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DIGITAL TECHNOLOGY ADOPTION, CLIENT CO-CREATION & ENTREPRENEURIAL NETWORKING AS DETERMINANTS OF COMPETITIVE ADVANTAGE

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KEYWORDS	ABSTRACT
Digital Technology Adoption, Client Co-Creation, Entrepreneurial Networking Determinants of Competitive Advantage	This study examined effect of digital technology adoption, client co-creation, and entrepreneurial networking on competitive advantage in interior design and architecture enterprises. It further analyzed whether service innovation mediated the relationship between these strategic capabilities and competitive advantage. The study employed a quantitative survey-based research design. The data were collected from interior designers, architects, design consultants and entrepreneurs operating in the creative design sector. Structural equation modeling was applied to evaluate measurement model, test direct hypotheses, and examine mediating role of service innovation. The findings demonstrated that digital technology adoption, client co-creation, and EN had significant positive effects on service innovation. The service innovation significantly higher competitive advantage by refining differentiation, client satisfaction, & market positioning. Mediation analysis confirmed that service innovation mediated the relationship between the three independent variables as well as competitive advantage. The results provide significant information to reach the conclusion of study and making decisions about the research variables in particular context. The results showed that interior design and architecture enterprises gain stronger market competitiveness when digital tools, client participation as well as professional networks are transformed into innovative service offerings.
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INTRODUCTION

In past few years, there has been tremendous evolution within interior design and architecture industry owing to the growing digitization trend, increased the client participation, and stiff competition within industry. With rising competition, it has become imperative for companies to go beyond the conventional design processes to offer increasingly personalized, efficient,

and innovative services (Sair, , Sohail & Nisar, 2024). The adoption of new technologies like BIM, virtual visualization technology, and cloud computing has helped designers rethink their approach towards design services by improving the precision, efficiency, and creativity of their operations (Sair, Sohail, Abbas & Nazeer, 2024). On other hand, clients have begun expecting greater involvement during the design process to enable them to influence the designs, thus transforming the traditional roles of designers and clients. In addition to this, entrepreneurial networking has turned out to be one of key sources of knowledge & partnership for designing organizations (Syafuddin, 2025). In such environment, competitive advantage can be viewed as the capacity of the firm to create superior value through the innovation and client-focused services.

The adoption of digital technology can be viewed as the degree of integration by firms of state-of-the-art digital technologies in design, planning & project management activities (Hussain, Masood, Idrees & Sohail, 2025). Client co-creation refers to the engagement of the client in the process of creation of value through active collaboration between the client and organization. Entrepreneurial networking can be viewed as building of inter-personal networks that allow access to resources and information (Zhang, Wang, Akram & Hong, 2023). Service innovation is viewed here as introduction of innovations into the processes of delivering service offerings to improve value to customers and the overall performance of the organization. Competitive advantage is thus viewed as the capacity of firm to outperform competitors in terms of market positioning & client satisfaction (Jawad & Sohail, 2022). The relationship amid these variables can be based on resource-based view and service dominant logic. According to resource-based view, utilization of information technology resources, client relationships, and entrepreneurial networking can be valuable, rare, and inimitable resources, which can improve company's performance.

According to service dominant logic, value can be created over interactions with customers, thus indicating the importance of customer co-creation in innovation (Hussain et al., 2025). The utilization of IT facilitates service innovation over advanced visualization and implementation, while customer co-creation can facilitate innovation by integrating the needs of consumers in the design process (Hasani et al., 2025). Entrepreneurial networking also fosters innovation as it gives companies access to new knowledge. Moreover, service innovation plays an important mediating role in the relationship because it facilitates differentiation and improvement of customer satisfaction (Larabi, 2025). Although there has been an increasing focus on the topic of digital transformation and innovations within creative industries, a number of issues are still not addressed in literature. Firstly, prior studies have paid little attention to analyzing digital technology adoption, co-creation, and networking practices in relation to one another, as well as developing frameworks explaining the joint effects of all these factors on competitive advantage.

Secondly, the insufficient attention has been paid to the role of the mediating variable, service innovation – in achieving competitive success, especially for creative enterprises engaged in interior design and architecture (Jacobsson & Linderöth, 2025). Finally, previous research has concentrated predominantly on manufacturing industry and generic service firms rather than

exploring the topic from the point of view of a creative firm (Pundziene, Nikou & Bouwman, 2022). It is essential to solve this research problem because organizations working in such creative industries as interior design & architecture find themselves under pressure of having to innovate while at the same time satisfying their clients' needs in the highly competitive environment. The lack of knowledge about how above factors interact prevents organizations from successfully translating their capabilities into business success (Dzreke & Dzreke, 2025). The significance of this research is in its theoretical and practical value, since this study offers an integrative framework, expanding current knowledge about innovative competitiveness in creative industries while providing the practical recommendations for managing competitive advantage.

LITERATURE REVIEW

The theoretical background of the proposed research relies mainly on the RBV theory, Service-Dominant Logic, and IDT, and it can be said that each of these concepts is responsible for explaining how organizations can gain competitive advantage over capability management, collaboration, and technological diffusion (Mughal, Riaz & Sohail, 2023). According to RBV, better-than-average performance is attained when organizations use valuable, rare, inimitable, and non-substitutable resources, such as digital technology, relational networks, and client engagement capabilities. Meanwhile, from the point of view of SDL, value is not created by an organization alone since it can emerge only through the process of interaction with clients, and client engagement is considered to be a key factor of innovation and improvement in services (Pop & Wallin, 2025). Furthermore, according to IDT, the technological diffusion contributes to improved organizational processes together with performance due to increased efficiency and communication. Consequently, it can be assumed that in knowledge-intensive and design-oriented sectors, digital technology adoption, client co-creation & entrepreneurial networking may serve as strategic capabilities for service innovation and competitive advantage (Roos, 2026).

An increased body of empirical literature confirms importance of use of digital technologies in promoting innovation and organization performance. Recent findings reveal that the adoption of the digital technologies, such as BIM, AI-based design platforms, and virtual collaboration applications significantly increase innovation efficiency and the quality of innovation results in architectural and design organizations (Sair et al., 2024). Besides, client co-creation has been well established as an important antecedent of service innovation in which active involvement of clients increases innovation performance through customization, satisfaction, and value alignment. Recent findings in service industries also show that co-creation process increases innovation performance by fostering the exchange of ideas and promoting innovative design outputs (Turk, Wontor, Yoshida, Dugstad, Julius, Hannibal, Quintana & Srivastava, 2025). Consequently, the research problem investigated in this study can be described as follows: the relationships between the digital technology adoption, client co-creation, and entrepreneurial networking and the resultant competitive advantage in interior design as well as architecture organizations, specifically as mediated by service innovation, have not been fully determined yet.

Entrepreneurial networking has also been revealed as an important determinant of innovation performance due to its ability to facilitate access to external knowledge and opportunities for collaboration that contribute to innovation. Recent empirical findings also demonstrate that entrepreneurial networking is a significant predictor of creative performance and competitive advantage in small firms and design industries through increased innovation potential and reduced resource constraints (Ibrahim & Aaltonen, 2025). However, while several important relationships have been confirmed empirically, there has been little research on the interaction between these three. Furthermore, service innovation has repeatedly been recognized as an important mediator for translating the capabilities into competitive results. Research indicates that the organizations cannot simply derive competitive advantage through technology or networking; rather, it is their ability to turn these inputs into innovations in services that offer differentiation in marketplace. In particular, significance of service innovation for increasing client satisfaction, customization, and value experience cannot be understated in the realms of design & creative industry, that can lead to competitive advantage (Qi, Ni, Zhang, Han & Ren, 2025).

Moreover, the research has shown that it is only through the combination of innovations in services and digitization as well as client engagement that competitive results can be increased. However, despite an increasingly rich literature, no clear link has yet emerged regarding the role of service innovation as the mediator between the adoption of digital technology, client co-creation, entrepreneurial networking & competitive advantage in architecture and interior design firms (Barile, Grimaldi, Loia & Sirianni, 2020). Based upon the theories and empirical findings mentioned above, it is hypothesized that adoption of digital technology positively impacts service innovation by providing an effective design process, visualization, and better collaboration. It is further assumed that entrepreneurial networking will positively impact service innovation by opening up avenues for external knowledge and creativity. In addition, it is also hypothesized that service innovation will positively impact competitive advantage in terms of creating differentiation, customer satisfaction, and positioning for desired outcomes. Lastly, service innovation is hypothesized to be a mediator in the relationship between digital technology adoption, client co-creation, entrepreneurial networking along with the competitive advantage.

RESEARCH METHODOLOGY

The methodology applied in the current study is based upon quantitative research methods as suggested by the researchers (Riaz et al., 2024; Sair et al., 2023; Sohail et al., 2023) aimed at exploring relationships amid adoption of digital technology, client co-creation, entrepreneurial networking, innovation in services, and competitive advantage within the interior design and architecture enterprises. The theoretical foundation of research lies in positivist philosophical paradigm, according to which social and organizational events be objectively described with the help of quantitative data analysis. This paradigm is suitable for present study, as it allows researchers to conduct hypothesis testing, generalize results and investigate causal connections between variables on the basis of quantifiable evidence. The target population of study consists of professionals who work in interior design and architecture companies in Pakistan, including

but not limited to the architects, interior designers, design consultants, project managers, and entrepreneurs who work in field of design. As a reason for conducting the research in Pakistan, one can refer to the fact that the development of the local construction and design industry has been progressing rapidly along with increase in usage of digital technologies and emphasis on innovation.

The sample of respondents was chosen by means of the non-probability purposive sampling techniques, which involved selection of those respondents who had significant professional expertise related to the topic and had involvement in decision-making in design-related areas. The size of the sample to be considered was based on the need of structural equation modeling, and about 300 respondents provided their data. Such sampling methods were used to ensure that the researcher reaches knowledgeable people capable of providing accurate and informed answers. Data were collected by means of a structured survey questionnaire developed based on the previously tested scales and measurement tools used in relevant literature sources on innovation management, digital transformation & service marketing. The survey questionnaire was separated into two major parts: demographic questions and measurement questions for constructs used in the study. Five-point Likert scale was used in the latter case, going from "strongly disagree" to "strongly agree". As a result of pretesting, survey was distributed among a number of companies in Pakistan's major cities including Lahore, Karachi, Islamabad, and others.

For the analysis of data, SEM method was adopted using SmartPLS because of the complexity of the models that involve multiple independent, mediating, and dependent variables and non-normal distribution of data. The analysis involved two stages; first, an evaluation of the measurement model was undertaken in order to measure reliability and validity by using factors such as Cronbach's alpha, composite reliability, convergent validity, and discriminant validity. The second step entailed the analysis of the structural model in order to confirm the hypothesized relationships both direct and indirect effects through mediation analysis using bootstrapping method. Ethical issues were keenly observed during entire process of research. It was clear to the respondents that there was the need to explain the objectives of research to be understood by them. Respondents' consent was sought before the process of data collection began. Also, respondents had freedom not to continue participating in the study, since they were told that the whole process would be voluntary and without any pressure to participate. The confidentiality and anonymity were also taken into the account during the whole research process.

RESULTS OF STUDY

Table 1
Reliability Analysis

Construct	CA	CR	RHO_A	Result
Digital Technology Adoption (DTA)	0.882	0.912	0.890	Reliable
Client Co-Creation (CCC)	0.869	0.904	0.876	Reliable

Entrepreneurial Networking (EN)	0.854	0.893	0.861	Reliable
Service Innovation (SI)	0.901	0.926	0.907	Reliable
Competitive Advantage (CA)	0.887	0.915	0.892	Reliable

According to the reliability test, all constructs under investigation have the adequate internal consistency and reliability. Specifically, the Cronbach alpha coefficients for Digital Technology Adoption (0.882), Client Co-creation (0.869), Entrepreneurial Networking (0.854), the Service Innovation (0.901), and Competitive Advantage (0.887) exceed threshold value of 0.70, which is the indicator of acceptable to excellent reliability levels. In turn, all composite reliability (CR) values vary between 0.893 and 0.926, which is higher than the minimum required threshold of 0.70 and demonstrates that indicators of each construct consistently measure corresponding latent construct. In this connection, the coefficients of rho_A, which offer an accurate estimate of reliability within the PLS-SEM, also remain at the level of 0.85 or higher. In summary, all constructs exhibit high internal consistency when measuring the theoretical dimensions in the study.

Table 2
Convergent Validity

Construct	AVE	Result
Digital Technology Adoption	0.612	Valid
Client Co-Creation	0.598	Valid
Entrepreneurial Networking	0.584	Valid
Service Innovation	0.641	Valid
Competitive Advantage	0.623	Valid

Results of the convergent validity demonstrate that all constructs used in this research fulfill the required threshold criteria of validity, which shows the adequacy of validation of the measurement model. The AVE values of digital technology adoption (0.612), client co-creation (0.598), Entrepreneurial Networking (0.584), Service Innovation (0.641), and the Competitive Advantage (0.623) are greater than the minimal acceptable value of 0.50, as specified in the PLS-SEM literature. Thus, it can be concluded that all constructs have good item convergence since each one can explain more than 50% of variance amid corresponding variables. Moreover, constructs of Service Innovation & Competitive Advantage have higher AVE values compared to others, which indicates more effective representations of latent constructs within research framework.

Table 3
Discriminant Validity

Constructs	DTA	CCC	EN	SI	CA
DTA	—	0.721	0.689	0.743	0.702
CCC	0.721	—	0.705	0.768	0.734
EN	0.689	0.705	—	0.712	0.690
SI	0.743	0.768	0.712	—	0.781
CA	0.702	0.734	0.690	0.781	—

Based on the discriminant validity test done by evaluating the Heterotrait–Monotrait (HTMT) Ratio of correlations between the research variables, it shows that all constructs in this study show high distinctness from each other. In this case, HTMT correlation values between Digital Technology Adoption, Client Co-Creation, Entrepreneurial Networking, Service Innovation, and Competitive Advantage vary between 0.689 and 0.781, where all values are less than 0.85 considered to be too liberal to establish discriminant validity. Thus, although all constructs are closely linked, the study reveals that they differ significantly and measure distinct theoretical constructs. The high HTMT correlation values between Service Innovation and Competitive Advantage (0.781) as well as Client Co-Creation and Service Innovation (0.768) make sense from a theoretical perspective, since they have strong conceptual association within the study model.

Table 4
Multicollinearity Test

Predictor	SI (VIF)	CA (VIF)
Digital Technology Adoption	2.31	—
Client Co-Creation	2.18	—
Entrepreneurial Networking	2.05	—
Service Innovation	—	2.42

The multicollinearity test conducted with the help of Variance Inflation Factor (VIF) shows that there is no multicollinearity among the independent variable constructs included in the model. This is because value of VIF for Digital Technology Adoption (VIF = 2.31), Client Co-Creation (VIF = 2.18), and Entrepreneurial Networking (VIF = 2.05) is well within the acceptable limit of 5, which means that the above-mentioned constructs have low correlation and can contribute independently towards the explanation of dependent variable, i.e., Service Innovation. Also, the value of VIF of Service Innovation (VIF = 2.42) when taken as a predictor of Competitive Advantage shows that the same is well within the acceptable limit as apparent from results in study.

Table 5
Model Fit Indices

Fit Index	Value	Threshold	Result
SRMR	0.056	< 0.08	Good Fit
NFI	0.921	> 0.90	Good Fit
RMS_theta	0.072	< 0.12	Acceptable
Chi-Square	612.45	Lower better	Acceptable

According to the model fit results, it can be concluded that suggested structural model shows satisfactory fit with the actual data. Specifically, the Standardized Root Mean Square Residual value of 0.056 is lower than 0.08, implying good agreement between the assumed theoretical structure and empirical data. In addition, Normed Fit Index value of 0.921 is higher than the desirable value of 0.90, suggesting acceptable quality of model. Moreover, RMS_theta value of

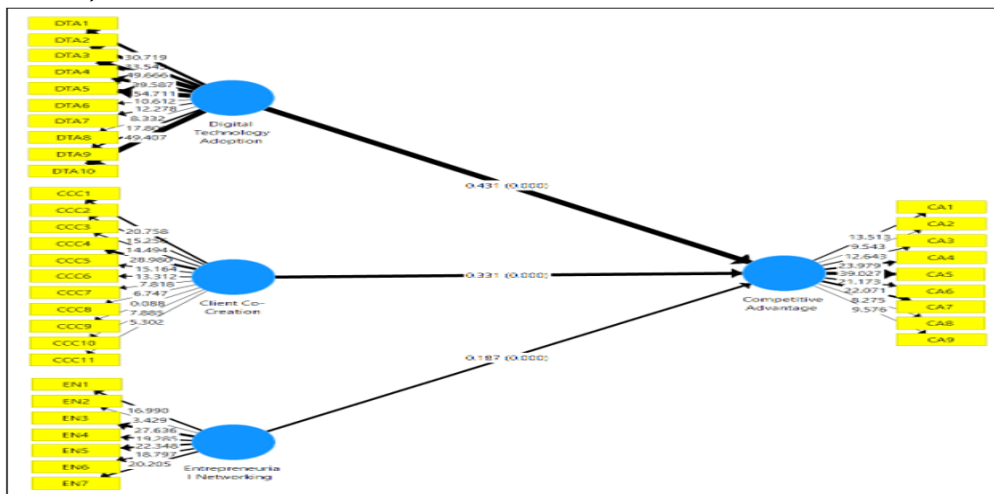
0.072 is less than 0.12, suggests that model has good predictive relevance. Though the value of Chi-Square statistic is high at 612.45, be regarded as acceptable within framework of PLS-SEM since values are typical for larger samples, when predictive accuracy rather than perfect fit is prioritized.

Table 6
Structural Model Results

	OS	SM	SD	TS	PV
Client Co-Creation -> CA	0.331019	0.325459	0.023648	13.9975	0.0000007
Digital Technology Adoption -> CA	0.431207	0.430173	0.021086	20.44989	0.0000
Entrepreneurial Networking -> CA	0.187129	0.189948	0.03028	6.180035	0.00010418

The findings suggest that all independent variables positively impact competitive advantage, where digital technology adoption is variable that greatest effect on competitive advantage, as can be seen from the greatest path coefficient ($O = 0.431$) and t-statistic (20.450). This indicates that digital technology adoption leads to better competitive advantage. The second predictor that positively impacts Competitive Advantage is client co-creation, has a path coefficient ($O = 0.331$) and very high t-statistic (13.998). Implication is that involvement of clients in creation of value for customers leads to viable advantage. Third predictor is entrepreneurial networking, which has the least influence ($O = 0.187$, $t = 6.180$), indicating that entrepreneurial networking positively influences competitive advantage, although it has lowest effect compared to other variables.

Figure 1
Structural Equational Model



DISCUSSION

The results from the research reveal empirical evidence for contribution that digital technology adoption, client co-creation and entrepreneurial networking make in influencing the service

innovation in interior design and architecture businesses (Shafiya et al., 2022). From research, it can be noted that digital technology adoption has a positive influence on service innovation. This firms adopting advanced technologies like BIM systems, 3D visualization programs, and cloud-based communication tools are in a better position to develop effective solutions to their problems. As such, organizations are likely to adopt innovative and efficient service processes. It is in line with argument that adoption of digital transformation helps improve capabilities through improved coordination, enhanced accuracy & creativity. Moreover, client co-creation has been established to impact service innovation strongly than other factors considered in the research.

The finding highlights the contribution made by customers' participation in the design process in influencing service innovation. It is clear from the result that customers' active engagement enables firms to identify their problems and come up with creative solutions. Entrepreneurial networking also showed its ability to influence service innovation positively (Riaz et al., 2025; Zafar et al., 2024). The findings also provide further proof of the mediating effects of service innovation, as it transforms strategic capabilities discussed above into sources of competitive advantage. The strong relationship between the service innovation and competitive advantage proves that the companies gain success in the market through their capability of transforming technological adoption and networking into innovation that gives firm competitive advantage. This shows that service innovation becomes a vital tool for improving the client satisfaction, positioning, and increasing service value for architectural and interior design firms. Thus, the mediation effect thus provides evidence to support the theoretical argument that innovation is the critical link that transforms the organizational resources and capabilities into competitive advantage.

CONCLUSION

The analysis demonstrates that competitive advantage in the interior design and architecture business is largely achieved via service innovation, which, in turn, is considerably enhanced by adoption of digital technologies, client co-creation & entrepreneurial networking. Thus, the proposed integrated model highlights that companies working in sphere under consideration have to evolve from their conventional practices and embrace innovation and collaboration to achieve sustainable development. The service innovation is revealed as an important strategic output that allows companies to differentiate, satisfy customers, and perform effectively in the dynamically changing market conditions. From the perspective of recommendations, interior design and architecture firms have to focus their attention upon investing in modern digital technologies to increase their innovation potential. Furthermore, companies should develop mechanisms for implementing client co-creation processes involving interaction with clients at an early stage of design process, holding the interactive workshops with them, and conducting feedback.

Companies are recommended to work on building strong network in their respective industry by participating in events aimed at networking & interacting with other professionals. Lastly, managers should develop an innovation-based organizational culture within company. The

implications from this study are far reaching from both theoretical and practical perspectives. In the theoretical sphere, the study makes substantial contribution to body of research on the resource-based view & service dominant logic in sense that it illustrates how competitiveness is not obtained directly over use of resources like technology, networking, but by transforming these into service innovation. The study makes an extension to previous research by including three elements digital technology adoption, client co-creation, and entrepreneurial networking – in one explanation of competitiveness within the creative industries. There are useful lessons drawn from the study which will benefit industry practitioners in understanding the need to combine technological capability, client involvement, and networking as a means to attaining competitiveness.

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