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Investigating the adoption of digital Library by postgraduate students in Jordan: An Enhanced of UTAUT Model

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A B S T R A C T

The current study aims to determine the factors influencing the intention to employ digital libraries among postgraduate students in Jordanian universities. The data were gathered through questionnaires in the format of Google Forms. The questionnaires were distributed to postgraduate students enrolled in Jordanian universities with digital libraries, who were recruited via purposive sampling. A total of 261 responses were received, with 67 deemed unsuitable for the study analysis and subsequently excluded. Resultantly, 194 valid questionnaires were finalized for data analysis. The SMART-partial least squares (PLS) software was utilized to conduct structural equation modelling (SEM) to test the study hypotheses. This study discovered that the variables, namely performance expectancy, effort, and facilitating conditions expectancy, were significantly and positively associated with the outcome variable, which is the intention to employ digital libraries. Meanwhile, social influence was revealed to be insignificant. Performance expectancy also significantly mediated the correlations between technological readiness and the intention to utilize and between online self-efficacy and the intention to utilize. The present study focused only on potential users among postgraduate students at Jordanian universities with digital libraries. The findings contributed valuable insights into the academic sector, especially library management to enhance the rate of digital library or e-library adoption at Jordanian universities. Digital library managers and policymakers could leverage the findings to design pertinent strategies that increase user engagement within digital library environments. The UTAUT model was demonstrated to be capable of predicting users' intentions of employing digital libraries and corroborated the mediation role of performance expectancy on the associations between technological readiness and the intention to utilize and between online self-efficacy and the intention to use.

1. Introduction

Daily operations, including commerce and data sharing, have been transformed by the rapid advancement of information and communication technology (ICT; Afthanorhan et al., 2020). Libraries have also embraced the transformation by transitioning to digital formats and offering digital services, such as electronic books or e-books and electronic magazines (Zhou, 2022). The transformation enables libraries to provide extensive databases and information compared to the physical limitations of traditional libraries (Halder, 2021). Hence, library digitisation becomes imperative due to the significant

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enhancement in information services for beneficiaries (Awamleh & Hamad, 2022). Specifically, digital libraries (DLs) emphasise digital collections, which facilitate unrestricted access both within and outside the library premises and underscore the importance of interlibrary networks (Said & Apriliyanti, 2022). Various DLs in Jordan are crucial in providing accessible full-text resources online (Abu Sirhan et al., 2019). The DLs also represent curated collections of digital artefacts by adhering to the principles of library acquisition while promoting enhanced information storage, retrieval, and dissemination similar to conventional libraries (Pourjahanshahi et al., 2023).

The worldwide trend of digitising library resources increases user accessibility and information availability, which simplifies tasks that previously required significant time and effort. As such, Jordanian universities are motivated to invest more in digital transformation to improve relevant services. The operational strategies of organisations are also impacted by digitisation owing to multiple benefits, including reduced costs and efforts while elevating accessibility regardless of geographical restrictions (Aakash & Gupta Aggarwal, 2022). While DLs originated in the past decade, the adoption rate is sluggish in terms of full usability by the target audience (Kiana et al., 2021). Students prefer employing search engines, such as Google (Xu & Du, 2019), although DL information sources and related services are considered more reliable. The DL usage rate also remains low despite online libraries more effectively providing the necessary information and the high investment amounts by universities on developing respective DLs (Afthanorhan et al., 2020). Economically, the significant investments in terms of financial resources, manpower, and time required to develop robust DL systems necessitate effective utilisation to prevent the squandering of invested resources (Murthy et al., 2018).

Negative DL attitudes and a lack of confidence in the DL content contribute to diminished engagement with online repositories and an increased reliance on unreliable external sources (Rosman et al., 2020). While prior researchers conducted DL research, a majority neglected DL users' intentions. Most studies concentrated on e-book usage (Masa'deh et al., 2022), the corresponding impact of employing DLs (Alajmi & Alotaibi, 2020), such as user satisfaction and quality factors (Afthanorhan et al., 2020), or user acceptance of modern technologies (Venkatesh et al., 2003). Notably, a scarcity of studies related to the intention to employ DLs is observed (Jamaludin & Mahmud, 2011) Click or tap here to enter text. despite the need for research into DL adoption (Iqbal et al., 2022). Nonetheless, several studies investigated the topic through the unified theory of acceptance and use of technology (UTAUT) to explicate user intention (Alajmi & Alotaibi, 2020). Accordingly, the present study examined and extended the UTAUT model with technological readiness and online self-efficacy to thoroughly comprehend the user intention of employing DL among Jordanian postgraduates.

The current study samples are potential DL users, including students, teachers, staff, and external users. The primary objective is to identify the association between effort expectancy (EE), performance expectancy (PE), facilitating conditions (FC), social influence (SI), and the intention to utilise DLs. In addition, this study expanded the UTAUT model by appraising the relationships between technological readiness (TR) and PE and between online self-efficacy (OS) and PE. The PE mediating effect on the correlations between TR and the intention to utilise DLs and between OS the intention to utilise DLs was also assessed. Resultantly, the current study contributed insights into alternative approaches to providing services and information through academic libraries and developing alternative DL servers. Practically, the study results would assist university library heads and officials in increasing the DL usage rate while investing more in DLs via effective strategies to enhance the intention of potential users while maintaining current users. The study also serves as a platform for future studies to investigate other factors contributing to the intention to employ DLs.

2. Literature Review

2.1 The Unified Theory of Acceptance and Use of Technology (UTAUT)

Venkatesh developed the UTAUT in 2003 by integrating previous findings to provide a comprehensive framework that delineates technological acceptance and usage (Venkatesh et al., 2012). This study applied the UTAUT due to higher explicability than other models through four main components, namely PE, EE, SI, and FC, in the knowledge of the behavioural intention to accept and employ modern technologies (Venkatesh et al., 2003). The UTAUT could also explain 70% of users' intentions to employ the latest technologies (Chopik & Francis, 2022). The UTAUT also provides a foundation to examine and comprehend the usage intention of the latest technologies, including DLs (Alajmi & Alotaibi, 2020). Hence, further DL academic discussions and diverse research approaches through the UTAUT are crucial.

2.2 The Relationship between PE and the Intention to Employ DLs

The PE is defined as the usefulness level of utilising a specific technology to improve job performance, which is determined by personal belief (Venkatesh et al., 2003; Venkatesh, 2022). Specifically, the PE is crucial to pinpointing the acceptance degree of the latest technology (Eiskjær et al., 2023). Past researchers revealed that PE was the primary factor contributing to behavioural intention (Ayaz & Yanartaş, 2020, Nazim et al., 2021) with a positive correlation between PE and user intention (Alomari & Abdullah, 2023; Walle et al., 2023).. A higher PE level results when higher efficiency with lower costs and reduced effort is perceived by users in employing the latest technology compared to conventional technologies (Hamzat & Mabawonku, 2018). This study hypothesised that:

H_1: *The PE positively impacts the intention to employ DLs.*

2.3 The Relationship between EE and the Intention to Employ DLs

The PE significantly impacts user intentions in adopting different technologies depending on the required effort degree (Jayakananthan & Jeyaraj, 2019), whereas EE determines the perceived ease of use (Venkatesh et al., 2003). A positive association was demonstrated between EE and user intention in prior research (Hunde et al., 2023), which posited that lower required effort contributed to higher usage levels (Jang et al., 2021). The current study propounded that:

H_2: *The EE positively impacts the intention to employ DLs.*

2.4 The Relationship between SI and the Intention to Employ DLs

The SI is defined as the degree to which an individual recognises the expectations of other acquainted individuals, including friends, acquaintances, and relatives, to benefit from the latest ICTs (Alvarez et al., 2020). Past scholars demonstrated a significant positive correlation between SI and user intentions regarding alternative technologies (Alduais & Al-Smadi, 2022; Hunde et al., 2023). Accordingly, a higher inclination to accept alternative technologies (Strzeleck, 2023) when SI exists through peers' suggestions and expectations in personal social networks (Palau-Saumell et al., 2019). The current study posited that:

H_3: *The SI positively impacts the intention to employ DLs.*

2.5 The Relationship between FC and the Intention to Employ DLs

The final UTAUT dimension, namely FC, is defined as customers' perceptions of available resources and support for a specific demeanour (Venkatesh et al., 2012). Past research confirmed the positive impact on consumers' behavioural intention to employ technologies (Ali & Warraich, 2023; Hunde et al., 2023). The existing literature also highlights the significant FC impact on consumers' behavioural intentions to employ the latest digital information sources. The FC is related to an individual's belief in the available materials and resources to utilise the technology (Haryanto et al., 2023). The current study proposed that:

H_4: *The FC positively impacts the intention to employ DLs.*

2.6 The Relationship between TR and PE

Blut and Wang (2020) delineated TR as individuals' tendency to accept and employ the latest technologies, which is also a psychological variable to determine the decision-making process of adopting alternative technologies (Chiu & Cho, 2020). Prior academicians revealed the significant TR impact on embracing and utilising modern technologies (Chen et al., 2021) Reyes-Mercado et al. (2023) also empirically discovered a positive relationship between TR and PE in digital learning environments. The present study postulated that:

H_5: *The TR positively impacts PE.*

2.7 The Relationship between OS and PE

Salah Dogham et al. (2022) denoted OS as an individual's capability to effectively resolve challenges and perform digital tasks. The concept was propounded by Bandura (1977), which is highly recognised as a key determinant of performance quality. An individual's motivation to engage in a task will increase when personal competence is considered sufficient and vice versa (Yan et al., 2017). Individuals with higher self-efficacy will also demonstrate increased proficiency in employing DLs owing to the high confidence in personal problem-solving capabilities by proactively seeking innovative solutions (Parhamnia, 2022). Existing empirical evidence also consistently demonstrates a positive association between OS and PE (Adi Alsyouf, 2021). Hence, this study hypothesised that:

H_6: *The OS positively impacts PE.*

2.8 Mediation

Mediation analysis is integral to enhancing models and theoretical comprehension (Ngah et al., 2021; Rahi et al., 2022). A mediating variable serves as a platform to transmit the impact of the antecedent variable to the dependent variable (Aguinis et al., 2017) by determining the degree of a specific effect or mechanism (Dippel et al., 2020). Figure 1 illustrates the research framework of the study. Previous researchers discovered a direct relationship between TR and PE (Reyes-Mercado et al., 2023). A positive correlation is also demonstrated between PE and user intention by the current knowledge corpus (Nikou & Aavakare, 2021), which highlights the positive TR impact on technological acceptance or the intention to employ DLs (Jamaludin & Mahmud, 2011; Shmueli et al., 2019). Simultaneously, past investigations discovered positive

relationships between OS and PE (Mshali & Al-Azawei, 2022), between PS and user intention (Kumar et al., 2020), and between PE and user intention (Awwad & Al-Majali, 2015). Hence, this study proposed that:

H7: *The PE positively mediates the association between TR and intention to employ DLs.*
H8: *The PE positively mediates the association between OS and intention to employ DLs.*

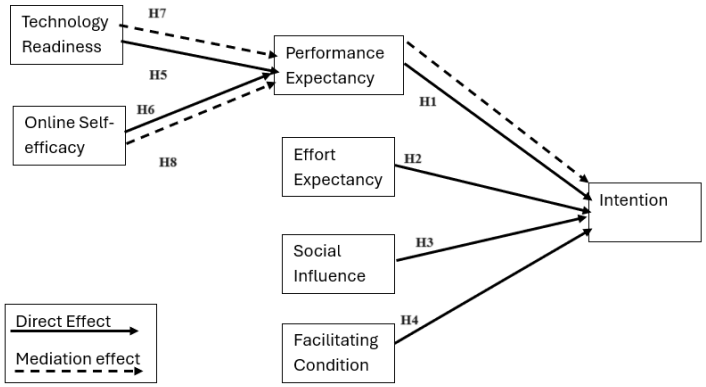

Fig. 1. Research Framework

3. Research Methodology

3.1 Instrument Development

The questionnaire administered in the current study consists of three sections. The first section asks about respondents' demographic characteristics. The second section appraises the independent variables and the third section examines the dependent variable. Previous studies were referred to when adapting the questionnaire items to fit the present study scope. Specifically, the PE, EE, SI, FC, and user intention items were adapted from Venkatesh et al. (2003), whereas the TR items were modified from Aharony and Gazit (2019) and Shirahada et al. (2019). Employing different measures to assess antecedent and outcome variables could prevent the common method variance (CMV) issue (Podsakoff et al., 2003). Thus, a Likert scale ranging from 1 to 5 was employed for the independent variables while a Likert scale ranging from 1 to 7 was employed for the dependent variables. The consistency between measurement scales was also ensured to enhance perceived uniformity while preventing item redundancy. Employing the same scales will increase item similarity and redundancy, which will lead to a lower understanding of measurement items with lower memory retrieval and judgment among respondents (Ngah et al., 2023).

3.2 Sampling and Data Collection

The present study applied a purposive sampling method to recruit potential users, namely postgraduate students at Jordanian public universities with DL facilities. Google Forms were utilised to incorporate the questionnaires, which were disseminated online via the official Facebook page of Jordanian university websites at the beginning of the semester for one month. A question filter, which is in line with the purposive sampling approach, was also asked to ensure respondent validity (Ngah et al., 2021; Jais & Ngah, 2024). The current study collected 261 responses with 67 cases excluded due to invalid responses, including not studying a postgraduate programme or currently employing a DL. The final sample size was 194 respondents. Hair et al. (2019) elucidated that the sample size should be determined based on the power of the analysis and the number of predictor variables (Ngah et al., 2022; Albtoosh et al., 2022). The researcher calculated the required sample size via the G*Power software (Bayen et al., 1996), which determined that the minimum sample size should be 85 based on four predictors with a power of 80%, a medium effect size, and a p-value equal to 0.05 (Gefen et al., 2011). The final sample size of 194 in this study exceeded the minimum requirement of 85. The results of the demographic information of the respondents are presented in Table 1. The descriptive statistical analysis shows that most of the respondents are male (58.4%). Most of the sample members are between the ages of 25-35 years (53%), and most of them are master's students (76.7%).

Table 1
Demographic information of respondents

Variable	Item	Frequency	Percentage (%)
Gender	male	118	58.4%
	female	84	41.6%
Age	25-35 years old	107	53.%
	35-45 years old	91	45%
	45 years old and above	4	2%
Type of study	Master's Degree	155	76.7%
	PhD	47	23.3

3.3 Data Analysis

The present study objective was to delineate the associations between the variables in the current research model by predicting and investigating the respective correlations via the Smart-PLS 4 software (Hair et al., 2019). The current research model is also complex due to the existence of more than seven constructs (Hair et al., 2017). As such, the researcher conducted PLS-SEM to reveal the respective impacts of independent variables on dependent variables to predict corresponding model paths (Hair et al., 2019). Simultaneously, a normality test was performed through multivariate skewness and kurtosis measures to validate the collected data by adhering to Hair et al.'s (2017) recommendations. The results demonstrated a non-normal distribution indicated by the significant values of multivariate skewness ($b = 11.561$, $p < 0.01$) and multivariate kurtosis ($b = 103.307$, $p < 0.01$). The Smart-PLS approach was employed to resolve potential data abnormalities (Albtoosh & Ngah, 2022; Long et al., 2022), namely CMV, to ensure no data bias (Ngah et al., 2022c; Halimi et al., 2021) rendered by employing a single data source (Podsakoff et al., 2012). Particularly, procedural and statistical analysis techniques with different measurement scales were utilised (Ngah et al., 2021; Rashid et al., 2022). A seven-point Likert scale was applied to appraise user intention while a five-point Likert scale was employed to examine other constructs. Simultaneously, the collinearity test was conducted (Ngah et al., 2024; Tuan Mansor et al., 2022) to ensure that the variance inflation factor (VIF) did not exceed the threshold value of 3.3, which demonstrated that this study is without CMV issues. Table 2 depicts that all VIF values are below 3.3 and demonstrate no CMV issue.

Table 2
Full collinearity

EE	FC	OS	PE	SI	TR
1.391	1.419	1.657	1.846	1.651	1.657

3.4 Measurement Model

Anderson and Gerbing's (1992) two-step method, namely the measurement model and the structural model, was employed in the current study. Construct validity was examined through composite reliability (CR), loadings, and average variance extracted (AVE). Hair et al. (2019) explicated that convergent validity is achieved when the loading value exceeds 0.5, the AVE value is or exceeds 0.5, and the CR achieves a minimum of 0.7. All three aforementioned values exceeded the respective threshold values in the present study, which suggested sufficient construct validity. Concurrently, discriminant validity was affirmed with the HTMT ratio lower than the threshold value of 0.9 (Franke & Sarstedt, 2019), as delineated in Table 4. As such, the measurement model satisfied all requirements for the constructs and items.

Table 3
Convergent validity

Construct	Item	Loading	CR	AVE
EE	EE1	0.652	0.902	0.7
	EE2	0.904		
	EE3	0.881		
	EE4	0.883		
FC	FC 2	0.855	0.837	0.639
	FC 3	0.57		
	FC 4	0.929		
OS	OS 1	0.666	0.882	0.601
	OS 2	0.698		
	OS 3	0.771		
	OS 4	0.879		
	OS 5	0.841		
PE	PE 1	0.804	0.905	0.705
	PE2	0.871		
	PE3	0.816		
	PE4	0.864		
SI	SI 1	0.72	0.892	0.674
	SI 2	0.829		
	SI 3	0.878		
	SI 4	0.849		
TR	TR 1	0.722	0.88	0.594
	TR 2	0.774		
	TR 3	0.812		
	TR 4	0.817		
	TR 5	0.724		
INT	INT 1	0.824	0.896	0.742
	INT 2	0.878		
	INT 3	0.881		

Note: FC1 was deleted due to low loading

Table 4
Discriminant validity (HTMT)

Construct	EE	FC	OS	PE	SI	TR
EE						
FC	0.471					
OS	0.509	0.786				
PE	0.528	0.521	0.68			
SI	0.427	0.562	0.639	0.672		
TR	0.513	0.676	0.737	0.701	0.609	

3.5 Structural Model

Multicollinearity was investigated by adhering to Hair et al.'s (2017) definition, wherein the VIF value should be below 5. The findings demonstrated that all VIF values were below 5, which suggested no collinearity between the study variables. Subsequently, bootstrapping was performed with a resampling procedure of 500 iterations to test the study hypotheses. A hypothesis is accepted when the beta values are positive, the t-values are equal to or exceed 1.645 except for SI, and the p-values are equal to or below 0.05. Simultaneously, the confidence interval contains no zero value indicated by both the lower (CILL) and upper (CIUL) levels (Hair et al., 2019). Table 5 portrays the hypothesis testing results. Particularly, a significant positive correlation was discovered between PE and user intention (PE → INT, β = 0.184, t = 2.51, p < = 0.05, LL = 0.089, UL = 0.319), which supported H1. The EE was also revealed to be significantly and positively associated with user intention (EE → INT, β = 0.18, t = 2.783, p < 0.05, LL = 0.069, UL = 0.279), which accepted H2. Contrarily, a negative association was demonstrated between SI and user intention (SI → INT, β = 0.086, t = 1.371, p = 0.085, LL = - 0.036, UL = 0.174), which did not support H3 as the t value was below 1.645.

A significant positive correlation was discovered between FC and user intention (FC → INT, β = 0.133, t = 1.999, p < 0.05, LL = 0.001, UL = 0.229), which accepted H4. Significant positive associations were also discovered between TR and PE (TR → PE, β = 0.376, t = 5.09, p < 0.001, LL = 0.245, UL = 0.481) and between OS and PE (OS → PE, β = 0.365, t = 4.588, p < 0.001, LBP = 0.243, UL = 0.505), which accepted H5 and H6. Meanwhile, for the mediation effect, the study that PE positively mediates the relationship between TR and INT intention (TR→PE → INT, β = 0.069, t = 2.11, p = 0.018, LL = 0.027, UL = 0.142), and also for the relationship between OS and INT (OS→PE → INT, β = 0.067, t = 2.254, p = 0.012, LL = 0.032, UL = 0.126), thus supporting the H7 and H8 of the study. Table 5 and figure 2 illustrates the findings of the study.

Table 5
Hypotheses testing.

Hypothesis	Relationship	Beta	SE	T value	P value	CILL	CIUL	f2	VIF
H1	PE → INT	0.184	0.073	2.51	0.006	0.089	0.319	0.023	1.842
H2	EE → INT	0.18	0.065	2.783	0.003	0.069	0.279	0.029	1.397
H3	SI → INT	0.086	0.063	1.371	0.085	-0.036	0.174	0.006	1.666
H4	FC → INT	0.133	0.067	1.999	0.023	0.001	0.229	0.015	1.453
H5	TR → PE	0.376	0.074	5.09	0.001	0.245	0.481	0.154	1.657
H6	OS → PE	0.365	0.08	4.588	0.001	0.243	0.505	0.146	1.657
H7	TR → PE → INT	0.069	0.033	2.11	0.018	0.027	0.142		
H8	OS → PE → INT	0.067	0.03	2.254	0.012	0.032	0.126		

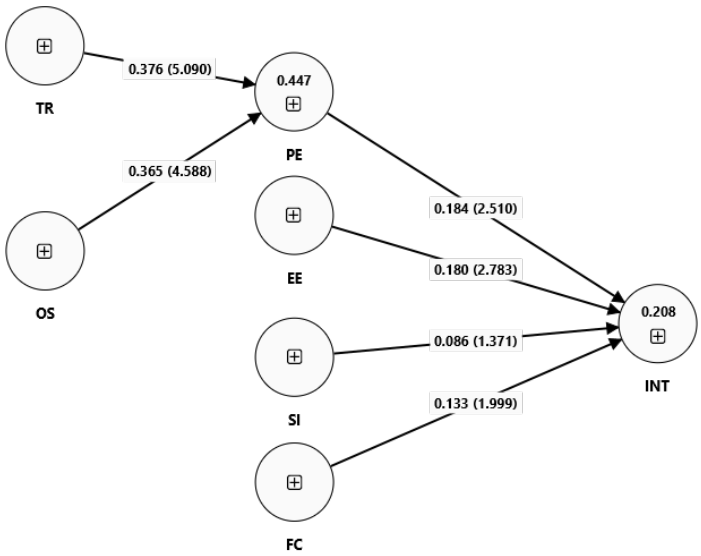

Fig. 2. Structural model

Meanwhile, the effect size (f^2) was determined (Cohen, 1992) with 0.02 as small, 0.15 as medium, and 0.35 as large. The predictive power of the research framework was also evaluated through PLS-Predict, which utilises a restricted sample to generate case-level predictions for the constructs or items. A tenfold procedure was performed to determine predictive power instead of the blindfold technique (Ngah et al., 2022; Shmueli et al., 2019). A combination of both negative and positive values indicates moderate predictive power, whereas all positive values posit the absence of predictive power. The results demonstrated that all PLS-LM values were negative, which postulated high predictive power (Shmueli et al., 2019). Table 6 indicates the findings for the PLS-predict analysis.

Table 6
PLS-Predict

Item	PLS-SEM_RMSE	LM_RMSE	PLS-LM	Q²predict
INT 1	0.611	0.655	-0.044	0.098
INT 2	0.684	0.691	-0.007	0.18
INT 3	0.641	0.713	-0.072	0.107
PE 1	0.467	0.495	-0.028	0.219
PE2	0.526	0.567	-0.041	0.344
PE3	0.489	0.529	-0.04	0.242
PE4	0.578	0.619	-0.041	0.366

4. Discussion

Potential DL users' intentions are crucial for administrators and academicians in the discipline of DL management. The UTAUT was applied in the present study to assess the intention of potential DL users, who were postgraduate students, at Jordanian universities with DLs. Postgraduate students were presumed to be the core users owing to the increasing dependence on digital information and resources. The data were evaluated via SEM conducted on the Smart-PLS software. The findings demonstrated that three out of four variables in the UTAUT produced significant impacts on the correlations between TR and PE and between OS and PE. Specifically, a significant positive relationship was revealed between PE and user intention INT, which accepted H1. The result aligns with past studies (Alomari & Abdullah, 2023) discovering a significant PE impact on user intention to employ DLs, which corroborates the integral PE role in promoting the utilisation of technological platforms.

The EE was demonstrated to be significantly and positively associated with DL user intention, which accepted H2. Hunde et al. (2023) also uncovered a positive correlation between EE and user intention, which propounded that university administrators or researchers should prevent usage complications or difficulties when establishing a DL system. Moreover, the association between FC and user intention was significant and positive in this study (Ali & Warraich, 2023), which accepted H4. Accordingly, higher accessibility to relevant equipment and resources would facilitate a user in embracing the latest technologies with effortless usage. The study also revealed significant positive correlations between TR and PE and between OS and PE, which are in line with Reyes-Mercado et al. (2023) and Adi Alsyouf (2021). Hence, both H5 and H6 were supported. The results highlighted the significance of TR and OS in elevating users' anticipated performance and intention to embrace modern technologies.

The relationship between SI and user intention was insignificant, which did not support H3 and corresponded with Hunde et al. (2023). Nonetheless, the finding is consistent with Calderón-Fajardo et al. (2023), which posited that SI might not be a significant factor contributing to embracing alternative technologies. While the existing studies postulate the significant SI impact on user attitudes toward emerging technologies, the current results propounded that SI did not demonstrate a similar effect on DL usage. Furthermore, postgraduate students possess higher self-determination, in which decision-making regarding technology adoption might be less influenced by external social factors. Meanwhile, PE was demonstrated to significantly mediate the associations between TR and user intention and between OS and user intention, which supported H7 and H8. The presence of PE would reinforce the relationships between TR and user intention and between OS and user intention.

The present study expanded the UTAUT by elucidating the determinants of DL usage intention among potential users. The current study also addressed the existing literature gap by including additional composite factors into the model to thoroughly comprehend the factors contributing to DL user intention. The DLs become more crucial in Jordan with more available information sources, which serve as an educational platform for students. Delineating user intentions and the contributing factors is crucial to increasing DL usage. The current findings demonstrated PE, EE, FC, TR, and OS significantly and positively impacted user intentions, whereas SI insignificantly influenced user intentions. Therefore, further investigations are required to determine the SI impact on DL usage intention. Moreover, PE could enhance the TR and OS impacts on user intentions, which recommends expanding the DL user base to elevate students' efficiency in constantly accessing required information while reducing the associated costs from conventional sources.

The present study scope focuses only on Jordanian postgraduate students, which may limit the generalisability of the results in other nations. Differences in cultures, social contexts, and technological advancement may also influence the model applicability. Future scholars could validate the model in various contexts to determine the cross-cultural applicability. Meanwhile, DL experts or stakeholders should prioritise the significant contributing factors, namely PE, EE, FC, TR, and OS, to increase the DL usage rate, which might decrease users' tendency to acquire information from unreliable sources. Different research models concentrating on modern technological usage and user intention in the academic environment could also be applied to determine the SI impact, which was discovered to be insignificant in the present study. Other variables could be included to expand the current scope and explore the indirect effect of SI. Thus, a more thorough comprehension of the factors contributing to DL usage could be obtained.

5. Conclusion

The current study sought to pinpoint the key factors contributing to potential DL user intentions through the UTAUT. Purposive sampling was performed to recruit Jordanian postgraduate students. The data were collected through an online survey before being analysed via SEM conducted on the Smart-PLS software. The results supported five hypotheses with significant relationships between the contributing factors and user intentions while another hypothesised factor was insignificant. The findings not only contributed to the knowledge corpus on DL user behaviour but also underscored the UTAUT predictive power in postgraduate students' usage intentions at Jordanian universities. The present study also contributed valuable insights into DL managers and policymakers to develop specific strategies for elevating DL user engagement and satisfaction.

References

Aakash, A., & Gupta Aggarwal, A. (2022). Assessment of Hotel Performance and Guest Satisfaction through eWOM: Big Data for Better Insights. *International Journal of Hospitality & Tourism Administration, 23*(2), 317–346. https://doi.org/10.1080/15256480.2020.1746218

Jamaludin, A., & Mahmud, Z. (2011). Intention to use digital library based on modified UTAUT model: Perspectives of Malaysian postgraduate students. *International Journal of Information and Communication Engineering*, *5*(3), 270-276.

Abu Sirhan, A., Abdrabbo, K. M., Ahmed Ali Al Tawalbeh, S., Hamdi Ahmed, M., & Ali Helalat, M. (2019). Digital rights management (DRM) in libraries of public universities in Jordan. *Library Management, 40*(8/9), 496–502. https://doi.org/10.1108/LM-05-2018-0044

Alsyouf, A. (2021). Self-efficacy and personal innovativeness influence on nurses beliefs about EHRS usage in Saudi Arabia: Conceptual model. *International Journal of Management*, *12*, 1049-1058.

Afthanorhan, A., Foziah, H., & Majid, N. A. (2020). Investigating Digital Library Success using the DeLone and McLean Information System Success 2.0: The Analysis of Common Factor based Structural Equation Modeling. *Journal of Physics: Conference Series, 1529*(4), 042052. https://doi.org/10.1088/1742-6596/1529/4/042052

Aguinis, H., Edwards, J. R., & Bradley, K. J. (2017). Improving Our Understanding of Moderation and Mediation in Strategic Management Research. *Organizational Research Methods, 20*(4), 665–685. https://doi.org/10.1177/1094428115627498

Aharony, N., & Gazit, T. (2019). Factors affecting students' information literacy self-efficacy. *Library Hi Tech, 37*(2), 183–196. https://doi.org/10.1108/LHT-10-2018-0154

Alajmi, M. A., & Alotaibi, J. H. (2020). Reconceptualization of system use in the context of the digital library: what are the roles of UTAUT and IS success models? *Journal of Electronic Resources Librarianship, 32*(3), 151–181. https://doi.org/10.1080/1941126X.2020.1790943

Albtoosh, Q. A. A., & Ngah, A. H. (2024). Testing the expectation confirmation theory on the training satisfaction context: the mediation role of mind wandering. *International Journal of Public Administration*, *47*(1), 26-40. https://doi.org/10.1080/01900692.2022.2081338

Alduais, F., & Al-Smadi, M. O. (2022). Intention to Use E-Payments from the Perspective of the Unified Theory of Acceptance and Use of Technology (UTAUT): Evidence from Yemen. *Economies, 10*(10), 259. https://doi.org/10.3390/economies10100259

Ali, I., & Warraich, N. F. (2023). Use and acceptance of technology with academic and digital libraries context: A meta-analysis of UTAUT model and future direction. *Journal of Librarianship and Information Science*, 096100062311797. https://doi.org/10.1177/09610006231179716

Alomari, A. S. A., & Abdullah, N. L. (2023). Factors influencing the behavioural intention to use Cryptocurrency among Saudi Arabian public university students: Moderating role of financial literacy. *Cogent Business & Management, 10*(1). https://doi.org/10.1080/23311975.2023.2178092

Alvarez, M., Campo, S., & Fuchs, G. (2020). Tourism in conflict zones: animosity and risk perceptions. *International Journal of Culture, Tourism and Hospitality Research, 14*(2), 189–204. https://doi.org/10.1108/IJCTHR-08-2019-0136

Anderson, j. C., & Gerbing, D. W. (1992). Assumptions and Comparative Strengths of the Two-Step Approach. *Sociological Methods & Research, 20*(3), 321–333. https://doi.org/10.1177/0049124192020003002

Awamleh, M. A., & Hamad, F. (2022). Digital preservation of information sources at academic libraries in Jordan: an employee's perspective. *Library Management, 43*(1/2), 172–191. https://doi.org/10.1108/LM-10-2021-0088

Awwad, M. S., & Al-Majali, S. M. (2015). Electronic library services acceptance and use. *The Electronic Library, 33*(6), 1100–1120. https://doi.org/10.1108/EL-03-2014-0057

Ayaz, A., & Yanartaş, M. (2020). An analysis on the unified theory of acceptance and use of technology theory (UTAUT): Acceptance of electronic document management system (EDMS). *Computers in Human Behavior Reports, 2*, 100032. https://doi.org/10.1016/j.chbr.2020.100032

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioural change. *Psychological Review, 84*(2), 191–215. https://doi.org/10.1037/0033-295X.84.2.191

Bayen, U. J., Murnane, K., & Erdfelder, E. (1996). Source discrimination, item detection, and multinomial models of source monitoring. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 22*(1), 197–215. https://doi.org/10.1037/0278-7393.22.1.197

Blut, M., & Wang, C. (2020). Technology readiness: a meta-analysis of conceptualizations of the construct and its impact on technology usage. *Journal of the Academy of Marketing Science, 4*8(4), 649–669. https://doi.org/10.1007/s11747-019-00680-8

Calderón-Fajardo, V., Carrasco-Santos, M. J., & Rossi Jiménez, C. (2023). The intention of consumers to use augmented reality apps in gastronomy – case of Málaga. *Current Issues in Tourism, 26*(9), 1446–1462. https://doi.org/10.1080/13683500.2022.2056002

Chen, S.-C., Li, S.-H., Liu, S.-C., Yen, D. C., & Ruangkanjanases, A. (2021). Assessing Determinants of Continuance Intention towards Personal Cloud Services: Extending UTAUT2 with Technology Readiness. *Symmetry, 13*(3), 467. https://doi.org/10.3390/sym13030467

Chiu, W., & Cho, H. (2020). The role of technology readiness in individuals' intention to use health and fitness applications: a comparison between users and non-users. *Asia Pacific Journal of Marketing and Logistics, 33*(3), 807–825. https://doi.org/10.1108/APJML-09-2019-0534

Chopik, W. J., & Francis, J. (2022). Partner influences on ICT use variety among middle-aged and older adults: The role of need for cognition. *Computers in Human Behavior, 126*, 107028. https://doi.org/10.1016/j.chb.2021.107028

Cohen, J. (1992). A power primer. *Psychological Bulletin, 112*(1), 155–159. https://doi.org/10.1037/0033-2909.112.1.155

Dippel, C., Ferrara, A., & Heblich, S. (2020). Causal mediation analysis in instrumental-variables regressions. *The Stata Journal: Promoting Communications on Statistics and Stata, 20*(3), 613–626. https://doi.org/10.1177/1536867X20953572

Eiskjær, S., Pedersen, C. F., Skov, S. T., & Andersen, M. Ø. (2023). Usability and performance expectancy govern spine surgeons' use of a clinical decision support system for shared decision-making on the choice of treatment of common lumbar degenerative disorders. *Frontiers in Digital Health, 5*. https://doi.org/10.3389/fdgth.2023.1225540

Franke, G., & Sarstedt, M. (2019). Heuristics versus statistics in discriminant validity testing: a comparison of four procedures. *Internet Research, 29*(3), 430–447. https://doi.org/10.1108/IntR-12-2017-0515

Gefen, D., Rigdon, E. E., & Straub, D. (2011). Editor's comments: an update and extension to SEM guidelines for administrative and social science research. *MIS quarterly*, *35*(2), 3-16. https://doi.org/10.2307/23044042

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review, 31*(1), 2–24. https://doi.org/10.1108/EBR-11-2018-0203

Hair, J., Hollingsworth, C. L., Randolph, A. B., & Chong, A. Y. L. (2017). An updated and expanded assessment of PLS-SEM in information systems research. *Industrial Management & Data Systems, 117*(3), 442–458. https://doi.org/10.1108/IMDS-04-2016-0130

Halder, D. (2021). A Transitional Shift From Traditional Library to Digital Library. In Research Anthology on Collaboration, Digital Services, and Resource Management for the Sustainability of Libraries (pp. 453–461). IGI Global. https://doi.org/10.4018/978-1-7998-8051-6.ch026

Halimi, F. F., Gabarre, S., Rahi, S., Al-Gasawneh, J. A., & Ngah, A. H. (2022). Modelling Muslims' revisit intention of non-halal certified restaurants in Malaysia. *Journal of Islamic Marketing*, *13*(11), 2437-2461. https://doi.org/10.1108/JIMA-01-2021-0014

Haryanto, R., Ady Bakri, A., ES Samosir, H., Idris, D. L., Fauzan, T. R., & Agustina, W. (2023). Digital Literacy and Determinants of Online Zakat Payments Lessons from Indonesia Experience with Utaut. *Journal of Law and Sustainable Development, 11*(4), e575. https://doi.org/10.55908/sdgs.v11i4.575

Hunde, M. K., Demsash, A. W., & Walle, A. D. (2023). Behavioural intention to use e-learning and its associated factors among health science students in Mettu University, southwest Ethiopia: Using modified UTAUT model. *Informatics in Medicine Unlocked, 36,* 101154. https://doi.org/10.1016/j.imu.2022.101154

Said, I. M., & Apriliyanti, M. (2022). Knowledge Management Model for Library in Indonesia (Study Case: Sunan Ampel State Islamic University of Surabaya).

Iqbal, M., Rafiq, M., & Soroya, S. H. (2022). Examining predictors of digital library use: an application of the information system success model. *The Electronic Library, 40*(4), 359–375. https://doi.org/10.1108/EL-01-2022-0008

Jang, M., Aavakare, M., Nikou, S., & Kim, S. (2021). The impact of literacy on intention to use digital technology for learning: A comparative study of Korea and Finland. *Telecommunications Policy, 45*(7), 102154. https://doi.org/10.1016/j.telpol.2021.102154

Jais, R., & Ngah, A. H. (2024). The moderating role of government support in chatbot adoption intentions among Malaysian government agencies. Transforming Government: People, Process and Policy. https://doi.org/10.1108/TG-02-2023-0026

Jayakananthan, M., & Jeyaraj, W. J. (2019). Behavioural Aspects of Postgraduate Students in Using Electronic Information Resources at the Library Eastern University, Sri Lanka. *Journal of the University Librarians Association of Sri Lanka, 22*(1), 36–55. https://doi.org/10.4038/jula.v22i1.7929

Kumar, J. A., Bervell, B., Annamalai, N., & Osman, S. (2020). Behavioural Intention to Use Mobile Learning: Evaluating the Role of Self-Efficacy, Subjective Norm, and WhatsApp Use Habit. *IEEE Access, 8*, 208058–208074. https://doi.org/10.1109/ACCESS.2020.3037925

Long, F., Ooi, C. S., Gui, T., & Ngah, A. H. (2022). Examining young Chinese consumers' engagement in restaurant food waste mitigation from the perspective of cultural values and information publicity. *Appetite, 175*. https://doi.org/10.1016/j.appet.2022.106021

Kiana, L., Ujakpa, M. M., Iyawa, G. E., Osakwe, J. O., & Iguna, K. (2021). Predictors of Digital Library Usage by Undergraduate Students at a Namibian University: Perspectives Based on Technology Acceptance Model. *African Journal of Library, Archives & Information Science*, *31*(1), 1–13.

Masa'deh, R., AlHadid, I., Abu-Taieh, E., Khwaldeh, S., Alrowwad, A., & Alkhawaldeh, R. S. (2022). Factors Influencing Students' Intention to Use E-Textbooks and Their Impact on Academic Achievement in Bilingual Environment: An Empirical Study Jordan. *Information, 13(*5), 233. https://doi.org/10.3390/info13050233

Mshali, & Al-Azawei. (2022). Predicting Online Learning Adoption: The Role of Compatibility, Self-Efficacy, Knowledge Sharing, and Knowledge Acquisition. Journal of Information Science Theory and Practice.

Nazim, N. F., Razis, N. M., & Hatta, M. F. M. (2021). Behavioural intention to adopt blockchain technology among bankers in Islamic financial system: perspectives in Malaysia. *Revista Română de Informatică și Automatică, 31*(1), 11–28. https://doi.org/10.33436/v31i1y202101

Ngah, A. H., Gabarre, S., Eneizan, B., & Asri, N. (2021). Mediated and moderated model of the willingness to pay for halal transportation. *Journal of Islamic Marketing, 12*(8), 1425–1445. https://doi.org/10.1108/JIMA-10-2019-0199

Ngah, A. H., Kamarulzaman, N. I., Puteh, S., Abdullah, N. A. C., Ariffin, N. A., & Fei, L. (2024). I will get my job: moderated and mediation model of students' perceived employability in post-pandemic era. Higher Education, Skills and Work-Based Learning. https://doi.org/10.1108/HESWBL-11-2023-0326

Ngah, A. H., Kamalrulzaman, N. I., Mohamad, M. F. H., Rashid, R. A., Harun, N. O., Ariffin, N. A., & Osman, N. A. A. (2022b). The sequential mediation model of students' willingness to continue online learning during the COVID-19 pandemic. *Research and Practice in Technology Enhanced Learning, 17*(1). https://doi.org/10.1186/s41039-022-00188-w

Ngah, A. H., Rahimi, A. H. M., Gabarre, S., Araya-Castillo, L., Ariza-Montes, A., & Han, H. (2021). Fostering Voluntourism Satisfaction and Future Behaviour in Island Destinations. *Sustainability, 13*(5), 2767. https://doi.org/10.3390/su13052767

Ngah, A. H., Tuan Mansor, T. M., Gabarre, C., Rahi, S., Khan, S., & Ahmad, R. (2023). I love my cosmetics: educated young Muslim's behaviour of non-halal certified cosmetics. *Journal of Islamic Marketing, 14*(11), 2798–2820. https://doi.org/10.1108/JIMA-06-2021-0196

Ngah, A. H., Thurasamy, R., Mohd Salleh, N. H., Jeevan, J., Md Hanafiah, R., & Eneizan, B. (2022c). Halal transportation adoption among food manufacturers in Malaysia: the moderated model of technology, organization and environment (TOE) framework. *Journal of Islamic Marketing, 13*(12). https://doi.org/10.1108/JIMA-03-2020-0079

Ngah, A. H., Tuan Mansor, T. M., Gabarre, C., Rahi, S., Khan, S., & Ahmad, R. (2022a). I love my cosmetics: educated young Muslim's behaviour of non-halal certified cosmetics. *Journal of Islamic Marketing*. https://doi.org/10.1108/JIMA-06-2021-0196

Nikou, S., & Aavakare, M. (2021). An assessment of the interplay between literacy and digital Technology in Higher Education. *Education and Information Technologies, 26*(4), 3893–3915. https://doi.org/10.1007/s10639-021-10451-0

Palau-Saumell, R., Forgas-Coll, S., Sánchez-García, J., & Robres, E. (2019). User Acceptance of Mobile Apps for Restaurants: An Expanded and Extended UTAUT-2. *Sustainability, 11*(4), 1210. https://doi.org/10.3390/su11041210

Parhamnia, F. (2022). Investigating mobile acceptance in academic library services based on Unified Theory of Acceptance and Use of Technology Model (UTAUT-2). *The Journal of Academic Librarianship, 48*(5), 102570. https://doi.org/10.1016/j.acalib.2022.102570

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioural research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*(5), 879–903. https://doi.org/10.1037/0021-9010.88.5.879

Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). Sources of Method Bias in Social Science Research and Recommendations on How to Control It. *Annual Review of Psychology, 63*(1), 539–569. https://doi.org/10.1146/annurev-psych-120710-100452

Pourjahanshahi, F., Mollahosseini, A., & Dehyadegari, S. (2023). Website quality and users' intention to use digital libraries: Examining users' attitudes, online co-creation experiences, and eWOM. *Journal of Retailing and Consumer Services, 74*, 103393. https://doi.org/10.1016/j.jretconser.2023.103393

Rahi, S., Alghizzawi, M., & Ngah, A. H. (2022). Factors influence user's intention to continue use of e-banking during COVID-19 pandemic: the nexus between self-determination and expectation confirmation model. *EuroMed Journal of Business*. https://doi.org/10.1108/EMJB-12-2021-0194

Rashid, A., Baber Ali, S., Rasheed, R., Amirah, N. A., & Ngah, A. H. (2022). A paradigm of blockchain and supply chain performance: a mediated model using structural equation modelling. *Kybernetes*. https://doi.org/10.1108/K-04-2022-0543

Reyes-Mercado, P., Barajas-Portas, K., Kasuma, J., Almonacid-Duran, M., & Zamacona-Aboumrad, G. A. (2023). Adoption of digital learning environments during the COVID-19 pandemic: merging technology readiness index and UTAUT model. *Journal of International Education in Business, 16*(1), 91–114. https://doi.org/10.1108/JIEB-10-2021-0097

Rosman, M. R. M., Ismail, M. N., & Masrek, M. N. (2020). Investigating the Predictors of Digital Library Engagement: A Structured Literature Analysis. *Pakistan Journal of Information Management and Libraries,* 60–82. https://doi.org/10.47657/1586

Hamzat, S. A., & Mabawonku, I. (2018). Influence of performance expectancy and facilitating conditions on use of digital library by engineering lecturers in universities in south-west, Nigeria. *Library philosophy and practice*, 1-16.

Salah Dogham, R., Elcokany, N. M., Saber Ghaly, A., Dawood, T. M. A., Aldakheel, F. M., Llaguno, M. B. B., & Mohsen, D. M. (2022). Self-directed learning readiness and online learning self-efficacy among undergraduate nursing students. *International Journal of Africa Nursing Sciences, 17*, 100490. https://doi.org/10.1016/j.ijans.2022.100490

Shirahada, K., Ho, B. Q., & Wilson, A. (2019). Online public services usage and the elderly: Assessing determinants of technology readiness in Japan and the UK. *Technology in Society, 58*, 101115. https://doi.org/10.1016/j.techsoc.2019.02.001

Shmueli, G., Sarstedt, M., Hair, J. F., Cheah, J.-H., Ting, H., Vaithilingam, S., & Ringle, C. M. (2019). Predictive model assessment in PLS-SEM: guidelines for using PLSpredict. *European Journal of Marketing, 53*(11), 2322–2347. https://doi.org/10.1108/EJM-02-2019-0189

Tuan Mansor, T. M., Mohamad Ariff, A., Hashim, H. A., & Ngah, A. H. (2022). External whistleblowing intentions of auditors: a perspective based on stimulus–organism–response theory. *Corporate Governance (Bingley), 22*(4), 871–897. https://doi.org/10.1108/CG-03-2021-0116

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS quarterly*, *27*(3), 425-478. https://doi.org/10.2307/30036540

Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. *MIS quarterly*, 157-178. 157. https://doi.org/10.2307/41410412

Venkatesh, V. (2022). Adoption and use of AI tools: a research agenda grounded in UTAUT. *Annals of Operations Research*, *308*(1), 641-652. https://doi.org/10.1007/s10479-020-03918-9

Walle, A. D., Jemere, A. T., Tilahun, B., Endehabtu, B. F., Wubante, S. M., Melaku, M. S., Tegegne, M. D., & Gashu, K. D. (2023). Intention to use wearable health devices and its predictors among diabetes mellitus patients in Amhara region referral hospitals, Ethiopia: Using modified UTAUT-2 model. *Informatics in Medicine Unlocked, 36*, 101157. https://doi.org/10.1016/j.imu.2022.101157

Xu, F., & Du, J. T. (2019). Examining differences and similarities between graduate and undergraduate students' user satisfaction with digital libraries. *The Journal of Academic Librarianship, 45*(6), 102072. https://doi.org/10.1016/j.acalib.2019.102072

Yan, Y., Zhang, X., Zha, X., Jiang, T., Qin, L., & Li, Z. (2017). Decision quality and satisfaction: the effects of online information sources and self-efficacy. *Internet Research, 27*(4), 885–904. https://doi.org/10.1108/IntR-04-2016-0089

Zhou, J. (2022). The role of libraries in distance learning during COVID-19. *Information Development, 38*(2), 227–238. https://doi.org/10.1177/02666669211001502