journal of Construction Economics and Building	1
Behavior & Information Technology	1
Agronomy	1
Interdisciplinary Journal of Contemporary Research in Business	1
Computers In Human Behavior	1
Information Systems Journal	1
Contaduría Y Administración	1
Key Engineering Materials	1
Expert Systems with Applications	1
Journal Of Educational Technology & Society	1
Inf Syst E-Bus Manage	1
Information Development	1
International Journal Of E-Education, E-Business, E-Management And E-Learning	1
5th Global Conference on Business, Management and Entrepreneurship (GCBME 2020) 2021	1
International Journal of Entrepreneurship	1
Journal Of Asian Finance Economics and Business	1
Others	1
Grand Total	25

4.3. Coding of Included Studies

To ensure capturing the required characteristics and differences in all selected studies, McKenzie et al. emphasized on creating a summary of the features of each study being reviewed that would assist in analyzing and identify consistency and variability of the studies' characteristics (McKenzie et al., 2019) . This approach can also make it easier to combine and categorize the features of the studies. Thus, each study was coded

based on the following:

- Sample size: refers to participants number in each study.

- Theory: refers to the theories used in each study's model.

- Sector/Type of organization refers to sample size's organization type in each study.

- `Type of corporate e-learning refers to the software or application type used for online training.

All the studies included in this meta-analysis are displayed in Table 4 along with their features.

Referring to Table 4, it is shown that there are different types of sectors and organizations are using e-learning as part of their employees' development. Notably, all the organizations included in this analysis are utilizing different types of corporate e-learning as a tool to train and build their employees' capabilities. Also, Figure 5 presents the published year of the studies.

Table 4: List of studies included in meta-analysis

Author	Year	Sample Size	Industry Sector	Theory	Type of technology used
(Ahmed Alzaabi & Ghani, 2021)	2021	492	Governmental	-	Web-based
(Čevra et al., 2022)	2022	222	Organizations	TAM	Live distance learning
(Mohammadyari & Singh, 2015)	2015	34	Accountants in SMEs	digital literacy & Theory of Acceptance and Use of Technology (UTAUT)	Easy-to-use Web 2.0 tools
(Subrmaniam & Senthil Kumar, 2019)	2019	202	IT	D&M IS model	Virtual e-learning
(Chen & Kao, 2012)	2012	185	banks, governments, & high-tech manufacturers	the partial behavioral model of IS use and D&M IS model	Computer based

Author	Year	Sample Size	Industry Sector	Theory	Type of technology used
(Chang et al., 2011)	2011	208	medium- and large-scale hospitals	D&M IS model	Web-based
(Hassanzadeh et al., 2012)	2012	3,598	Education	D&M IS model	Internet-based
(Chen, 2010)	2010	193	Different Organizations	D&M IS model & respecified IS success model of Seddon	Web-based
(Marjanovic et al., 2015)	2015	279	Energy Companies	D&M IS model	Web-based
(C.-H. Lin et al., 2019)	2019	463	Network, Telecommunications, Electronic spare-parts, Banking, Insurance, Investment, Agricultural, Restaurant, tourism, Mechanical car and motorbike, Military, government, and teaching	D&M IS model & Expectation Confirmation Theory (ECT) & Theory of Communicative Action	Digital learning

Author	Year	Sample Size	Industry Sector	Theory	Type of technology used
(Cheng & Chen, 2015)	2015	137	Service Company	D&M IS model	Web-based vocational training
(Wolor et al., 2020)	2020	200	Motorcycle dealing company	-	Internet-based
(Weng et al., 2015)	2015	578	Corporations (telecommunication, banking, insurance)	TAM & Social support	Web-based
(Hsia et al., 2014)	2014	223	High-tech	TAM	Web-based
(Abrego Almazán et al., 2017)	2017	133	Service & commerce	D&M IS model	Multi-dimensional computer-based
(Mohammadi, 2015)	2015	390		D&M IS model & (TAM)	Integrated web based
(Calisir et al., 2014)	2014	546		TAM	Web-based
(Cheng, 2011)	2011	328	Financial Services	TAM	Digital learning

Author	Year	Sample Size	Industry Sector	Theory	Type of technology used
(Cheng, 2012)	2012	483	High-tech	TAM	Web-based
(Thurasamy et al., 2012)	2012	163	multinational companies	D&M IS model & (TAM) & Expectation Confirmation Model (ECM)	Web-based, online-based, and blackboard e-learning
(Bagram & Mohsin, 2009)	2009	150	private sector	-	Web-based
(Chuo et al., 2011)	2011	1071	Hospitals	TAM & Theory of Reasoned Action (TRA)	Web-based
(Sargent et al., 2012)	2012	147	construction company	Theory of Acceptance and Use of Technology (UTAUT)	Computer based & web based
(Purnomo & Lee, 2013)	2012	306	Banking sector	TAM	Learning Management System (LMS)
(Rulevy & Aprilianti, 2021)	2021	113	Consumer Goods	TAM	Digital learning
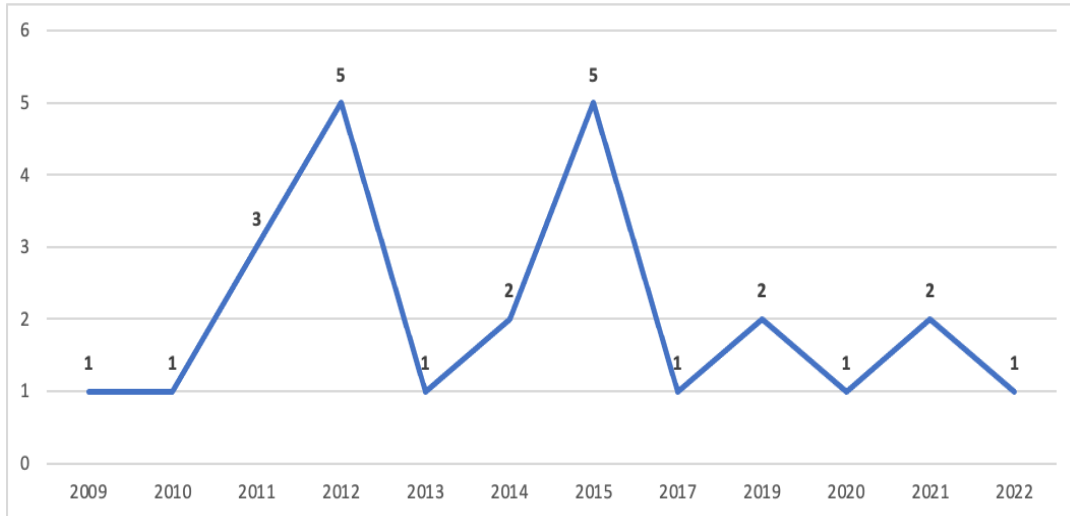
Figure 6: Trend of published journals over years

4.4. Meta-Analysis Procedure

Meta-analysis is used in this study to validate the relationship between using e-learning in organizations and its impact on individual performance and overall benefits to the organization in the context of D&M model and TAM. The effect size is required for meta-analysis, thus, the correlations or regression coefficients from the research articles included during the statistical review phase are utilized in the study. The studies included in this study have had correlation and regression coefficients together while some studies had regression coefficients with no data related to correlation between variables. According to Peterson and Brown (2005), to get the value of the correlation, the regression coefficient's effect size was converted to correlation $r = \beta + 0.05 \lambda$; where r means to the size effect, β is the regression coefficient, and is the indicator variable that equals 1 when β is positive and 0 when β is negative. Once r is

calculated, it means all data set is ready for meta-analysis.

The next step is using StataSe software to conduct the meta-analysis using r with no further manual calculation. Thus, it was decided to proceed with the second option. All data extracted from the studies are uploaded in StataSe to run the required analysis for each relationship, which means StataSe was used to analyze and examine eight hypotheses for this meta-analysis. In all calculations, the outputs are presented based on both random and fixed effect models. To validate the outcome of a meta-analysis model, it is required to conduct a heterogeneity test. Q and I^2 have been evaluated to ascertain the heterogeneity and verify the use of a random-effects statistical framework. In meta-analysis, the Q test is used for assessing variability in effect sizes. The I^2 assesses the level of actual heterogeneity, which means that the I^2 index can be described as the proportion of total effect size variability attributable to true heterogeneity.

CHAPTER 5: FINDINGS

The analysis was conducted on a total of 56 effect sizes from the correlations and path coefficients from the studies. The total sample size of the studies included in this meta-analysis is 10,844, which had a range between 34 and 3,598. The total number of the studied relationships is 56, which had a range between 4 and 12. The relationship between perceived usefulness and corporate e-learning use had the highest number of studies (k=12). On the other hand, the relationship between user satisfaction and corporate e-learning use that had the greatest number of collected sample size (n =5,728). Furthermore, the relationship between organization support and corporate e-learning use and the relationship between corporate e-learning use and net benefits

were the least studied (k=4). In addition, corporate e-learning use and net benefits had

the least number of collected sample size (n=865). For the heterogeneity test, referring

to the meta-analysis conducted by Yu, if I^2 is less than 50%, fixed-effect model should

be used to conduct the meta-analysis of the relationships (Yu, 2022). If not, random-

effect model will be conducted. Table 5 shows the findings of meta-analysis. First,

publication bias will be covered in the section below. Then, further results of each

relationship will be illustrated.

Table 5: Meta-analysis findings

H#	Total n	K	r	z-value	p-value	95% CI	Q	I
H1	1,610	6	0.515	5.25	0.00	0.323, 0.708	107.73	95.40%
H2	1,331	5	0.317	13.32	0.00	0.274, 0.36	515.25	99.20%
H3	981	4	0.302	9.92	0.00	0.243, 0.362	5.25	42.90%
H4	4,638	12	0.451	6.22	0.00	0.309, 0.593	361.18	97%
H5	3,327	8	0.37	6.36	0.00	0.256, 0.484	87.74	92%
H6	5,728	8	0.563	9.12	0.00	0.427, 0.698	192.38	96.40%
H7	2,044	9	0.505	8.64	0.00	0.391, 0.62	72.02	88.90%
H8	865	4	0.414	3.95	0.00	0.208, 0.619	35.45	91.50%

Total n= sample size, K=number of studies, r=effect size, CI= Confidence interval

5.1. Publication Bias

In scientific research, publication bias occurs when studies are only published if they have significant or positive results (van Aert et al., 2019). This can cause the perception of the effect size to be exaggerated and false positive results to be spread. In this meta-analysis, publication bias was tested on the correlation coefficient and standard error for each relationship using the software StataSe.

For the first relationship, which is system quality and corporate e-learning use, the H0: beta1 = 0; no small-study effects with p-value = 0.7460. It means it is not significant, therefore, there is no publication bias.
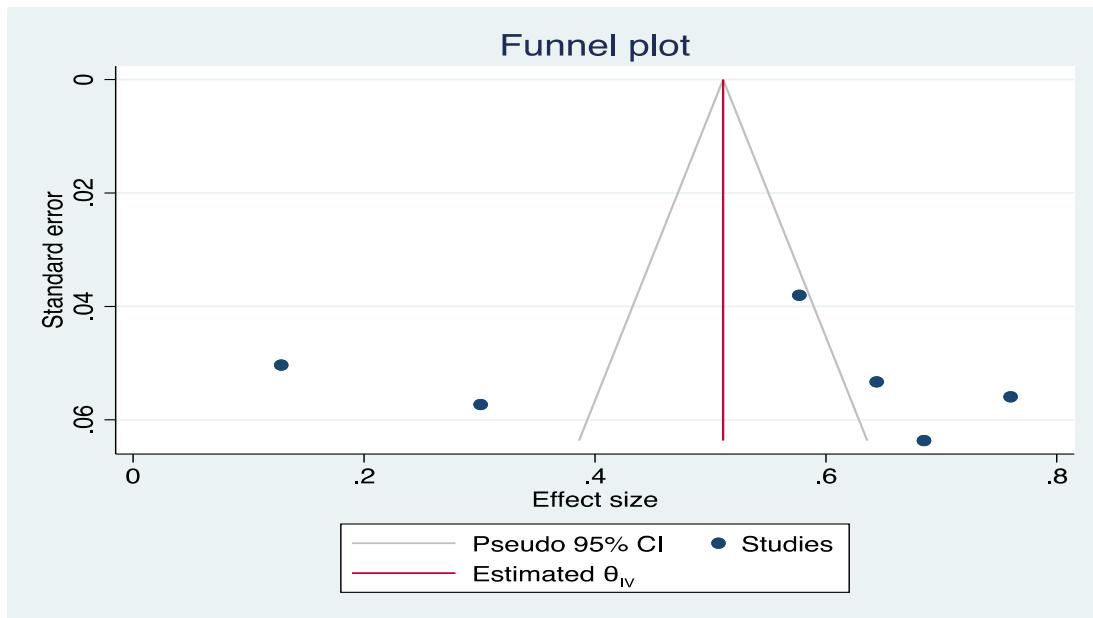
Figure 7: H1 Funnel plot of results of publication bias

Next, results of publication bias of information quality and corporate e-learning use, the H0: beta1 = 0; no small-study effects with p-value = 0.2722. It means it is not significant, therefore, there is no publication bias as shown in figure 8.
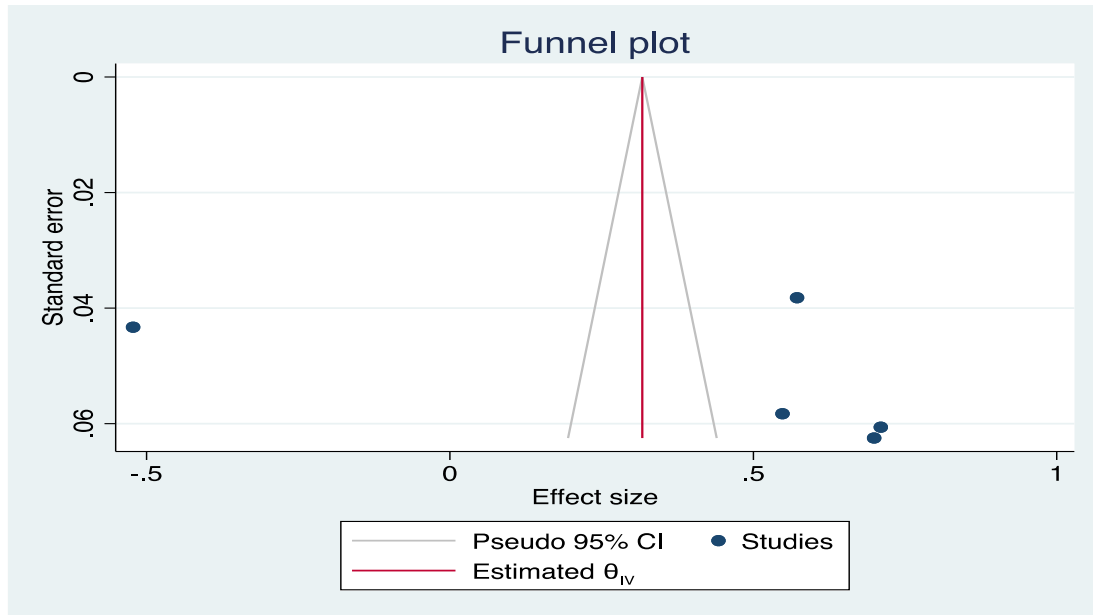
Figure 8: H2 Funnel plot of results of publication bias

Next, results of publication bias of organization support and e-learning use, the H0: beta1 = 0; no small-study effects with p-value = 0.0556. It means it is not significant, therefore, there is no publication bias as shown in figure 9.
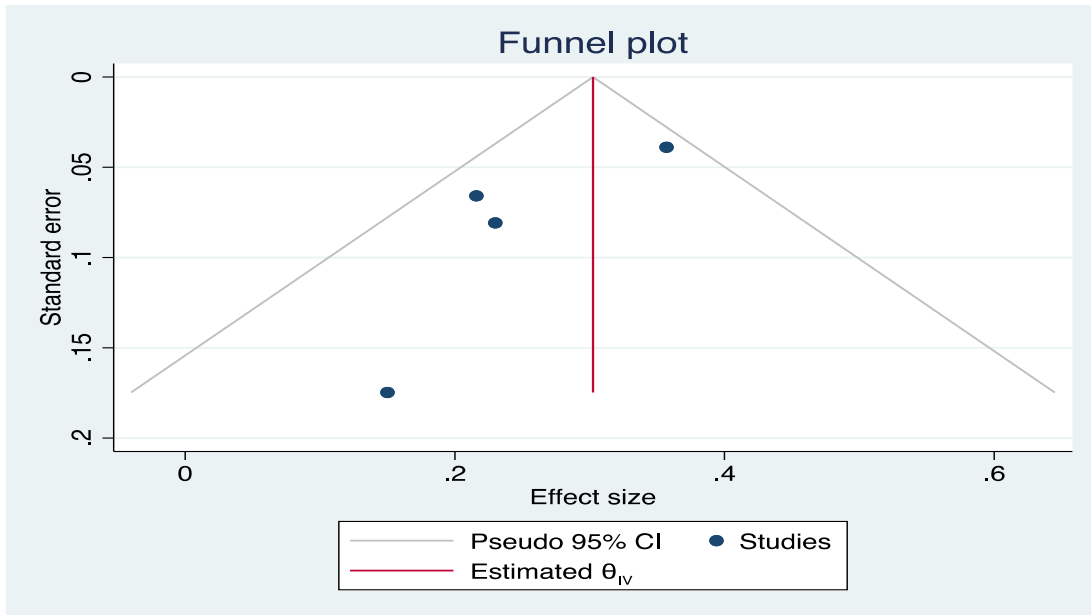
Figure 9: H3 Funnel plot of results of publication bias

The results of publication bias of perceived usefulness and e-learning use, the H0:

beta1 = 0; no small-study effects with p-value = 0.0554. It means it is not significant,

therefore, there is no publication bias as shown in figure 10.
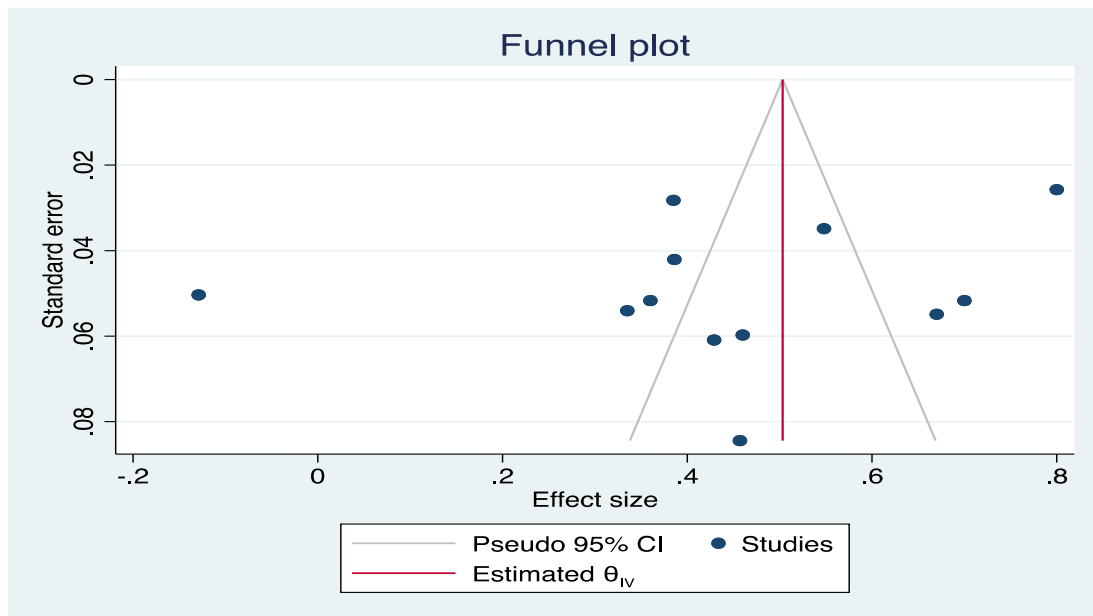
Figure 10: H4 Funnel plot of results of publication bias

The results of publication bias of perceived ease of use and e-learning use, the H0: beta1 = 0; no small-study effects with p-value = 0.021. It means it is significant, therefore, there is publication bias as shown in figure 11.
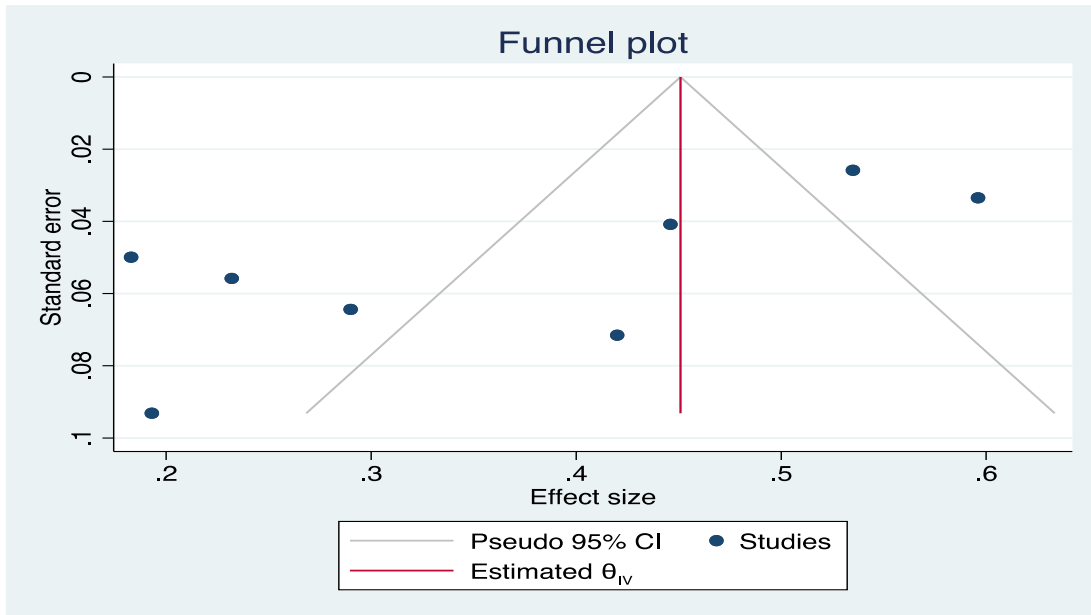
F*igure 11: H5 Funnel plot of results of publication bias*

The results of publication bias of user satisfaction and e-learning use, the H0: beta1 = 0; no small-study effects with p-value = 0.0064. It means it is significant, therefore, there is publication bias as shown in figure 12.
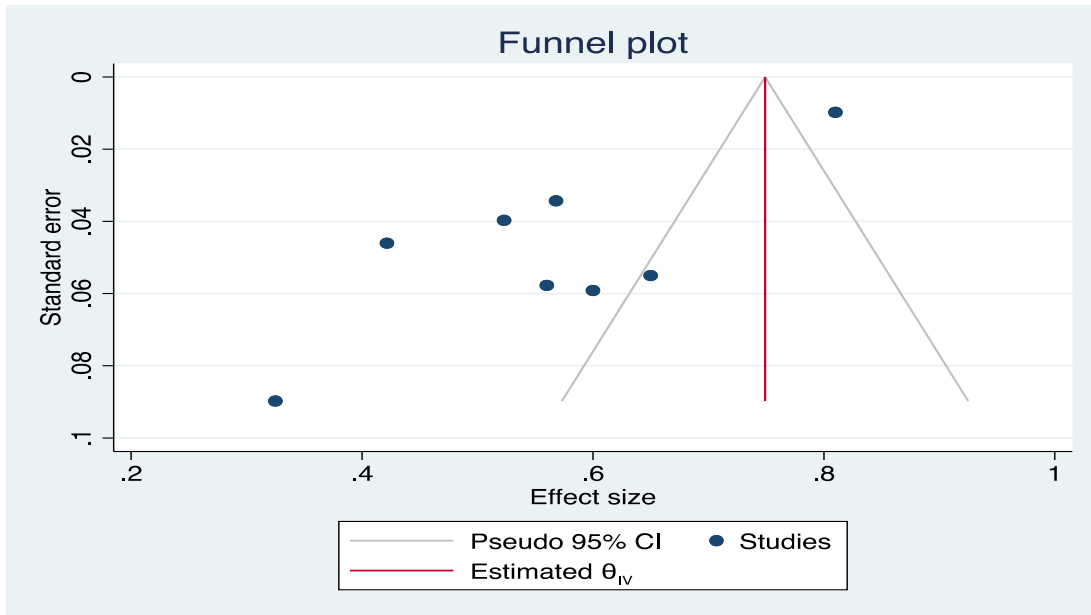
Figure 12: H6 Funnel plot of results of publication bias

The results of publication bias of e-learning use and job performance, the H0: beta1 = 0; no small-study effects with p-value = 0.882. It means it is not significant, therefore, there is no publication bias as shown in figure 13.
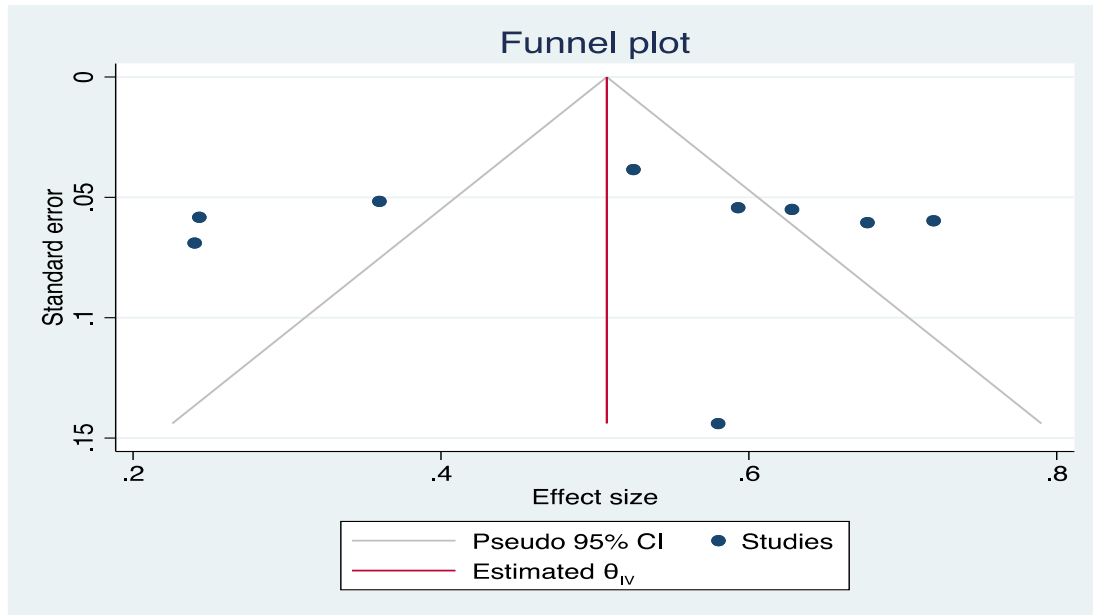
Figure 13: H7 Funnel plot of results of publication bias

The results of publication bias of e-learning use and net benefits, the H0: beta1 = 0; no

small-study effects with p-value = 0.7882. It means it is not significant, therefore, there

is no publication bias as shown in figure 14.
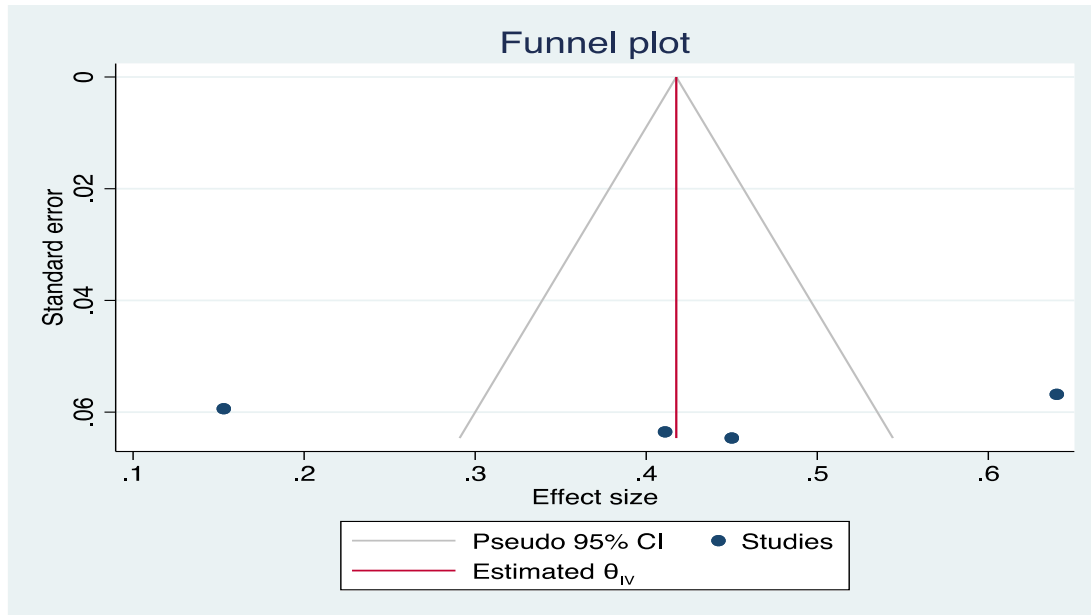
Figure 14: H8 Funnel plot of results of publication bias

5.2. System Quality and E-learning Use

Six effect sizes were used to examine the effect of system quality on e-learning use.

The random effect model was used as per the recommendation of Yu (2022) for the

heterogeneity test; Q=107.73, I2= 95.4% and P<0.001. The results of the random effect

model show that z= 5.249. The highest weight among the 6 studies is 17.09 %, which

refers to the study conducted by (C.-H. Lin et al., 2019). The lowest weight is 16.33%,

which references the study conducted by (Abrego Almazán et al., 2017). Overall r is

0.515. Therefore, it confirms the positive significance relationship between system quality and e-learning use. Figure 15 shows the plot of the effect of system quality on e-learning use.

Study	Effect (95% CI)	% Weight		Sample size
Chang & Liu & Hwang (2011)	0.64 (0.54, 0.75)	16.68	0.053	208
Marjanovic & Delic & Lalic (2015)	0.30 (0.19, 0.41)	16.55	0.057	279
Lin & Wang & Liu Pan (2019)	0.58 (0.50, 0.65)	17.09	0.038	463
Cheng & Chen (2015)	0.76 (0.65, 0.87)	16.59	0.056	137
Abrego & Sánchez & Medina (2017)	0.69 (0.56, 0.81)	16.33	0.064	133
Mohammadi (2015)	0.13 (0.03, 0.23)	16.76	0.050	390
Overall, DL (I^2 = 95.4%, p = 0.000)	0.52 (0.32, 0.71)	100.00	0.098	

0.00 0.25 0.50 0.75 1.00
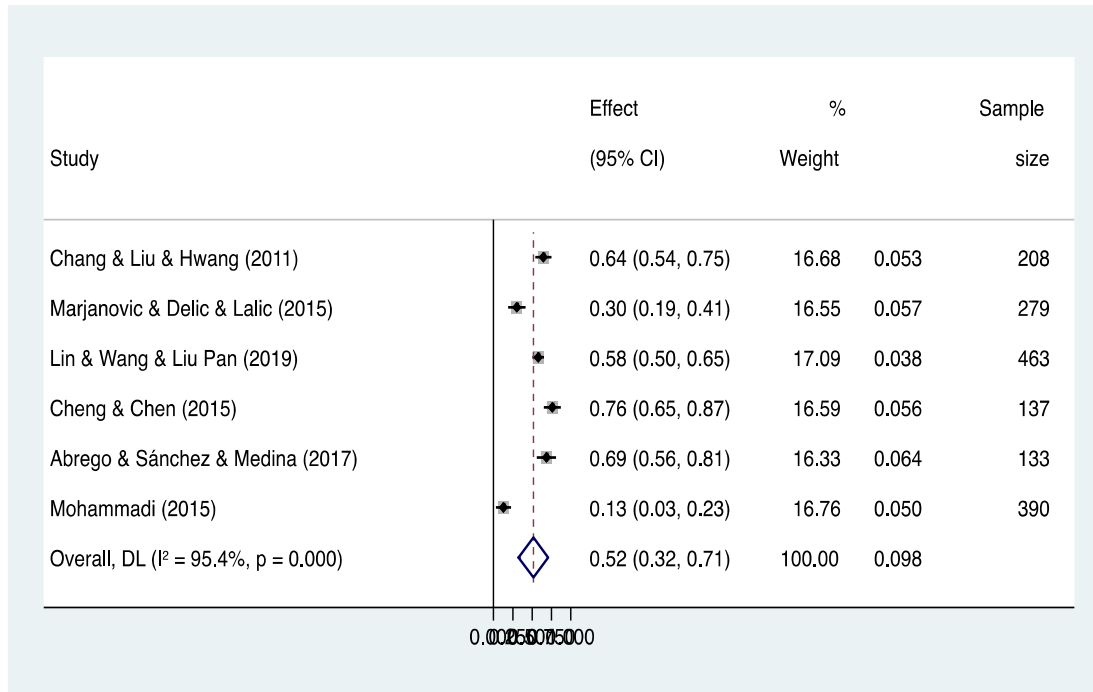
Figure 15: A forest plot of the relationship between system quality and e-learning use

5.3. Information Quality and E-learning Use

Five effect sizes were found to examine the impact of information quality on e-learning. The random effect model was used based on the results of the heterogeneity test; Q=515.25, I^2= 99.2% and P<0.001. The results of the random effect show that z= 1.558. However, the p-value is greater than .05 (0.119). When running the fixed effect

model, the p-value came out as P<0.001 with a z-value of 14.323. With the fixed-effect model, the highest weight among the 5 studies is 33.56 %, which refers to the study conducted by (C.-H. Lin et al., 2019). The lowest weight of 12.55 %, refers to the study conducted by (Abrego Almazán et al., 2017). Overall r is 0.317 and P<0.001. Therefore, it confirms the positive significance relationship between information quality and e-learning use. Figure 16 shows the plot of the effect of information quality on e-learning use.
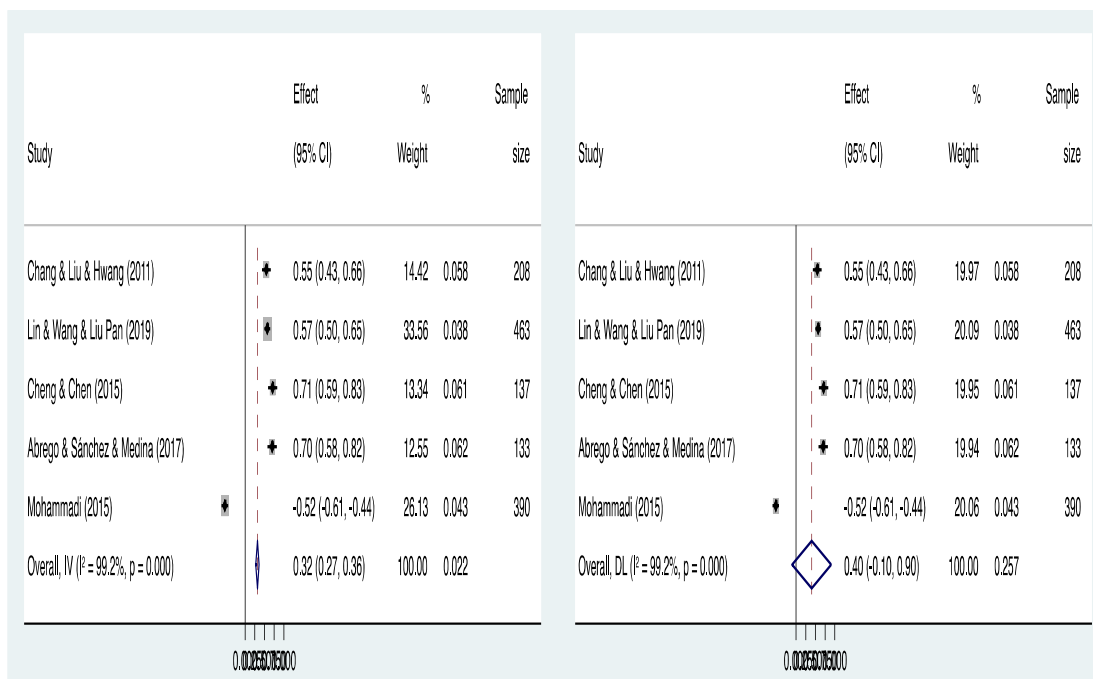
Figure 16 A forest plot of relationship between information quality and on e-learning use

5.4. Organization Support and E-learning Use

Four effect sizes were found to examine the impact of organization support on e-learning. Fixed effect model was used based on the results of the heterogeneity test; $Q= 5.25$, $I^2= 42.9\%$ - which is less than 50% - and $P<0.001$. The results of fixed effect model show that z-value is 9.924. The highest weight among the 4 studies is 43.15 %, which refers to the study conducted by (Weng et al., 2015). The lowest weight is 6.63 %, which is referred to the study conducted by (Mohammadyari & Singh, 2015). Overall r is 0.302 and $P<0.001$. Therefore, it confirms the positive significance relationship between organization support and e-learning use. Figure 17 shows the plot of the effect of organization support on e-learning use.

Study	Effect (95% CI)	% Weight		Sample size
Cevra (2022)	0.22 (0.09, 0.35)	21.43	0.066	222
Singh (2015)	0.15 (-0.19, 0.49)	3.04	0.175	34
Weng & Tsai & Weng (2015)	0.36 (0.28, 0.43)	61.31	0.039	578
Sargent & Hyland (2012)	0.23 (0.07, 0.39)	14.22	0.081	147
Overall, IV (I^2 = 42.9%, p = 0.154)	0.30 (0.24, 0.36)	100.00	0.030	

0.00 0.25 0.50 0.75 1.000
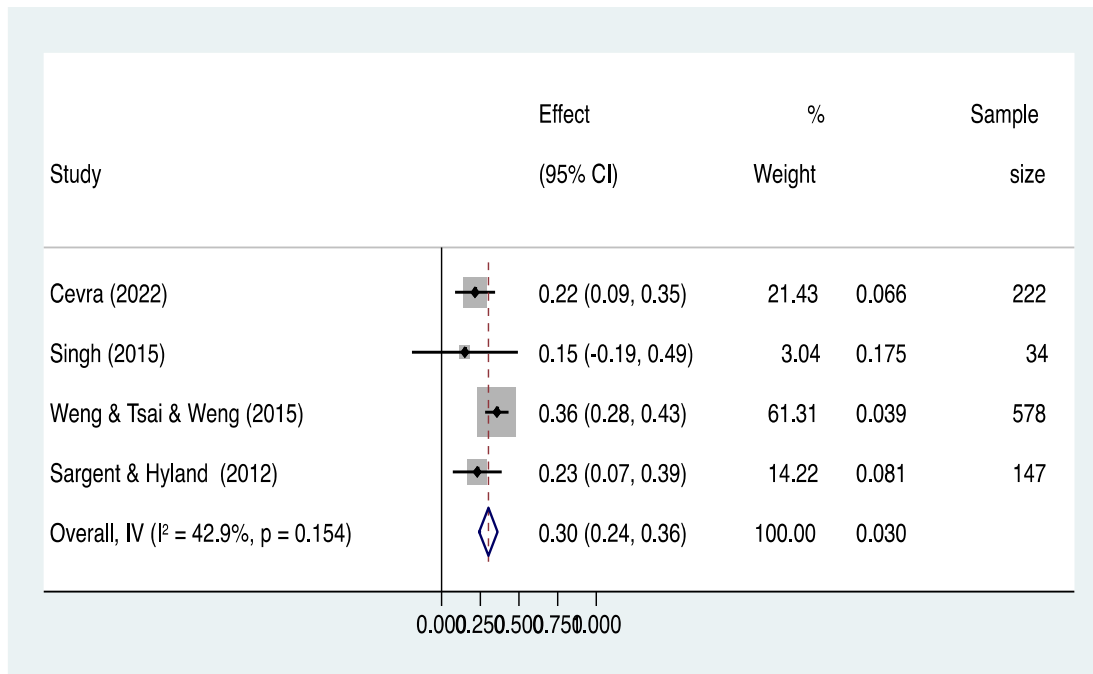
Figure 17 A forest plot of relationship between organization support and on e-learning use

5.5. Perceived Usefulness and E-learning Use

Twelve effect sizes were found to examine the impact of perceived usefulness on e-learning. The random effect model was used based on the results of heterogeneity test; Q= 361.18, I^2= 97% - which is greater than 50% - and P<0.001. The results of random effect model show that z= 6.224. The weight among the twelve studies is 8.61 %, which refers to the study conducted by (Calisir et al., 2014) while the lowest weight is 7.78 %, which refers to the study conducted by (Rulevy & Aprilianti, 2021). Overall r is 0.451 and P<0.001. Therefore, it confirms the positive significance relationship between perceived usefulness and e-learning use. Figure 18 shows the plot of the effect of perceived usefulness on e-learning use.

Study	Effect (95% CI)	% Weight		Sample size
Cevra (2022)	0.43 (0.31, 0.55)	8.20	0.061	222
Chen & Kao (2012)	0.67 (0.56, 0.78)	8.29	0.055	185
Chen (2010)	0.70 (0.60, 0.80)	8.33	0.052	193
Weng & Tsai & Weng (2015)	0.55 (0.48, 0.62)	8.53	0.035	578
Hsia & Change & Tseng (2014)	0.46 (0.34, 0.58)	8.22	0.060	223
Mohammadi (2015)	-0.13 (-0.23, -0.03)	8.35	0.050	390
Calisir & Gumussoy & Bayraktaroglu (2014)	0.80 (0.75, 0.85)	8.61	0.026	546
Cheng (2011)	0.36 (0.26, 0.46)	8.33	0.052	328
Cheng (2012)	0.39 (0.30, 0.47)	8.46	0.042	483
Chuo & Tsai & Lan (2011)	0.38 (0.33, 0.44)	8.59	0.028	1071
Purnomo & Lee (2012)	0.34 (0.23, 0.44)	8.30	0.054	306
Rulevy & Aprilianti (2021)	0.46 (0.29, 0.62)	7.78	0.084	113
Overall, DL (I² = 97.0%, p = 0.000)	0.45 (0.31, 0.59)	100.00	0.072	

Figure 18 A forest plot of the relationship between perceived usefulness impact on e-learning use

5.6. Perceived Ease of Use Impact on E-learning Use

Eight effect sizes were found to examine the impact of perceived usefulness on e-learning. The random effect model was used based on the results of the heterogeneity test; Q= 87.74, I²= 92% - which is more than 50% - and P<0.001. The results of random effect model show that z= 6.361. The highest weight among the eight studies is 13.77 %, which refers to the study conducted by (Chuo et al., 2011). The

lowest weightage is 10.39 %, which refers to the study conducted by (Rulevy & Aprilianti, 2021). Overall r is 0.451 and P<0.001. Therefore, it confirms the positive significance relationship between perceived ease of use and e-learning use. Figure 19 shows the plot of the effect of perceived ease of use on e-learning use.

Study		Effect (95% CI)	% Weight		
Weng & Tsai & Weng (2015)		0.60 (0.53, 0.66)	13.53	0.033	578
Hsia & Change & Tseng (2014)		0.29 (0.16, 0.42)	12.07	0.064	223
Mohammadi (2015)		0.18 (0.09, 0.28)	12.82	0.050	390
Cheng (2012)		0.45 (0.37, 0.53)	13.24	0.041	483
Thurasamy & Hazlina & Tan say (2012)		0.42 (0.28, 0.56)	11.66	0.072	163
Chuo & Tsai & Lan (2011)		0.54 (0.48, 0.59)	13.77	0.026	1071
Purnomo & Lee (2012)		0.23 (0.12, 0.34)	12.53	0.056	306
Rulevy & Aprilianti (2021)		0.19 (0.01, 0.38)	10.39	0.093	113
Overall, DL (I^2 = 92.0%, p = 0.000)		0.37 (0.26, 0.48)	100.00	0.058	

0.0000 250 500 750 000

Figure 19 A forest plot of relationship between perceived ease of use impact on e-learning use

5.7. User Satisfaction Impact on E-learning Use

Eight effect sizes were found to examine the impact of perceived usefulness on e-learning. The random effect model was used based on the results of the heterogeneity test; Q= 192.38, I^2= 96.4% - which is greater than 50% - and P<0.001.

The results of random effect model show that z= 8.124. The weight among the eight studies is 13.42 %, which refers to the study conducted by (Hassanzadeh et al., 2012). The lowest weight is 10.98 %, which refers to the study conducted by (Rulevy & Aprilianti, 2021). Overall r is 0.563 and P<0.001. Therefore, it confirms the positive significance relationship between user satisfaction of use and e-learning use. Figure 20 shows the plot of the effect of user satisfaction on e-learning use.

Study		Effect (95% CI)	% Weight		Sample size
Chen & Kao (2012)		0.60 (0.48, 0.72)	12.26	0.059	185
Chang & Liu & Hwang (2011)		0.56 (0.45, 0.67)	12.31	0.058	208
Hassanzadeh & Kanaani & Elahi (2012)		0.81 (0.79, 0.83)	13.42	0.010	3598
Chen (2010)		0.65 (0.54, 0.76)	12.41	0.055	193
Lin & Wang & Liu Pan (2019)		0.52 (0.45, 0.60)	12.89	0.040	463
Weng & Tsai & Weng (2015)		0.57 (0.50, 0.64)	13.03	0.034	578
Mohammadi (2015)		0.42 (0.33, 0.51)	12.70	0.046	390
Rulevy & Aprilianti (2021)		0.32 (0.15, 0.50)	10.98	0.090	113
Overall, DL (I^2 = 96.4%, p = 0.000)		0.56 (0.43, 0.70)	100.00	0.069	

0.00 0.25 0.50 0.75 1.00

Figure 20 A forest plot of user satisfaction impact on e-learning use

5.8. E-learning Use and Job Performance

Nine effect sizes were found to examine the impact of perceived usefulness on e-learning. The random effect model was used based on the results of the

heterogeneity test; Q= 72.02, I²= 88.90 % - which is greater than 50% - and P<0.001. The results of the random effect model show that z= 8.647. The highest weight among the 9 studies is 12.3 %, which refers to the study conducted by (Ahmed Alzaabi & Ghani, 2021). The lowest weight is 10.98 %, which refers to the study conducted by (Mohammadyari & Singh, 2015). Overall r is 0.505 and P<0.001. Therefore, it confirms the positive significance relationship between e-learning use of use and job performance. Figure 21 shows the plot of the effect of e-learning use on job performance.

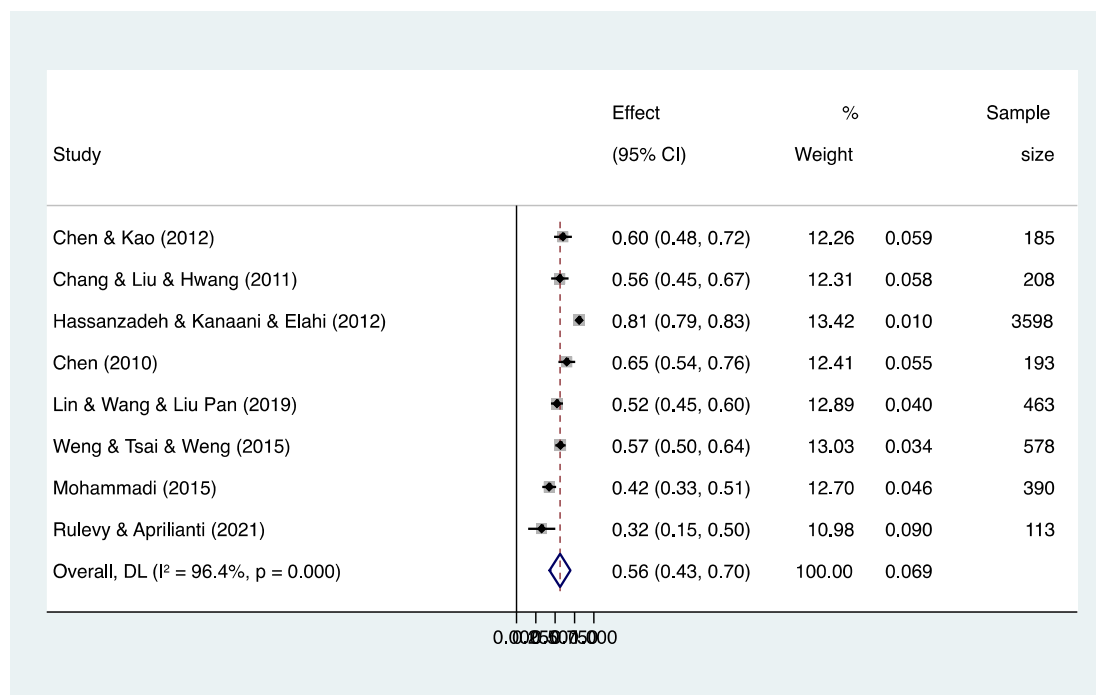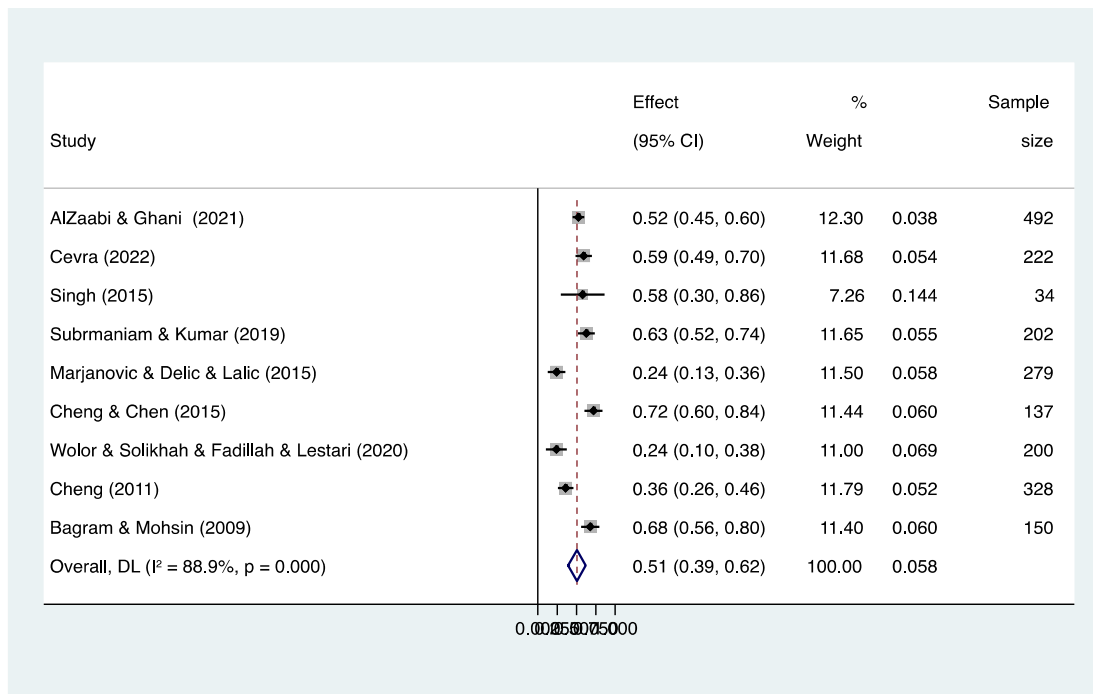| Study		Effect (95% CI)	% Weight		Sample size
AlZaabi & Ghani (2021)		0.52 (0.45, 0.60)	12.30	0.038	492
Cevra (2022)		0.59 (0.49, 0.70)	11.68	0.054	222
Singh (2015)		0.58 (0.30, 0.86)	7.26	0.144	34
Subrmaniam & Kumar (2019)		0.63 (0.52, 0.74)	11.65	0.055	202
Marjanovic & Delic & Lalic (2015)		0.24 (0.13, 0.36)	11.50	0.058	279
Cheng & Chen (2015)		0.72 (0.60, 0.84)	11.44	0.060	137
Wolor & Solikhah & Fadillah & Lestari (2020)		0.24 (0.10, 0.38)	11.00	0.069	200
Cheng (2011)		0.36 (0.26, 0.46)	11.79	0.052	328
Bagram & Mohsin (2009)		0.68 (0.56, 0.80)	11.40	0.060	150
Overall, DL (I² = 88.9%, p = 0.000)		0.51 (0.39, 0.62)	100.00	0.058	

0.00 0.25 0.50 0.75 1.00

Figure 21 Relationship between e-learning use and performance

5.9. E-learning Use and Net Benefits

Four effect sizes were found to examine the impact of perceived usefulness on e-learning. The random   effect model was used based on the results of the heterogeneity test; Q= 35.45, I^2= 91.5 % - which is greater than 50% - and P<0.001. The results of the random effect model show that z= 3.949. The highest weight among the 4 studies is 25.29 %, which refers to the study conducted by (Ahmed Alzaabi & Ghani, 2021; Chen & Kao, 2012). The lowest weight is 24.75 %, which refers to the study conducted by (Chen, 2010) . Overall r is 0.414 and P<0.001. Therefore, it confirms the positive significance relationship between e-learning use of use and net benefits of the organization. Figure 22 shows the plot of the effect of on e-learning use on organization's net benefit.

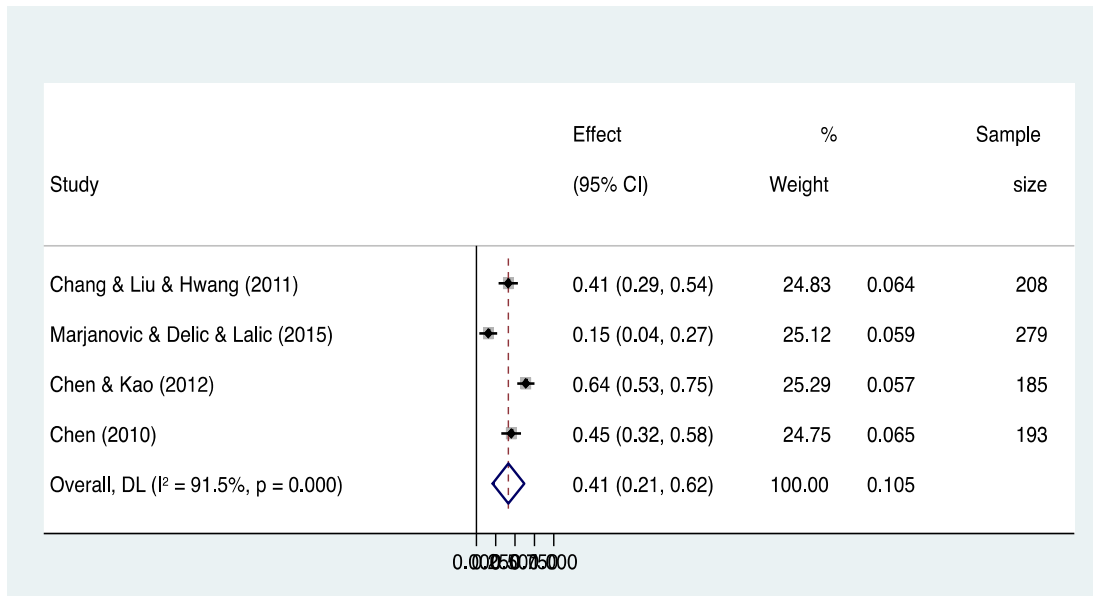| Study	Effect (95% CI)	% Weight		Sample size
Chang & Liu & Hwang (2011)	0.41 (0.29, 0.54)	24.83	0.064	208
Marjanovic & Delic & Lalic (2015)	0.15 (0.04, 0.27)	25.12	0.059	279
Chen & Kao (2012)	0.64 (0.53, 0.75)	25.29	0.057	185
Chen (2010)	0.45 (0.32, 0.58)	24.75	0.065	193
Overall, DL (I^2 = 91.5%, p = 0.000)	0.41 (0.21, 0.62)	100.00	0.105	

0.00 0.25 0.50 0.75 1.00

Figure 22 Relationship between e-learning use and net benefits

Table 6 shows the summary of all hypotheses tested in this meta-analysis. All the eight hypotheses were supported, which means all antecedents of e-learning use and consequences show a positive significant impact on it.

Table 6: List of hypothesis result

H#	Hypothesis	Result
H1	System quality has significant & positive impact on E-Learning use	Supported
H2	Information quality has significant & positive impact on E-Learning use	Supported
H3	Organization support has significant & positive impact on E-Learning use	Supported
H4	Perceived usefulness has significant & positive impact on E-Learning use	Supported
H5	Perceived ease of use has significant & positive impact on E-Learning use	Supported
H6	Satisfaction has significant & positive impact on E-Learning use	Supported
H7	E-Learning use has significant & positive impact on Job Performance	Supported
H8	E-Learning use has significant & positive impact on net benefits	Supported

CHAPTER 6: DISCUSSION AND CONCLUSION

6.1. Discussion

This meta-analysis was conducted integrating both D&M model & TAM to validate the factors affecting e-learning use. The result of meta-analysis supports the quantitative analysis conducted on the studies in the context of e-learning use. The significant impact of technological, organizational, and individual factors on e-learning use was supported even though some factors were showing no significance impact in some of the studies included in our meta-analysis, which was be highlighted in the coming section. Likewise, e-learning use effect on job performance and net benefits is well supported.

Technological factors that support e-learning use include system quality and information quality. Both have positive significant impact on e-learning use. Notably, system quality has a higher impact on e-learning use, compared to information quality. The results of system quality are consistent with results of studies conducted by (Abrego Almazán et al., 2017; Chang et al., 2011; Cheng & Chen, 2015; C.-H. Lin et al., 2019; Marjanovic et al., 2015; Mohammadi, 2015). This can be justified by having well-structured system and attractive interface while maintaining its security.

Also, information quality has positive significant relationship with e-learning use, which is supporting H2 and consistent with results of studies conducted by (Abrego Almazán et al., 2017; Chang et al., 2011; C.-H. Lin et al., 2019; Mohammadi, 2015). However, it contradicted the study conducted by Cheng & Chen as they concluded that information quality has no significant impact on e-learning use (Cheng & Chen, 2015). It can be explained that the level of information and e-learning curriculum may have

no impact on employees to participate in e-learning as information and content are common across the users (Cheng & Chen, 2015).

Since technological factors overall plays a critical role in using e-learning by employees, organizations should invest in having the updated educational content while maintaining simple system with no complexity that could affect the employees' willingness to use it regularly.

Organization factors and support also had a positive significant impact on e-learning use, which supports H3. The result of our meta-analysis is consistent with results of studies by (Čevra et al., 2022; Sargent et al., 2012). However, it is contradicting what was concluded in both studies of (Mohammadyari & Singh, 2015; Weng et al., 2015). Their results can be justified by the difference in context between corporate-level technologies and individual-level electronic services. The study conducted by Mohammadyari & Singh haven't examined the e-learning use with corporate-level outcomes (Mohammadyari & Singh, 2015). Also, according to their study, despite the fact that support from managers does not have a significant direct effect on learners' behavioral intention to adopt e-learning, it remains an essential predictor of current e-learning outcomes (Weng et al., 2015).

Further, individual factors including perceived usefulness, perceived ease of use, and user satisfaction, has positive significant influence on e-learning use. Although the relationship between perceived usefulness and e-learning use was the highest relationship studied (k=12), we found that user satisfaction has the highest effect on e-learning use (r=0.563).

The perceived usefulness's positive impact on e-learning use supports H4 and is

consistent with findings of the studies by (Calisir et al., 2014; Čevra et al., 2022; Chen, 2010; Chen & Kao, 2012; Cheng, 2011, 2012; Chuo et al., 2011; Hsia et al., 2014; Mohammadi, 2015; Purnomo & Lee, 2013; Rulevy & Aprilianti, 2021; Weng et al., 2015).

Moreover, perceived ease of use has positive significant relationship with e-learning use, which is supporting H5 and consistent with results of studies conducted by (Cheng, 2012; Chuo et al., 2011; Hsia et al., 2014; Mohammadi, 2015; Rulevy & Aprilianti, 2021; Thurasamy et al., 2012; Weng et al., 2015). However, the finding is not aligned with the results of the study conducted by Purnomo & Lee as it concluded that perceived ease of use has no significant influence on e-learning use (Purnomo & Lee, 2013). Also, it has been hypothesized that as participants become familiar with a completely new e-learning infrastructure, perceived ease of use diminishes because effectiveness dampen the effect of ease of use (Purnomo & Lee, 2013).

Furthermore, user satisfaction has positive significant relationship with e-learning use, which is supporting H6 and consistent with results of studies conducted by (Chang et al., 2011; Chen, 2010; Chen & Kao, 2012; Hassanzadeh et al., 2012; C.-H. Lin et al., 2019; Mohammadi, 2015; Rulevy & Aprilianti, 2021; Weng et al., 2015)

Referring to the relationship between e-learning use and its outcomes, both relationships are positively significant with job performance and overall net benefits. Hence, e-learning use has a positive significant relationship with job performance, which supports H7 in our meta-analysis. It is also aligned with the studies conducted by (Ahmed Alzaabi & Ghani, 2021; Bagram & Mohsin, 2009; Čevra et al., 2022; Chen, 2010; Cheng, 2011; Marjanovic et al., 2015; Subrmaniam & Senthil Kumar, 2019;

Wolor et al., 2020).

Additionally, e-learning use has positive significant relationship with overall net benefits, which supports H8. It is also consistent with the result of the studies by (Chang et al., 2011; Chen, 2010; Chen & Kao, 2012). However, it is not aligned with the result of the study conducted by (Marjanovic et al., 2015). This can be justified by the data collection method, which might be biased and other methods such as direct observation should be considered with emphasis on the importance of collecting objectively assessed factors affecting IS success in order to better comprehend the relationships and assessment factors (Marjanovic et al., 2015).

6.2. Theoretical & Practical Implication

The meta-analysis outcomes incorporate the D&M IS model and TAM theories to inform interested researchers, organizations, and decision makers on the benefits and gains of adopting e-learning as part of their personnel's developments plan to improve their skills and performance while enhancing overall benefits. The theoretical significance of e-learning use is essential from various viewpoints as it validates the factors affecting users' adoption of e-learning.

First, since all variables of technological factors had significant impact on e-learning use, organizations and decision makers should focus on improving these factors. As information and system quality contribute to e-learning use (Weng et al., 2015), organizations should choose the convenient and reliable system with well-structured and user-friendly interface and have appropriate asynchronous and synchronous e-learning that attends to employees' needs (Perveen, 2016). A task force should be

formed with representation from the learning & development team and Information Technology department to ensure adopting the most convenient e-learning platform (Marjanovic et al., 2015). Also, it is recommended that reliable materials are included that are precise, up-to-date, comprehensive, and helpful to the user.

Also, to adopt new technological infrastructure, leaders and upper management must understand the importance of organizational support and its effect on personnel's behavior (Sargent et al., 2012). Since organization support contributes to e-learning use, it is recommended for organizations to have a clear vision of e-learning objectives on the long run. To ensure e-learning utilization, it is recommended to include it as part of its strategy. It is important to identify e-learning as a major learning tool to maintain job performance and productivity and overall benefits to the company (Čevra et al., 2022). Moreover, decision makers might include online courses as part of employees' goals that should be evaluated at end of year as part of their development goals for the year (Liu, 2007).

Furthermore, individual factors are significantly influencing e-learning use. Since perceived usefulness, perceived ease of use, and user satisfaction contribute to e-learning use (Mohammadi, 2015), it is recommended that organizations raise awareness among the employees regarding the online learning's effectiveness, convenience, timesaving, and its advantages towards job performance and overall organization's net benefit. When users find e-learning course materials to be diversified, frequently updated, and focused on learners, and when they perceive the virtual instructional design to be level-appropriate, adaptable, and customizable, they are likely to consider e-learning system to be more beneficial and less difficult to use

(Almaiah & Alyoussef, 2019). Also, referring to the literature review, user satisfaction is influenced by perceived usefulness and perceived ease of use (Chen, 2010; Chen & Kao, 2012; Mohammadi, 2015; Weng et al., 2015) . Thus, user satisfaction has the highest effect size in this meta-analysis. This gives an indication to organizations to take an action and assess the employee's satisfaction on the training tools to get feedback and understand the areas required improvements (Cooper, 2016).

6.3. Conclusion

The aim of this meta-analysis is to validate the factors affecting e-learning use and the impact of the latter on performance and net benefits in the context of D&M IS model, TAM, TOE, and absorptive capacity theory. After conducting the literature review, it showed that the most common theories used were D&M IS model and TAM only. Twenty-five studies were included in this meta-analysis. The coding extracted the details of each study such as sample size, sector type, grounded theory, type of e-learning used, correlation coefficient, path coefficient, and relationships in the context of D&M IS model and TAM. As a result, all relationships included in this meta-analysis were supported. The relationship between user satisfaction and e-learning use had the greatest number of collected sample size (n =5,728) and highest correlation coefficient (r= 0.563). This implies that organizations shall have strategies that focus on staff's satisfaction to motivate them to use e-learning. The least relationships studied were the relationship between organization support and e-learning use and e-learning use and net benefits (k=4), while organization support and e-learning had the lowest correlation coefficient (r=0.307). This implies the fact that some organizations

use e-learning as a compulsory tool for their capability building. It can be concluded that system quality, information quality, organization support, perceived usefulness, perceived ease of use, and user satisfaction are positively impacting e-learning use. Also, e-learning use contributes positively on job performance and net benefits overall.

6.4. Limitations & Future Recommendations

This meta-analysis was conducted in the context of e-learning use, considering D&M IS model and TAM. There are few limitations. Having large number of studies included in the meta-analysis will give more comprehensive results and a stronger validation of the relationships examined. However, the meta-analysis is conducted on empirical studies only, which led to excluding various good articles due to lack of sufficient statistics. Also, most of the articles found during the searching phase are related to students' use of e-learning, which was not within the scope of this meta-analysis as we only included articles related to corporate e-learning.

Another limitation is related to publication bias, which is related to perceived ease of use and satisfaction impact on e-learning adoption and use. It incurred due the limited number of published articles related to e-learning use antecedents and outcomes that might indicate different findings. Another justification might be related to the methodology of the selected published studies as there should be registered usage rate and feedback forms to have efficient empirical information.

Since absorptive capacity theory was highlighted in the section of theoretical foundation in our study, the selected studies for meta-analysis didn't include it as their grounded theory. Therefore, future research may elaborate and validate this theory in context of corporate e-learning. Additionally, the framework used in this meta-analysis

focused on e-learning antecedents and outcomes only. Future research should include

moderators and mediators such as field, age group, level of personnel experience in

future meta-analysis.

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