

A Study on Advancements in Information Systems and Service Design for Enhanced User Experience

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Abstract - The fast growth of digital services has created the need for information systems that offer efficiency as well as user experiences and satisfaction. But digital services design practices usually look at the quality of the information system, the service quality, and the aspect of usability separately. The present research paper is aimed at presenting an integrated architecture of information system, service design, and user experience, which will help to enhance the delivery of digital services using a human-centered method. A descriptive and analytical approach is employed through the study of current models of information system success, technology acceptance models, and service design principles and usability assessment methods. Five-layer architecture including user research, service design, information systems, user experience, and delivery channels are suggested based on literature review. Comparative analysis shows that traditional methods are typically characterized by a linear process of evaluation; however, the presented approach makes it possible to iterate on the improvement of the design through linking feedback from users and redesign processes. It has been shown that the inclusion of such aspects as service blueprinting, interaction design, accessibility, and multichannel approach could contribute to greater usability and effectiveness of the service as a whole. The presented model offers practical insights in relation to e-government systems, mobile banking, healthcare services, and conversational digital services.

Keywords: Information Systems, Service Design, User Experience, Usability, Digital Service Delivery, Human-Centred Design

I. INTRODUCTION

Today, public and private digital services rely heavily on information systems that have to function reliably and present data in a way understandable and satisfying for their users. The reliability of the information system per se is no longer considered a sufficient criterion of adoption; the system's success can be defined from the perspective of the combined quality of information, service, and the experience of the interaction at every point of contact (DeLone & McLean, 2003; Khan & Nayak, 2026b). It has been shown previously by early technology adoption researchers that usefulness and ease of use of the system define whether the target audience adopts the technology; subsequently, the concept of value creation has been transformed to involve co-creation of value through provider-user collaboration (Bitner et al., 2008; Vargo & Lusch, 2004; García & Fernández, 2024).

This change gave rise to the field of service design, which includes visualization methods, including service blueprints that correlate the customer's actions with front stage and back stage processes in the organisation (Homburg et al., 2017). Combining this with information systems that have traditionally been designed to be efficient in the back end but not in the front end provides a process-oriented approach to ensuring that the technical architecture corresponds to the order in which the interactions take place. Customer experience management as a complementary area focuses on

the fact that the experience is built through many touchpoints (Vargo & Lusch, 2008; Venkatesh et al., 2003).

However, despite this convergence on the conceptual level, many implementation systems—especially those that are based in the public sector, mobile banking applications, or a blend of both—still are designed with the focus on completeness of functionality at first, followed by usability consideration at later stages or sometimes even completely missing in implementation processes. The rationale behind conducting this research is related to the fact that adoption frameworks like the unified theory of acceptance and use of technology are very successful in predicting intentions but hardly ever coupled with practical guidelines regarding interface and flow of service (Suratno & Shafira, 2022).

The three aims of this research are to first consolidate the constructs and flow patterns observed in the studies on information systems, service quality, and usability; secondly, to examine the generalized sequence of events often used to describe digital service success and suggest an integrated architecture comprising layers of user research, service design, system, and interface issues built around the process of feedback; and lastly, to provide implications of this architecture in the context of digital services such as e-government, banking, and conversational interfaces.

The literature review is provided in Section 2; the methodology along with the suggested flow and architecture is discussed in Section 3; the synthesized results are presented in Section 4; the discussion follows in Section 5.

II. LITERATURE REVIEW

2.1 Information Systems Success and Adoption Models

The revised information systems success model categorizes system, information, and service quality as predictors of use and user satisfaction, which in combination create the net benefit gained by the individual or organization (DeLone & McLean, 2003). This framework has been used and further validated in multiple studies involving various e-government, healthcare, and educational information systems, suggesting the quality measures are good predictors of satisfaction, even if the importance of each factor varies across different settings (Khan & Nayak, 2026a). In addition to the success model, the technology acceptance model focuses on identifying the two main beliefs about a technology that predict usage intention – namely perceived usefulness and perceived ease of use (Vargo & Lusch, 2004). The unified theory of acceptance and use of technology brings together several alternative adoption models into four key factors influencing technology acceptance – performance expectancy, effort expectancy, social influence, and facilitating conditions (Suratno & Shafira, 2022). Modern applications of these frameworks consider both information systems success and technology acceptance in the explanation of continuance intention and citizen trust in e-government systems, revealing that satisfaction predicts

more consistently continuance intention than the initial acceptance intention itself (Monteiro et al., 2021).

2.2 Service Quality, Service-Dominant Logic, and Value Co-Creation

According to the service-dominant logic perspective, value creation is the result of interaction between the provider and the user instead of being the intrinsic part of the product itself, an assumption upon which a lot of service design practices are based nowadays (Bitner et al., 2008; Khan & Sujatha, 2025). This assumption can be implemented through various approaches, among which one can consider the behavioral-consequences model of service quality and its relationship to perceived quality and behavioral intentions, such as repurchase intention and word-of-mouth Chan et al., (2021) or the means-end chain linking price, perceived quality, and value (Kala et al., 2024). The approach of service blueprinting allows translating these constructs into tangible elements through an illustration of the actions performed by the customer, the actions of the employees and the technologies supporting the service according to a line of visibility separating what is experienced by the user and what operates invisibly backstage (Homburg et al., 2017). In the context of digital retail, the design-oriented information systems research on automated checkout systems proves the relevance of considering the service and the technology as one integrated service system in order to improve performance and customer satisfaction (Bitner et al., 2008; Homburg et al., 2017).

2.3 User Experience, Usability Evaluation, and Accessibility

Still one of the most popular discount methods of usability analysis is heuristic evaluation, when trained experts evaluate an interface in accordance with the small set of known principles. Early empirical studies have shown that individual experts find only part of all usability issues in the designs and that using several experts provides much better results due to covering much larger number of problems (Monteiro Ferreira & Venturelli, 2022). Standardized post-task measurement tools provide quantification of the heuristic evaluation process: research presented at the symposium shows correlation of the scale scores with the independent performance and business metrics, and thus can be used for more than just usability testing (Alsaedi, 2020). Design thinking research conducted within a business-to-business services company shows how structuring the interface development process according to the empathize-define-ideate-prototype-test process allows creating requirements based on the interviews and questionnaires of real users (Al-Nidawi et al., 2018). Analysis of the ISO 9241-210 series of human-centered design standards shows how the emphasis moved from ergonomics to user experience and finally to universal design principles, highlighting the overlap between formal standards and contemporary UX practice (Nooruddin et al., 2022).

Accessibility research takes usability research one step further by applying it to users who have disabilities; empirical validation of the Web Content Accessibility Guidelines using controlled usability testing reveals that conformance, through checklist compliance, detects only a small fraction of the accessibility issues experienced by people with disabilities, highlighting the importance of using conformance testing with users (Hsu & Lin, 2023). Comparisons between automated testing systems for accessibility reveal inconsistent results across tools, thereby making the case for complementing automated testing with manual testing with users (Islam et al., 2020). Usability evaluations for mobile devices take this approach further in a resource-constrained environment; heuristic testing of mobile health applications in a developing country setting reveals navigational, feedback, and error-prevention violations mostly found in applications which lacked a structured design review before launch (Faisal & Dharmaraj, 2024). Technology acceptance research involving online/mobile banking platforms demonstrates how perceived usability influences behavioural commitment to the use of such platforms (Vargo & Lusch, 2004).

2.4 Application in E-Government and Digital Public Services

A series of empirical investigations on e-government service quality has found a multidimensional structure of service perceptions, including functional, interactional, and result-based service design attributes that collectively influence citizens' satisfaction beyond the scope of a single dimension of quality (Alsarraf et al., 2023). Studies on trust have revealed that the amount of effort put in delivering services regardless of the result affects citizen trust in government (Grier et al., 2013). User attributes related to content delivery on government websites validated through focus group interviews reveal that users give priority to interaction and emotional aspects along with accessibility and usability issues (Nielsen & Molich, 1990). Structural models of adoption factors from various e-government applications show that user perception attributes account for a considerable portion of variance of adoption along with infrastructure readiness attributes (Rømen & Svanæs, 2012).

Additional regional investigations utilizing the information systems success model to measure e-government service quality reveal that the evaluation methods used for information systems have to be tailored to fit the environment in order to be useful (Ilieva et al., 2024; Homburg et al., 2017).

2.5 Conversational Interfaces and Emerging Service Channels

Service provision is diversifying to areas other than online and mobile platforms, where conversational agents now feature prominently as the first interface for customer services. Research separates three distinct elements of conversational agent-based services as determinants of customer satisfaction and loyalty – core service quality,

service recovery quality, and conversational quality, where conversational quality predicts customer loyalty independent of service accuracy (Hauser et al., 2019). This finding adds on to previous studies on heuristic evaluation, which suggest that principles of usability formulated for graphical interfaces need some modification when used for natural language interfaces.

2.6 Digital Transformation and Customer Experience Management

More broadly, the literature on customer experience management sees experience as a construct created throughout the entire customer journey experience as opposed to individual moments of interaction, and considers organisational capability gaps, rather than technology gaps only, as the main barrier to successful experience management (Vargo & Lusch, 2008). Combined with the literature on success of information systems and service design discussed above, such literature implies that user experience in digital service delivery could be enhanced only through simultaneous attention to architecture, process design, and organisational capabilities, rather than each of these being adequate enough independently from others. Such integration serves as a basis for the architecture suggested below.

III. METHODOLOGY

The method of descriptive analysis is used, involving a review of existing literature on the design and evaluation processes in the information systems, service design, and usability domains without any involvement of empirical data obtained through interaction with human participants. The five steps of the methodology include the following: (1) the selection of the relevant literature on information-systems success and adoption models, service quality and service design methodology, and usability and user experience evaluations; (2) the identification of the sequence of constructs/stages which each of the streams applies to explain the process whereby a digital service generates or fails to generate a positive result; (3) the comparison of the aforementioned sequences with the aim of revealing the common flow applicable for most of the models of explanation; (4) the development of the overall architectural framework encompassing the separate streams of user research, service design, information systems, and interface design around the general flow, closed with a feedback loop; and (5) the qualitative comparison of the general flow with the architecture developed.

The analysis of the flow involved in the previous literature demonstrates that the flow has been generally linear, as depicted in fig. 1(a), where quality constructs related to the system, information and services are input factors, which determine perceived usefulness or usability and then intention to use and use, which leads to user satisfaction and ultimately net benefits. The flow is evaluative in nature as it is generally used for assessing if the designed system meets its objectives and is generally used after the system has been

created, but generally does not have a specific process of feedback from evaluation to design process.

This architecture, as illustrated in fig. 1(b), refines the sequence into five levels of concerns instead of five successive measures. In the user research level, needs, personas and journey mapping are gathered before defining any system component. In the service design level, the needs are translated into a service blueprint, specifying the front stage touchpoints and the back stage processes. In the information system level, the data, application, integration

and security services are implemented for the support of the service blueprint. The user experience level controls the interaction design, interface presentation and the compliance with usability and accessibility rules regardless of the selected channel by the user. Finally, the delivery channel level distributes the designed service through web portal, mobile app, kiosk, or assisted counter, according to the user base. Feedback and analytics cycle provide usage, satisfaction, and accessibility data from the delivery level to the user research level, thereby completing the circle rather than terminating it with one measurement.

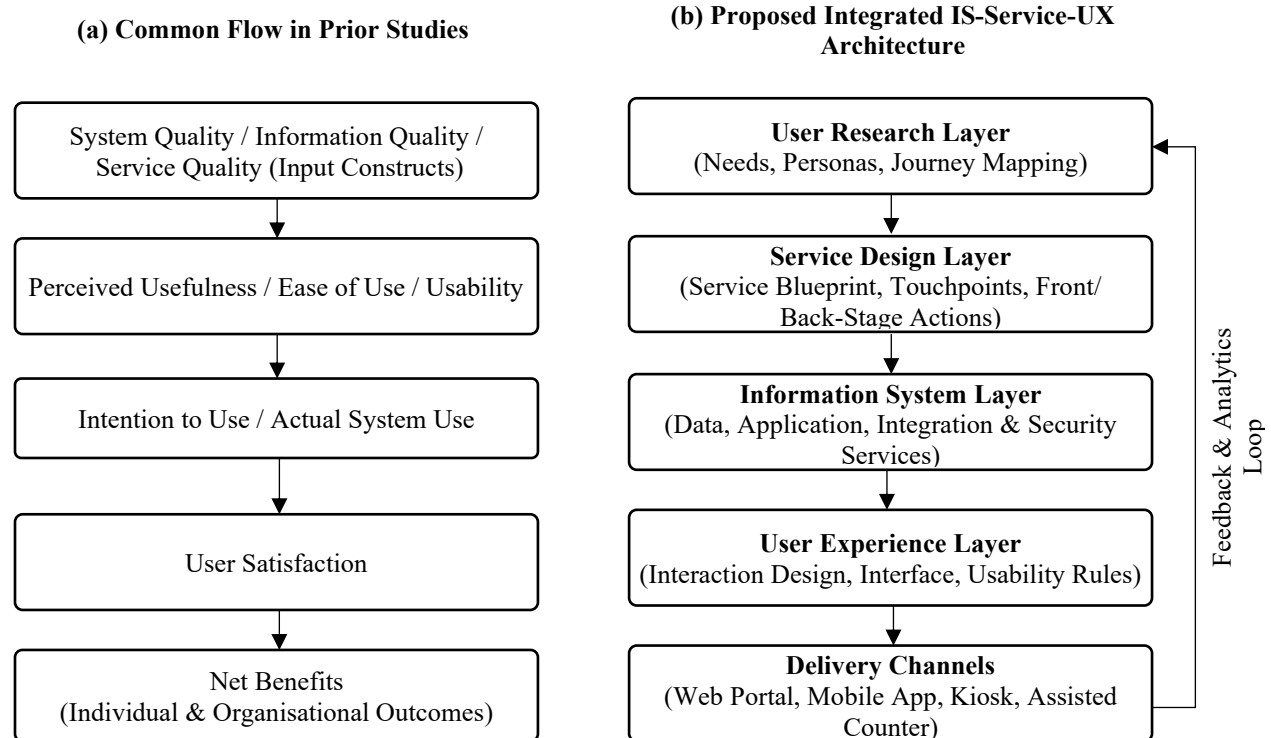


Fig. 1 (a) Generalized Flow Common to Prior Information-Systems Success and Usability Studies; (b) Proposed Integrated Information System-Service Design-User Experience Architecture with a Closed Feedback Loop

The comparative synthesis within the literature review is informed by the following five criteria: which quality aspect(s) (system, information, or service quality) are taken into account in terms of quality aspects; whether there is a feedback loop through which results of evaluation are fed back into the design process; which delivery channels are taken into consideration (web, mobile, conversational, or assisted/kiosk); whether accessibility issues for users with disabilities are considered separately; and what is the main dependent variable (satisfaction, adoption, loyalty, or trust).

IV. RESULTS

Table I is a brief description of the five comparative criteria within the large set of literature that has been covered in

Section 2. Adoption and success models such as information-systems success model, technology acceptance model, and unified acceptance and use of technology have included system and information qualities in their research while covering service quality and accessibility inconsistently. The service design and service quality literature has discussed the service quality comprehensively and, when using blueprinting as a technique, they have easily covered multi-channel services but rarely include the feedback mechanism for re-design. Studies focusing on usability and accessibility have included the feedback explicitly in the research as the iterative process is an essential part of the process and most studies are focused on one channel which includes web-based service or mobile applications.

TABLE I COMPARATIVE SYNTHESIS OF LITERATURE STREAMS AGAINST THE FIVE REVIEW CRITERIA

Literature stream	Constructs typically covered	Feedback loop specified	Channel scope	Primary outcome
IS success / adoption models	System, information quality; usefulness; ease of use	Rarely	Single system (channel-agnostic)	Satisfaction, use
Service quality / service design	Service quality, value co-creation, blueprint touchpoints	Occasionally	Multi-channel (when blueprinted)	Satisfaction, loyalty
Usability / accessibility evaluation	Heuristics, task performance, conformance	Frequently (iterative testing)	Mostly single channel	Usability score, problem count
E-government / public digital services	Combined system, service, and interaction constructs	Occasionally	Web, mobile, assisted counter	Satisfaction, trust, continuance
Conversational / emerging channels	Core service, recovery, and conversational quality	Rarely reported explicitly	Conversational agent only	Satisfaction, loyalty

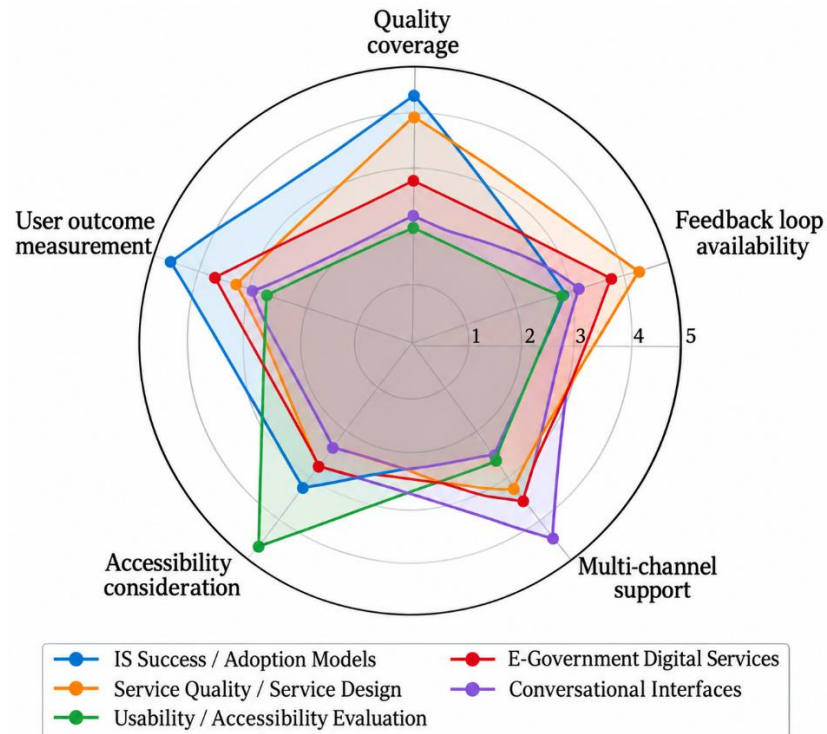


Fig. 2 Comparative Analysis of Digital Service Evaluation Approaches Across Key Assessment Criteria

Fig. 2 is a comparison of the various existing methods of evaluating digital services in terms of quality criteria, feedback methods, channel coverage, access, and outcomes measurement. The result of this evaluation shows that although each method focuses on certain aspects, none of them considers human-centered evaluation comprehensively.

Three trends are observed from this synthesis. Firstly, no stream reviewed here simultaneously addresses all three aspects of quality, an explicit feedback process, multi-channel scope and accessibility; instead, each stream focuses on some subset of the mentioned criteria. Secondly, research which uses service-design approaches including blueprinting shows higher incidence of multi-channel consideration than research limited to acceptance or success models only. Thirdly, conversational and accessibility issues are still relatively under-addressed compared to web and mobile usability concepts, even though conversational agents

become increasingly popular and there are still disabled users who require their needs to be met.

Compared with the suggested architecture in fig. 1(b), the five layers are mapped correspondingly to user research, service design, information system, user experience and delivery-channel layers described in table I, while the feedback and analytics cycle is the criterion addressed the least in the reviewed research streams. The correspondence means that the general five-step flow in fig. 1(a) is correct not in terms of its content but completeness: it represents the result of design process evaluation without specifying what layers form this result and how feedback should go into next iteration.

V. DISCUSSION

The above-described synthesis corresponds to the view that even if there is good system, information, and service quality, the satisfaction cannot be achieved if no interactional design is applied (DeLone & McLean, 2003). One can observe how the relatively scarce application of explicitly designed interaction design in the reviewed research could be the reason for why some digitization projects succeed in terms of achieving their technical objectives but fail in terms of citizen/customer satisfaction, as was observed in case when it was interaction effort, not outcome quality, which influenced the trust to a service provider (Grier et al., 2013). If one looks at each level of the suggested architecture as a co-created value process, following service dominant logic, then it would confirm the circular nature of fig. 1(b).

Concerning the case of e-government, the multiple dimensions of service perceptions discussed in the literature Alsarraf et al., (2023) can be seen as relating directly to the service design and user experience components of the proposed architecture framework. On the other hand, since studies have shown that measures need to be contextually adjusted in order to reliably measure the effects in the public sector domain Ilieva et al., (2024) the proposed framework should be seen as a template for adaptation to the local conditions rather than as something applicable uniformly across different contexts. This is particularly true in the case of developing countries where there is an ongoing process of digital transformation of public administration, and channels are introduced simultaneously.

Diversification of channels will have implications for the user-experience layer as well. The finding that conversation quality is an independent predictor of customer loyalty which is unrelated to transaction accuracy, suggests that heuristics for interaction design need to be explicitly extended in the case where the service is offered using conversational agents instead of forms. Likewise, the finding that compliance with formal accessibility guidelines covers only a small fraction of the problems faced by users with disabilities suggests that the feedback loop of the proposed architecture must be designed to include inputs from such users directly, and not only overall satisfaction ratings that may hide problems for a minority of users.

Finally, the perspective on Organisational capabilities arising from the customer experience management literature Vargo & Lusch, (2008) holds that the architecture presented herein is necessary but insufficient for improving user experience: an organization also requires the capability and mandate to make changes to the service or interface in the face of problems highlighted by evaluation within the feedback loop. Variation by sector and resource availability found in mobile usability and adoption research and in design-based information systems research on automated retail systems implies that there may be reasonable differences in the relative weight that is placed on each level of the proposed architecture, for instance, between a well-endowed banking

application and a government portal working with fewer resources. As a literature review, this study has yet to empirically validate the proposed architecture in actual implementation; a controlled comparison of services designed according to the proposed architecture versus services designed without such an architecture would need to take place in order to prove causality.

VI. CONCLUSION

In this study, an integrated architecture has been proposed that includes information systems engineering, service design and user experience perspectives, which have limitations in current digital service development methods. This study found that current information systems success and technology acceptance models pay attention to success criteria such as system quality, information quality, usability, and adoption but do not offer any information about continuous redesign and improvements from the user perspective. To solve this problem, a five-layered integrated architecture consisting of user research, service design, information systems, user experience, and delivery channels has been suggested with a closed feedback and analytics loop. It was found that existing literature streams usually focus on certain aspects of digital service quality but the suggested model includes various aspects such as usability, accessibility, service interaction, and multi-channel delivery. This framework can be considered very useful in creating digital platforms in the fields of e-government, banking, healthcare, and conversation due to the ability to adapt constantly taking into account the user's needs and system performance. Nonetheless, as it is mentioned above, this study is purely literature review and empirical evidence should be provided in order to confirm the usefulness of this framework in reality. In future researches, it is needed to consider implementation of pilot systems, usability testing in various environments of digital services, and accessibility feedback mechanism.

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