Service design for reducing waiting times and improving patient experience in Tanzanian primary-healthcare facilities

Charles Raphael

crn201412@gmail.com

https://orcid.org/0000-0003-3108-1344

Tengeru Institute of Community Development, Tanzania

Recommended Reference: Raphael, C. (2026). Service design for reducing waiting times and improving patient experience in Tanzanian primary-healthcare facilities. *African Quarterly Social Science Review, 3*(1), 165–176. https://doi.org/10.51867/AQSSR.3.1.16

ABSTRACT

Across healthcare systems worldwide, long waiting times and unsatisfactory patient experiences continue to signal persistent inefficiencies in service delivery. However, there is the lack of empirically grounded guidance on how service design principles can be applied to reduce waiting times while simultaneously enhancing patient experience in a sustainable and contextually appropriate manner. This study investigates how service design can be applied in Tanzanian primary healthcare facilities to reduce waiting times and improve patient experience, specifically in major urban centres including Arusha, Dodoma, Dar es Salaam, Mbeya, and Mwanza. This study is grounded in service design theory and contemporary services marketing perspectives. It uses positivism, quantitative approach, descriptive and explanatory cross-sectional design. Data were collected through structured questionnaire from 462 patients who were sampled using a multi-stage sampling strategy in primary healthcare facilities in major urban centres including Arusha, Dodoma, Dar es Salaam, Mbeya, and Mwanza. The data were analysed using descriptive statistics and structural equation modelling. The findings demonstrate that service design practices play a pivotal role in enhancing both operational efficiency and patient experience. Well-designed service processes are associated with significantly shorter patient waiting times ($\beta = -0.46$, $p < 0.001$; $R^2 = 0.42$), while longer waits substantially undermine perceptions of service quality, responsiveness, and overall satisfaction ($\beta = -0.39$, $p < 0.001$). Service design practices also exert a direct positive effect on patient experience ($\beta = 0.41$, $p < 0.001$), with the model explaining a substantial proportion of experiential variance ($R^2 = 0.58$). The partial mediating role of waiting time ($\beta = 0.18$, $p < 0.001$) indicates that efficiency and experience are complementary outcomes of service design. These findings indicate that integrating service design into primary healthcare management is not only an operational improvement tool but also a critical pathway for achieving patient-centred, efficient, and sustainable health service delivery in Tanzania. Accordingly, the study recommends adopting service design as a strategic approach to support more responsive and sustainable healthcare services in Tanzania.

Keywords: Patient Experience, Primary Health Care, Service Design, Waiting Time

I. INTRODUCTION

Across healthcare systems worldwide, long waiting times and unsatisfactory patient experiences continue to signal persistent inefficiencies in service delivery. These challenges are particularly pronounced in complex healthcare environments, where patients often navigate multiple service touchpoints before receiving care (Hafiz *et al.*, 2024; Siciliani *et al*., 2013). Beyond their operational implications, prolonged waiting and fragmented experiences undermine patient trust and satisfaction, factors increasingly recognised as critical to treatment adherence, health outcomes, and service utilisation (Wolf *et al.*, 2014).

In response to these enduring challenges, service design has gained growing attention as a promising approach for rethinking healthcare delivery (Ostrom *et al*., 2019; Palazzo *et al*., 2024). Rooted in human-centred principles, service design places patients and frontline staff at the core of innovation, offering structured methods to uncover process bottlenecks, redesign service flows, and improve the end-to-end patient journey (Patrício *et al*., 2017; Rego *et al*., 2022; Palazzo *et al*., 2024). By emphasising co-creation, experiential insight, and systemic thinking, service design enables healthcare organisations to move beyond incremental efficiency fixes toward more meaningful and sustainable improvements in both service performance and patient experience (Patrício *et al*., 2017; Ostrom *et al*., 2019; Frow *et al.*, 2016).

Healthcare systems are inherently complex service ecosystems characterised by diverse patient needs, multi-stage interactions, and the involvement of numerous professional and organisational actors. This complexity renders service delivery particularly vulnerable to coordination failures and process inefficiencies, which frequently manifest in

long waiting times and fragmented patient experiences (Ostrom *et al.*, 2019). Consequently, waiting time has emerged as a critical indicator of systemic strain, with prolonged delays consistently associated with lower patient satisfaction, reduced trust in providers, and poorer perceived care outcomes (Siciliani *et al.*, 2013; Wolf *et al*., 2014).

Empirical evidence from both high-income and resource-constrained settings confirms the pervasiveness of this problem. Studies conducted in primary and referral healthcare facilities across diverse contexts report extended waiting periods that negatively shape patients' perceptions of service quality and overall performance (Biya *et al*., 2022; Dibba *et al*., 2025). These findings highlight the limitations of isolated efficiency-oriented interventions and point to the need for approaches that address the underlying design of healthcare service processes.

Beyond operational considerations, service design plays a central role in advancing patient-centred care. By fostering a deeper understanding of patients' needs, expectations, and emotional responses, service design allows healthcare organisations to prioritise experience alongside clinical quality (Frow *et al*., 2016; Ostrom *et al*., 2019). When patients are actively involved in shaping their care pathways, services are more likely to be perceived as respectful, responsive, and supportive of overall well-being, contributing to more sustainable improvements in both service performance and patient experience (Wolf *et al.*, 2014; Palazzo *et al*., 2024).

The adoption and effectiveness of service design in healthcare are shaped by organisational and contextual conditions. Organisational culture, leadership commitment, resource availability, and frontline staff competencies play decisive roles in determining whether healthcare facilities can meaningfully engage in design-led service improvement (Ostrom *et al*., 2019; Rego *et al.*, 2022; Palazzo *et al.*, 2024). Technological infrastructure including digital queue management systems and real-time feedback platforms further enables data-informed redesign by supporting coordination, communication, and bottleneck reduction across the care journey (Rego *et al*., 2022; Palazzo *et al*., 2024). Patient engagement also emerges as a critical enabler, as co-design workshops and experiential feedback loops help surface latent needs and refine service solutions in ways that purely administrative innovations cannot achieve (Frow *et al*., 2016; Ostrom *et al*., 2019; Wolf *et al*., 2014).

In high-income countries, service design has increasingly been applied in both experimental and operational settings to improve patient flows and reduce inefficiencies (Patrício *et al*., 2017; Ostrom *et al.*, 2019; Palazzo *et al*., 2024). Interventions such as digital appointment systems and interactive patient information dashboards have contributed to shorter waiting times and improved satisfaction in European and North American healthcare facilities (Greenhalgh *et al*., 2020; Siciliani *et al*., 2013). These experiences demonstrate the potential of design-led approaches to simultaneously enhance efficiency and patient experience.

In contrast, evidence from sub-Saharan Africa reveals persistent challenges in primary healthcare settings, where staffing shortages, administrative delays, and resource constraints often prolong waiting times (Ayimbillah *et al*., 2011; Kruk *et al*., 2018; Nwagbara *et al*., 2024). In Ethiopia, outpatient waiting times exceeding several hours have been documented, reflecting systemic issues that service design approaches could address through workflow realignment and improved patient communication (Biya *et al*., 2022). Similarly, quality improvement initiatives in Ghana demonstrate that engaging patients in redesigning waiting experiences can improve satisfaction outcomes (Darkwa *et al*., 2023). Across West Africa, waiting time remains a consistent predictor of patient satisfaction, underscoring the broader relevance of this issue (Dibba *et al*., 2025).

In Tanzania, prolonged waiting times and uneven patient experiences persist across primary, district, and referral healthcare facilities, reflecting shortcomings in the design and coordination of service delivery rather than isolated operational failures. Evidence from Kilimanjaro Christian Medical Centre shows that targeted organisational and technical interventions such as workflow reorganisation and queue management can substantially reduce outpatient waiting times (Mwanswila *et al*., 2024; Mollel & Mwanswila, 2024). However, similar challenges continue to affect large urban referral hospitals, including Temeke and Muhimbili, where administrative bottlenecks, fragmented patient pathways, and limited digital integration undermine efficiency and satisfaction (Venance, 2022; Mainda & Sulle, 2024).

Beyond operational performance, studies in district and municipal hospitals reveal that long waiting times, weak communication, and limited patient involvement strongly shape negative perceptions of care quality, even when clinical outcomes are acceptable (Chagula, 2025). Encouragingly, emerging human-centred design research in rural Tanzania highlights the potential of participatory service design to address these challenges more holistically. Co-design initiatives involving patients, healthcare workers, and community stakeholders in maternal and child health services have strengthened communication, improved relationships, and enhanced perceived responsiveness (Isangula *et al*., 2024). Complementary evidence from simulation-based modelling further suggests that redesigning patient flows and reallocating resources can improve waiting times without substantial infrastructural expansion (Simwita, 2023).

Despite these contributions, the existing Tanzanian literature reveals a critical gap. Most studies approach waiting time reduction and patient experience as parallel rather than interconnected outcomes of healthcare service design. Operational studies prioritise efficiency metrics without systematically examining how redesigned processes are experienced by patients, while patient satisfaction studies remain largely descriptive and offer limited insight into deliberate service redesign (Bergh *et al*., 2022; Simwita, 2023; Ruhazwe, 2024). Only a small number of studies

explicitly engage with participatory or co-design approaches, and these have yet to be extended to the broader challenge of end-to-end patient journeys across healthcare services (Isangula *et al*., 2024).

As a result, healthcare managers and policymakers in Tanzania lack empirically grounded guidance on how service design principles can be applied to reduce waiting times while simultaneously enhancing patient experience in a sustainable and contextually appropriate manner. Addressing this gap requires research that explicitly positions waiting time reduction and patient experience as interconnected outcomes of healthcare service design, drawing on participatory methods and service design tools to redesign patient journeys within real-world settings. Accordingly, this study investigates how service design can be applied in Tanzanian primary healthcare facilities to reduce waiting times and improve patient experience.

1.1 Research Objective

i. Examine how existing healthcare service processes are designed and how these designs contribute to patient waiting times and experience outcomes;
ii. Analyse patient and frontline healthcare worker experiences across key service touchpoints to identify design-related bottlenecks;
iii. Assess the extent to which human-centred and participatory service design practices can simultaneously reduce waiting times and enhance patient experience; and
iv. Develop a service design-based framework integrating operational efficiency and patient experience improvement for application in Tanzanian healthcare facilities.

II. LITERATURE REVIEW

2.1 Theoretical Review

This study is grounded in service design theory and contemporary services marketing perspectives that conceptualise services as dynamic systems co-created through interactions among providers, users, and supporting infrastructures. In healthcare, these interactions unfold across multiple touchpoints and stages, making service outcomes such as waiting time and patient experience which highly dependent on how service processes are designed, coordinated, and experienced (Ostrom *et al*., 2019). The theoretical framework integrates service design theory, customer (patient) experience theory, and value co-creation logic to explain how deliberate redesign of healthcare services can reduce waiting times while improving patient experience.

2.1.1 Service Design Theory in Healthcare

Service design theory emphasises the deliberate organisation of people, processes, physical environments, and supporting technologies to create services that are useful, usable, and meaningful for users (Patrício *et al*., 2017). In healthcare contexts, service design provides a structured lens for understanding how patients move through service systems, how frontline staff interact with users, and how organisational arrangements shape service performance. By foregrounding service processes and experiences rather than outcomes alone, service design is particularly well suited to addressing persistent inefficiencies such as long waiting times (Rego *et al*., 2022).

From this perspective, waiting time is not simply a capacity or scheduling problem but an outcome of how workflows, decision points, and handovers are configured across the patient journey. Tools such as patient journey mapping, service blueprinting, and touchpoint analysis allow healthcare organisations to visualise service processes holistically, identify bottlenecks, and redesign service flows in ways that enhance both efficiency and patient experience (Palazzo *et al*., 2024). In this study, service design theory provides the central logic linking process redesign to improvements in waiting time and patient experience in Tanzanian healthcare settings.

2.1.2 Patient Experience Theory

Patient experience theory, grounded in the broader customer experience literature, conceptualises experience as a multidimensional construct shaped by cognitive, emotional, relational, and contextual factors across the service journey (Ostrom *et al*., 2019). In healthcare, patient experience extends beyond clinical outcomes to include perceptions of waiting, communication, empathy, fairness, and responsiveness. Empirical evidence consistently shows that prolonged waiting times undermine patient satisfaction and trust, even when technical quality of care is perceived as high (Wolf *et al*., 2014).

Within this framework, waiting time functions as both an objective indicator of service performance and a subjective experience that shapes patients' emotional responses and overall evaluations of care. Service design interventions influence patient experience by reshaping how waiting is organised, communicated, and perceived through clearer information flows, more predictable service sequences, and improved interactions with frontline staff (Rego *et*

al., 2022). Patient experience theory therefore explains why reductions in waiting time must be accompanied by improvements in service interactions to generate meaningful experiential gains.

2.1.4 Value Co-Creation and Human-Centred Design

The framework is further informed by value co-creation theory, which views service value as emerging through interactions between service providers and users rather than being unilaterally delivered by organisations (Frow *et al*., 2016). In healthcare, this perspective highlights the importance of engaging patients and frontline staff as co-designers of services, recognising their experiential knowledge as a critical input into service improvement. Co-creation practices such as co-design workshops, participatory prototyping, and feedback loops enable organisations to surface latent needs and develop solutions that are better aligned with users' lived experiences (Palazzo *et al*., 2024).

Human-centred design operationalises value co-creation by prioritising empathy, participation, and iterative learning throughout the service redesign process. In resource-constrained settings such as Tanzania, where opportunities for large-scale infrastructural investment are limited, co-creative service design offers a pragmatic pathway for improving service performance through process innovation rather than resource expansion.

2.1.5 Linking Service Design, Waiting Time, and Patient Experience

Taken together, these perspectives suggest that service design practices such as journey mapping, workflow redesign, and co-creation shape waiting time by reducing process inefficiencies and improving coordination across service touchpoints. Reduced and better-managed waiting times, in turn, positively influence patient experience, particularly perceptions of responsiveness, fairness, and care quality. At the same time, service design can directly enhance patient experience by improving communication, interaction quality, and emotional support during service encounters. Waiting time is therefore positioned as both an operational outcome and an experiential mediator linking service design practices to patient experience outcomes.

2.2 Conceptual Framework

Healthcare services can be understood as complex service systems in which efficiency and patient experience emerge from the way service processes are designed and enacted across multiple touchpoints. Within this perspective, service design provides a human-centred approach for organising people, processes, physical environments, and supporting technologies to improve both operational performance and experiential outcomes (Ostrom *et al*., 2019; Rego *et al*., 2022). This approach is particularly relevant for addressing prolonged waiting times and uneven patient experiences, which are closely linked to service design and coordination rather than to clinical quality alone (Palazzo *et al*., 2024).

2.2.1 Service Design Practices and Patient Waiting Time

Service design practices including patient journey mapping, service blueprinting, workflow redesign, and co-creation with patients and frontline staff which enable healthcare organisations to visualise service processes holistically and identify bottlenecks that disrupt patient flow. By improving coordination across service touchpoints, service design can reduce both actual and perceived waiting times (Rego *et al*., 2022; Palazzo *et al*., 2024). Prior studies indicate that administrative delays, fragmented workflows, and unclear role allocation are key contributors to prolonged waiting times, underscoring the importance of deliberate service redesign (Ostrom *et al*., 2019).

Ho_1: Service design practices have a significant effect on reducing patient waiting time in healthcare facilities.

2.2.2 Patient Waiting Time and Patient Experience

Patient experience is shaped not only by clinical outcomes but also by how patients perceive time, communication, fairness, and responsiveness throughout the service journey (Wolf *et al*., 2014). Waiting time therefore operates as both an efficiency indicator and a subjective experience that strongly influences patient satisfaction, trust, and emotional responses. Prolonged or poorly managed waiting times are consistently associated with negative evaluations of care quality, even when clinical services are adequate (Ostrom *et al.,* 2019).

Ho_2: Patient waiting time has a significant effect on patient experience in healthcare services.

2.2.3 Direct Effects of Service Design on Patient Experience

Beyond its influence on waiting time, service design is expected to directly affect patient experience by improving interaction quality, communication, and emotional support during service encounters. Human-centred and co-creative approaches actively involve patients and frontline staff in shaping services, enabling healthcare organisations to align service delivery more closely with patient needs and expectations (Frow *et al*., 2016; Palazzo *et al*., 2024).

Through clearer service pathways and improved information flow, service design can enhance patient experience independently of measurable reductions in waiting time.

Ho₃: Service design practices have a direct and significant effect on patient experience in healthcare services.

2.3.4 Mediating Role of Patient Waiting Time

Integrating these relationships, the framework positions patient waiting time as a mediating mechanism through which service design practices influence patient experience. By reducing inefficiencies and improving patient flow, service design lowers waiting time, which in turn enhances patient experience. At the same time, service design also improves experiential outcomes directly through improved communication and co-created service encounters, reflecting the interdependence of efficiency and experience (Rego *et al*., 2022; Ostrom *et al*., 2019).

Ho₄: Patient waiting time mediates the relationship between service design practices and patient experience.

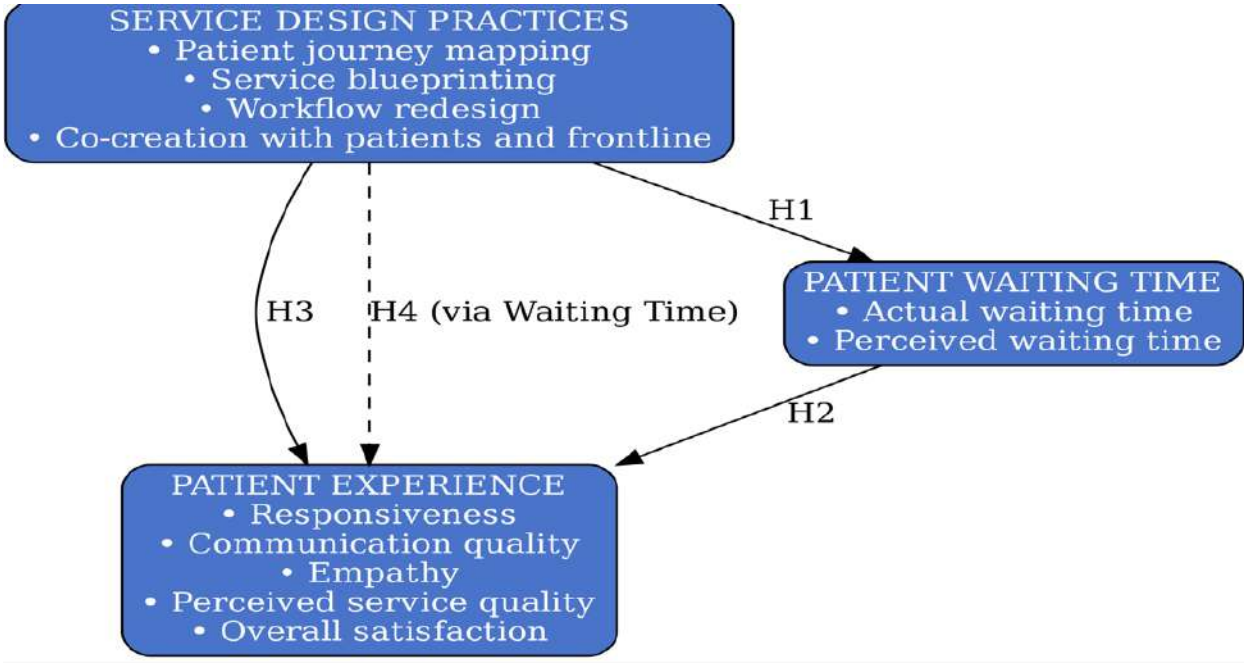

Figure 1
Conceptual Framework

III. METHODOLOGY

3.1 Research Philosophy and Approach

This study is grounded in a positivist research philosophy, which assumes that social phenomena can be objectively observed, measured, and analysed using empirical data and statistical techniques (Hair *et al.*, 2022). Positivism is appropriate for testing theoretically derived relationships and producing generalisable findings. Consistent with this stance, the study adopts a quantitative, deductive approach, enabling empirical testing of hypotheses derived from service design theory, patient experience theory, and value co-creation logic using survey data (Hair *et al*., 2022).

3.2 Research Design and Area of Study

A descriptive and explanatory cross-sectional research design was employed. The descriptive component captures the current state of service design practices, patient waiting time, and patient experience, while the explanatory component examines causal relationships among these variables (Sekaran & Bougie, 2019). Data were collected at a single point in time from patients attending primary healthcare facilities in major urban centres in Tanzania (Arusha, Dodoma, Dar es Salaam, Mbeya, and Mwanza). These cities were selected due to their high patient volumes and persistent challenges related to waiting times and service delivery efficiency. Primary healthcare facilities were chosen because they serve as the first point of contact for most patients and strongly shape overall patient experience.

3.3 Population and Sampling

The target population comprised patients receiving services at selected primary healthcare facilities in the five study cities during the data collection period. Patients were considered appropriate respondents because they directly experience service processes, waiting times, and staff interactions, enabling informed evaluation of service design outcomes and patient experience (Wolf *et al*., 2014). Sample size determination followed established guidelines for multivariate analysis and structural equation modelling, which recommend a minimum of 10 observations per estimated parameter or at least 300 cases (Hair *et al*., 2022). Accordingly, a target sample of 500 patients was considered sufficient to ensure statistical power and generalisability. However, only 462 (92.4%, response rate) was achieved in the field during data collection.

A multi-stage sampling strategy was applied. First, healthcare facilities were purposively selected based on patient volume and service scope. Second, systematic random sampling was used to select patients within facilities. Second, systematic random sampling was used to select patients within each facility. The sampling interval (n) was determined by dividing the estimated average daily outpatient attendance by the required number of respondents per facility, based on the allocated sample size. Accordingly, every nth exiting patient was invited to participate after a randomly selected starting point, a procedure that reduced selection bias while remaining feasible in busy healthcare environments (Sekaran & Bougie, 2019).

3.4 Variables and Measurement

The study examined three main constructs: service design practices, patient waiting time, and patient experience. All variables were measured using multi-item scales adapted from validated instruments in services marketing and healthcare research, with minor contextual modifications. Responses were captured using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree).

Table 1

Variables and Measurement

Variable	Measurement Indicators	Scale	Source
Service Design Practices	Journey clarity, workflow efficiency, staff–patient interaction design, co-creation opportunities	5-point Likert	Rego *et al.* (2022); Palazzo *et al.* (2024)
Patient Waiting Time	Perceived waiting duration, fairness of waiting, information during waiting	5-point Likert	Ostrom *et al.* (2019); Wolf *et al.* (2022)
Patient Experience	Responsiveness, communication quality, empathy, perceived service quality, overall satisfaction	5-point Likert	Wolf *et al.* (2014); Ostrom *et al*. (2019)

3.5 Data Collection

Primary data were collected using a structured questionnaire administered primarily in Swahili, the national language and the most familiar medium for respondents. The original questionnaire was developed in English and translated into Swahili using a forward–backward translation procedure to ensure semantic and conceptual equivalence. Discrepancies were resolved through consensus among bilingual experts. Where necessary, trained research assistants conducted face-to-face administration for respondents with limited literacy. This approach enhanced inclusivity and minimised recall bias by capturing responses immediately after service encounters (Sekaran & Bougie, 2019).

3.6 Validity and Reliability

Content validity was ensured by adapting items from established scales and seeking expert review from healthcare management and services marketing scholars. Construct validity was assessed using confirmatory factor analysis to examine convergent and discriminant validity, while reliability was evaluated using Cronbach's alpha and composite reliability, with values of 0.70 or above considered acceptable (Hair *et al*., 2022). A pilot study involving approximately 30 patients was conducted to refine item wording and improve clarity.

3.7 Data Analysis

With the aid of SmartPLS, data were analysed using descriptive statistics summarised respondent characteristics and key variables. Structural equation modelling (SEM) was employed to test the hypothesised relationships among service design practices, patient waiting time, and patient experience, including the mediating effect of waiting time. SEM was selected because it enables simultaneous estimation of multiple relationships while accounting for measurement error (Hair *et al*., 2022).

3.8 Ethical Considerations

Ethical approval was obtained from the relevant institutional ethics review board prior to data collection, and permission was secured from facility management in each study location. Participation was voluntary, informed consent was obtained from all respondents, and confidentiality and anonymity were assured. No personal identifiers were collected, and the study adhered to international ethical principles for health and social science research.

IV. FINDINGS & DISCUSSION

4.1 Description of the Sample

Although the study initially aimed to recruit 500 respondents, 462 completed questionnaires were successfully obtained i.e. 92.4% of response rate. This final sample size was sufficient to support robust statistical analysis and met established requirements for the analytical techniques employed. Data were collected from 462 patients attending primary healthcare facilities in Arusha (18.6%), Dodoma (16.9%), Dar es Salaam (27.7%), Mbeya (17.3%), and Mwanza (19.5%). Females constituted 57.4% of respondents, reflecting utilisation patterns reported in Tanzanian primary healthcare facilities. The majority of respondents (61.2%) were aged between 25 and 44 years, consistent with outpatient attendance trends documented in urban Tanzania. Approximately 68% of respondents reported visiting the facility more than twice in the previous six months, suggesting familiarity with service processes.

Table 2

Descriptive Profile of Respondents (N = 462)

Characteristic	Category	Frequency	Percentage
City of healthcare facility	Arusha	86	18.6
	Dodoma	78	16.9
	Dar es Salaam	128	27.7
	Mbeya	80	17.3
	Mwanza	90	19.5
	Total	**462**	**100.0**
Gender	Male	197	42.6
	Female	265	57.4
	Total	**462**	**100.0**
Age group (years)	Below 25	64	13.9
	25–34	143	31.0
	35–44	140	30.3
	45–54	72	15.6
	55 and above	43	9.2
	Total	**462**	**100.0**
Education level	No formal education	58	12.6
	Primary education	147	31.8
	Secondary education	168	36.4
	College/University	89	19.3
	Total	**462**	**100.0**
Frequency of facility visits (past 6 months)	First visit	148	32.0
	2–3 visits	191	41.3
	More than 3 visits	123	26.7
	Total	**462**	**100.0**

4.1.1 Measurement Model Assessment

The measurement model was assessed for reliability and validity prior to hypothesis testing.

Table 3

Reliability and Convergent Validity

Construct	Cronbach's α	Composite Reliability	AVE
Service Design Practices	0.89	0.91	0.67
Patient Waiting Time	0.86	0.88	0.64
Patient Experience	0.92	0.94	0.70

All constructs exceeded recommended thresholds (α > 0.70; CR > 0.70; AVE > 0.50), indicating satisfactory internal consistency and convergent validity. Discriminant validity was confirmed using the Fornell–Larcker criterion, with each construct's square root of AVE exceeding inter-construct correlations.

4.2 Structural Model and Hypotheses Testing

Structural Equation Modelling (PLS-SEM) was used to test the hypothesised relationships. In testing hypothesis one (H_1), the results in Table 4 show that, service design practices had a significant negative effect on patient waiting time ($\beta = -0.46$, $t = 9.18$, $p < 0.001$). These results indicate that, better-designed service processes were associated with shorter waiting times. Furthermore, the results of hypothesis two (H_2) reveal that, patient waiting time had a significant negative effect on patient experience ($\beta = -0.39$, $t = 7.64$, $p < 0.001$). This suggests that, longer waiting times substantially reduced patients' perceptions of service quality, responsiveness, and satisfaction. Moreover, results of hypothesis three (H_3) disclose that, service design practices had a direct positive effect on patient experience ($\beta = 0.41$, $t = 8.02$, $p < 0.001$), even after accounting for waiting time. In the hypothesis four (H4) which was mediating role of patient waiting time, bootstrapping analysis confirmed that patient waiting time partially mediates the relationship between service design practices and patient experience (indirect effect $\beta = 0.18$, $p < 0.001$). The direct path remained significant, indicating partial mediation.

Table 2

Summary of Hypotheses Testing

Hypothesis	Path	β	p-value	Result
H1	Service Design → Waiting Time	−0.46	<0.001	Supported
H2	Waiting Time → Patient Experience	−0.39	<0.001	Supported
H3	Service Design → Patient Experience	0.41	<0.001	Supported
H4	Mediation via Waiting Time	0.18	<0.001	Supported

Generally, the model explained 42% of the variance in patient waiting time and 58% of the variance in patient experience, indicating strong explanatory power for a services marketing study in a public healthcare context.

4.2.1 Service Design–Based Framework Integrating Operational Efficiency and Patient Experience

This figure presents a service design–based framework derived from the study's empirical findings. Service design practices are positioned as the primary driver of both operational efficiency and patient experience, reflecting their significant effects on patient waiting time ($\beta = -0.46$, $p < 0.001$) and patient experience ($\beta = 0.41$, $p < 0.001$). Patient waiting time occupies a central mediating role, linking service design practices to patient experience through its strong negative effect on experiential outcomes ($\beta = -0.39$, $p < 0.001$) and its partial mediation of the service design–experience relationship (indirect effect $\beta = 0.18$, $p < 0.001$). Together, the relationships illustrate how service design simultaneously reduces waiting times and enhances patient experience, integrating efficiency and human-centred care within Tanzanian primary healthcare facilities.

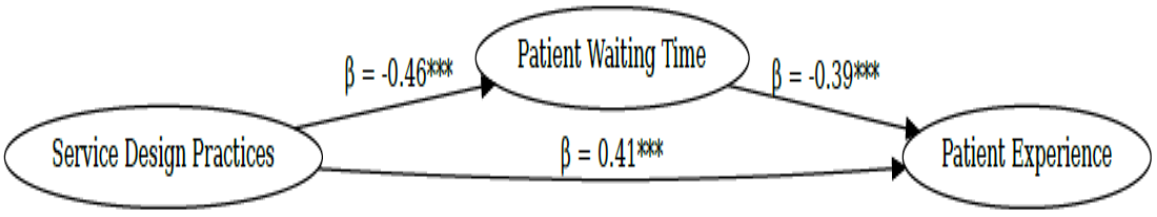

Figure 2

Service Design–Based Framework Integrating Operational Efficiency and Patient Experience

4.3 Discussion

4.3.1 Service Design and Waiting Time Reduction

The findings demonstrate that service design practices significantly reduce patient waiting times in Tanzanian primary healthcare facilities. This result aligns closely with empirical evidence from Tanzania showing that workflow

reorganisation, queue management, and role clarification reduce outpatient delays (Mwanswila *et al*., 2024; Mollel & Mwanswila, 2024). The magnitude of the effect observed in this study suggests that waiting time challenges in Tanzania are not solely a function of resource shortages, but are also deeply rooted in how services are designed and coordinated. These results extend earlier Tanzanian studies that focused primarily on technical or organisational interventions by showing that service design provides an integrative framework for addressing multiple inefficiencies simultaneously. This supports the argument that redesigning patient journeys and service touchpoints is a more sustainable approach than isolated operational fixes.

4.3.2 Waiting Time as a Determinant of Patient Experience

Consistent with prior Tanzanian and regional studies, waiting time emerged as a strong predictor of patient experience. Longer waiting times were associated with lower perceptions of responsiveness, communication quality, and overall satisfaction. This finding echoes results reported in district and municipal hospitals in Tanzania, where prolonged waits undermined patient trust and perceived quality of care (Venance, 2022; Chagula, 2025). From a services marketing perspective, this reinforces the view that waiting time is not merely an operational metric, but a core experiential attribute that shapes how patients evaluate service encounters. Poorly managed waiting erodes the perceived value of healthcare services, even when clinical outcomes are acceptable.

4.3.3 Direct Effects of Service Design on Patient Experience

Importantly, service design practices also had a direct positive effect on patient experience, independent of waiting time. This suggests that patients value not only shorter waits, but also how services are delivered, including clarity of information, empathy of staff, and perceived fairness of service processes. These findings resonate strongly with human-centred design evidence from rural Tanzania, where co-design approaches improved provider–client relationships and communication (Isangula *et al*., 2024). This result extends patient satisfaction studies in Tanzania by demonstrating that improvements in experience do not depend exclusively on reducing delays. Instead, experience can be enhanced through better-designed interactions, clearer service pathways, and more responsive communication-key principles of service design.

4.3.4 Mediating Role of Waiting Time

The partial mediation effect confirms that patient waiting time is a key mechanism through which service design influences patient experience, but not the only one. This finding supports the integrated logic of the conceptual framework and aligns with service design theory, which posits that service outcomes emerge through both process efficiency and experiential quality. In practical terms, this means that healthcare managers should not treat waiting time reduction and patient experience improvement as separate initiatives. Rather, both outcomes should be pursued simultaneously through service design interventions that reshape patient journeys holistically.

4.3.5 Theoretical and Contextual Contributions

The study contributes to the Journal of Services Marketing literature in three key ways. First, it extends service design and customer experience theory into a low-resource public healthcare context, addressing a gap in empirical evidence from Sub-Saharan Africa. Second, it empirically demonstrates the mediating role of waiting time, reinforcing the link between operational efficiency and experiential outcomes. Third, it positions patients explicitly as service users, aligning healthcare research with core services marketing principles (Ayimbillah *et al*., 2011).

From a theoretical perspective, the study underscores the importance of integrating operational efficiency and patient experience within a unified service design framework. Future research should build on this approach by examining how service design practices interact with contextual factors such as organisational culture, leadership, and technological infrastructure. Longitudinal and mixed-method studies would be particularly valuable for assessing how design-led interventions evolve over time and for capturing the dynamic interplay between efficiency and experience in healthcare services.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

This study makes distinct theoretical and practical contributions by demonstrating how service design functions as an integrative mechanism for simultaneously addressing waiting times and patient experience in low-resource primary healthcare settings. Conceptually, the findings advance service design and patient experience theories by empirically confirming that waiting time operates not merely as an operational variable but as a mediating service design outcome that shapes how value is perceived and co-created during healthcare encounters. By situating this relationship within a Tanzanian public healthcare context, the study extends predominantly high-income country–based service design scholarship into an under-examined institutional and resource-constrained environment.

From a services marketing and value co-creation perspective, the study contributes new empirical evidence showing that efficiency and experience are not competing objectives but mutually reinforcing outcomes of intentional service configuration. This insight refines existing theory by illustrating how patient experience in constrained systems is strongly influenced by the design of service touchpoints, communication practices, and patient flow logic, rather than by throughput speed alone. In doing so, the study offers a context-sensitive theoretical extension of service design principles applicable to public sector services in emerging economies.

Practically, the study provides actionable guidance for healthcare managers and policymakers operating under severe capacity and funding limitations. The findings demonstrate that low-cost, design-oriented interventions such as restructuring patient journeys, clarifying service sequences, and engaging frontline staff and patients in co-design can yield meaningful improvements without reliance on major infrastructural investments. This positions service design as a feasible, scalable, and policy-relevant strategy for strengthening primary healthcare performance in Tanzania and comparable low-resource settings. In general, the study's core contribution lies in reframing service design from a supplementary improvement tool to a strategic capability for public healthcare systems. By empirically linking service design to both operational efficiency and patient-centred value creation in a resource-constrained context, the research offers a transferable analytical lens for scholars and practitioners seeking sustainable solutions to persistent healthcare delivery challenges in emerging economies.

5.2 Recommendations

Based on the obtained findings, this study offers several practical and theoretical recommendations for improving healthcare service delivery in Tanzanian primary healthcare facilities through service design. From a managerial and practice perspective, healthcare managers should adopt service design as a strategic approach rather than treating waiting time reduction and patient experience improvement as separate initiatives. The evidence shows that inefficiencies are closely tied to how services are designed and coordinated; therefore, managers should prioritise holistic redesign of patient journeys across key service touchpoints, including registration, consultation, and pharmacy services. Practical actions such as workflow reorganisation, clearer task allocation among staff, and improved sequencing of service activities can yield meaningful reductions in waiting times without requiring substantial additional resources.

In addition, healthcare facilities should strengthen communication during waiting periods, as patient experience is shaped not only by the length of waiting but also by how waiting is perceived. Providing timely information about expected waiting times, service procedures, and delays can reduce uncertainty and enhance perceptions of fairness and responsiveness. Training frontline staff in patient-centred communication and empathetic interaction is therefore critical for improving experiential outcomes alongside operational efficiency.

The findings further highlight the value of human-centred and participatory service design practices. Healthcare managers are encouraged to actively involve patients and frontline staff in co-design processes, such as feedback workshops, journey mapping exercises, and small-scale service prototyping. These approaches help surface design-related bottlenecks that may be invisible to administrators and enable the development of solutions that are better aligned with patients' lived experiences and staff capabilities. Given resource constraints in Tanzanian primary healthcare settings, such low-cost, participatory interventions offer a practical and sustainable pathway for service improvement.

At the policy level, the study recommends integrating service design principles into ongoing health system reforms and digital health initiatives. Policymakers should support the adoption of design-led approaches by incorporating patient experience metrics alongside traditional efficiency indicators in performance monitoring frameworks. Investments in basic digital tools, such as appointment scheduling systems and queue management technologies, should be complemented by attention to service design and user experience to ensure that technological solutions translate into meaningful improvements for patients. Largely, these recommendations emphasise that improving waiting times and patient experience in Tanzanian primary healthcare facilities requires a shift from isolated operational fixes toward deliberate, human-centred service design, offering a more sustainable and contextually appropriate pathway for enhancing healthcare service performance.

Declaration of Interest

The author declares that he does not have any known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Funding Declaration

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

REFERENCES

Ayimbillah, A. R., Abekah-Nkrumah, G., & Ameyaw, D. K. (2011). Managing healthcare quality in Ghana: A necessity of patient satisfaction. *International Journal of Health Care Quality Assurance, 24*(7), 548–563. https://doi.org/10.1108/09526861111160580

Bergh, K., Bishu, S., & Taddese, H. B. (2022). Identifying the determinants of patient satisfaction in the context of antenatal care in Kenya, Tanzania, and Malawi using Service Provision Assessment data. *BMC Health Services Research, 22*, 746. https://doi.org/10.1186/s12913-022-08085-0

Biya, M., Gezahagn, M., Birhanu, B., Yitbarek, K., Getachew, N., & Beyene, W. (2022). Waiting time and its associated factors in patients presenting to outpatient departments at public hospitals of Jimma Zone, Southwest Ethiopia. *BMC Health Services Research, 22*(1), 107. https://doi.org/10.1186/s12913-022-07502-8

Chagula, M. G. (2025). Assessment of healthcare service satisfaction among National Health Insurance Fund beneficiaries: A case of Musoma Municipal (Master's dissertation, The Open University of Tanzania).

Darkwa, M., Engel, K., Findlay, Z., Voyer, A.-M., & Waddell, A. E. (2023). Using co-design to improve the client waiting experience at an outpatient mental health clinic. *BMJ Open Quality, 12*(1), e001781. https://doi.org/10.1136/bmjoq-2021-001781

Dibba, Y., Boima, F., Jerome, J. G., Watson, S. I., Chery, L., Higgins, J., Chung, V., Joseph, S., Mulailwa, K. P., Mukherjee, J., & Mekonnen, Z. A. (2025). Patient satisfaction and its associated factors in selected primary healthcare facilities in Kono District, Sierra Leone: A cross-sectional study. *BMJ Open, 15*(4), e093501. https://doi.org/10.1136/bmjopen-2024-093501

Frow, P., McColl-Kennedy, J. R., & Payne, A. (2016). Co-creation practices: Their role in shaping a healthcare ecosystem. *Industrial Marketing Management, 56*, 24-39.

Greenhalgh, T., Wherton, J., Shaw, S., & Morrison, C. (2020). Video consultations for Covid-19. *The BMJ, 12*, m998. https://doi.org/10.1136/bmj.m998

Hafiz, O., Yin, X., Sun, S., Yang, J., & Liu, H. (2024). Examining the use and application of the WHO Integrated People-Centred Health Services Framework in research globally: A systematic scoping review. *International Journal of Integrated Care, 24*(2), 9. https://doi.org/10.5334/ijic.7754

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2022). *A primer on partial least squares structural equation modeling (PLS-SEM)* (3rd ed.). Sage. https://doi.org/10.1007/978-3-030-80519-7

Isangula, K., Pallangyo, E., & Ndirangu, E. (2024). Nurses' and clients' perspectives after engagement in the co-designing of solutions to improve provider-client relationships in maternal and child healthcare: A human centered design study in rural Tanzania. *BMC Nursing, 23*(1), 1-11. https://ecommons.aku.edu/eastafrica_fhs_sonam/513

Kruk, M. E., Gage, A. D., Arsenault, C., Jordan, K., Leslie, H. H., Roder-DeWan, S., Adeyi, O., Barker, P., Daelmans, B., Doubova, S. V., English, M., García-Elorrio, E., Guanais, F., Gureje, O., Hirschhorn, L. R., Jiang, L., Kelley, E., Lemango, E. T., Liljestrand, J., Malata, A., ... Pate, M. (2018). High-quality health systems in the Sustainable Development Goals era: Time for a revolution. *The Lancet Global Health, 6*(11), e1196–e1252. https://doi.org/10.1016/S2214-109X(18)30386-3

Mainda, G. M., & Sulle, A. (2024). The roles of e-government on effective services delivery in the health sector: A case of Muhimbili Referral Hospital, Tanzania. *African Journal of Empirical Research, 5*(3), 588–604. https://doi.org/10.51867/ajernet.5.3.51

Mollel, H. A., & Mwanswila, M. J. (2024). Outcome evaluation of effect of organizational strategies on reduction of patient waiting time at the outpatient department at Kilimanjaro Christian Medical Centre - Northern, Tanzania. *medRxiv*.

Mwanswila, M. J., Mollel, H. A., & Mushi, L. D. (2024). Outcome evaluation of technical strategies on reduction of patient waiting time in the outpatient department at Kilimanjaro Christian Medical Centre—Northern Tanzania. *BMC Health Services Research, 24*, 785. https://doi.org/10.1186/s12913-024-11231-5

Nwagbara, U. I., Hlongwana, K. W., & Chima, S. C. (2024). Mapping evidence on the factors contributing to long waiting times and interventions to reduce waiting times within primary health care facilities in South Africa: A scoping review. *PLoS ONE, 19*(8), e0299253. https://doi.org/10.1371/journal.pone.0299253

Ostrom, A. L., Fotheringham, D., & Bitner, M. J. (2019). Customer acceptance of AI in service encounters: Understanding antecedents and consequences. In P. P. Maglio, C. A. Kieliszewski, J. C. Spohrer, K. Lyons, L. Patrício, & Y. Sawatani (Eds.), *Handbook of Service Science, Volume II* (pp. 77-103). Springer. https://doi.org/10.1007/978-3-319-98512-1_5

Palazzo, A. C., Bertelli, M., & Gaspari, J. (2024). A systemic review on the adoption of service design practices to improve the quality of user experience and organization in the healthcare environment. *Sustainability, 16*(13), 5595. https://doi.org/10.3390/su16135595

Patrício, L., Gustafsson, A., & Fisk, R. (2017). Upframing service design and innovation for research impact. *Journal of Service Research, 21*(1), 3-16. https://doi.org/10.1177/1094670517746780

Rego, S., Pereira, L., Dias, Á., Gonçalves, R., & da Costa, R. L. (2022). How service design can improve the patient experience. *International Journal of Services, Economics and Management, 13*(4), 410–449.

Ruhazwe, F. (2024). Optimizing primary healthcare infrastructure for surgical services in Dodoma: Strategies, challenges, and impact assessment. *NIU Journal of Social Sciences, 10*(4), 17-30. https://doi.org/10.58709/niujss.v10i4.2026

Sekaran, U., & Bougie, R. (2019). *Research methods for business: A skill building approach.* John Wiley & Sons.

Siciliani, L., Borowitz, M., & Moran, V. (Eds.). (2013). *Waiting time policies in the health sector: What works?* OECD Health Policy Studies. OECD Publishing. https://doi.org/10.1787/9789264179080-en

Simwita, Y. (2023). Improving patient experience in healthcare processes: Discrete event simulation-based approach. *Tanzanian Journal of Population Studies and Development, 30*(2), 82-96. https://doi.org/10.56279/tjpsd.v30i2.222

Venance, S. (2022). Factors influencing patient waiting time in public health facilities: A case study of Temeke Referral Hospital (Master's thesis, The Open University of Tanzania).

Wolf, J. A., Niederhauser, V., Marshburn, D., & LaVela, S. L. (2014). Defining patient experience. *Patient Experience Journal, 1*(1), 7-19. https://doi.org/10.35680/2372-0247.1004