



BEDOUIN EMPLOYEES' AND SERVICE USERS' PERCEPTIONS OF THE IMPACT OF TECHNOLOGY INTEGRATION IN PUBLIC INSTITUTIONS IN SOUTHERN ISRAEL ON SERVICE QUALITY, ACCESSIBILITY, AND SOCIAL INCLUSION

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Abstract:

Digital transformation has become central to public-service delivery, yet an online channel does not necessarily ensure an understandable, usable, or socially inclusive service. This study examined how Bedouin employees and service users perceive the impact of technology integration in public institutions in Southern Israel on service quality, accessibility, and social inclusion. An interpretive qualitative descriptive design was used to answer how the two groups understand digital integration in health, education, and administrative services. The purposive sample comprised 26 participants: 13 Bedouin employees and 13 service users, distributed across health ($n = 9$), education ($n = 8$), and administrative services ($n = 9$). Individual semi-structured interviews were conducted in Arabic and analyzed through an integrated deductive-inductive thematic approach. Five interconnected themes were developed: efficiency conditional on completion of the digital service pathway; effective access as an interconnected system of resources; redistribution rather than elimination of work and burden; mediation as a bridge to access and a limit on autonomy and privacy; and transparency and user control as foundations of trust, equity, and social inclusion. Technology integration was perceived as beneficial when it reduced travel, enabled tracking, preserved information, and supported completion. Its value weakened when channels were fragmented, messages were ambiguous, connectivity was unstable, attachments were difficult, or access depended on unstructured mediation. The study concludes that digital public-service quality should be evaluated through the complete user journey and the user's capacity to understand, complete, question, correct, and control the process. Public institutions should combine coherent pathways with mobile-compatible design, plain Arabic, progress-saving functions, organized human support, and privacy-preserving assistance.

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JEL: O33 – Technological Change: Choices and Consequences; Diffusion Processes; H83 – Public Administration; Public Sector Accounting and Audits; D63 – Equity, Justice, Inequality, and Other Normative Criteria and Measurement; Z13 – Economic Sociology; Economic Anthropology; Social and Economic Stratification (for social inclusion and community aspects); H11 – Structure, Scope, and Performance of Government (if emphasizing public-sector service delivery); I38 – Government Policy; Provision and Effects of Welfare Programs (if the focus is more on access to health and social services); O35 – Social Innovation (if the journal interprets digital public-service innovation broadly).

Keywords: digital transformation; public services; service quality; accessibility; social inclusion; Bedouin community; e-government; digital divide; qualitative research; thematic analysis

1. Introduction

Digital technologies increasingly structure the relationship between public institutions and the people who depend on them. Public services that once required an office visit, a paper form, or repeated telephone contact are now mediated through portals, applications, automated notifications, digital records, and remote submission systems. This shift is often presented as a route to faster procedures, lower administrative costs, and more responsive government. Yet digital transformation is not simply the conversion of paper into an electronic format. It can reorganize institutional processes, redistribute responsibility between employees and users, and change the point at which human explanation or discretion enters the service encounter (Lindgren *et al.*, 2019; Mergel *et al.*, 2019). The practical meaning of a digital service therefore depends not only on whether a system exists, but also on how it works within the full pathway through which a person seeks, completes, and follows a public service.

The policy literature increasingly reflects this broader understanding. The OECD's digital government framework emphasizes user-centered design, data-informed administration, openness, proactive services, and government-as-a-platform rather than isolated online portals (OECD, 2020). Similarly, international assessments treat digital government as an institutional transformation that should advance sustainable and inclusive development (United Nations Department of Economic and Social Affairs [UN DESA], 2024). These frameworks are important, but their principles become meaningful only when translated into everyday service experiences. A service may be officially available online while remaining difficult to use because the required device is unsuitable, connectivity is unstable, verification procedures are inconsistent, the language is formally translated but practically unclear, or support is available only through family members. In such cases, digital availability and effective accessibility are not equivalent.

This distinction is especially important in socially and geographically peripheral contexts. Digital inequality research shows that disparities persist across access, skills, forms of use, and the benefits derived from technology (Scheerder *et al.*, 2017; van Deursen & Helsper, 2015; van Dijk, 2020). A person may own a smartphone and use messaging applications confidently while still being unable to complete a multi-stage public transaction involving identity verification, document conversion, attachments, or formal administrative terminology. Digital public services can therefore reduce traditional burdens, such as travel and queueing, while creating new burdens related to account management, error recovery, file preparation, and reliance on intermediaries. The relevant question is not simply whether individuals are connected, but whether the system enables them to convert that connection into a meaningful public-service outcome.

The Bedouin community in Southern Israel provides a significant context for examining these issues. Research has documented inequalities in infrastructure, patterns of technology use, and the capabilities required to convert digital resources into practical opportunities among Bedouin communities (Abu-Kaf *et al.*, 2019; Marciano *et al.*, 2024). Studies concerning the Arab population in Israel have also identified educational, linguistic, spatial, and demographic barriers to digital government use (Harari *et al.*, 2026; Rosenberg, 2019). These findings should not be interpreted as evidence that the community is homogeneous or uniformly digitally disadvantaged. Individual experiences vary according to the specific task, prior practice, available devices, connectivity, language, institutional support, and the person's relationship to the service. A contextual qualitative approach is therefore necessary to avoid treating age, education, residence, or community membership as deterministic explanations.

Existing scholarship provides strong conceptual accounts of technology acceptance, digital service quality, digital inequality, trust, and public value. However, these literatures are often examined separately, and studies commonly privilege either the institutional perspective or the citizen perspective. Less attention has been given to how the same digital pathway is interpreted simultaneously from inside the institution and from the point of use, particularly in the Bedouin context. Employees can observe system integration, internal records, support demands, and the redistribution of front-line work. Service users encounter login procedures, devices, connectivity, attachments, language, assistance, confirmation, and the practical consequences of delay. Bringing these perspectives together makes it possible to identify where institutional assumptions and user experience converge or diverge.

The present study addresses this gap by examining digital transformation as an institutional and social process rather than a purely technical intervention. It connects three outcome domains—service quality, accessibility, and social inclusion—with four cross-cutting interpretive dimensions: technical; cognitive and skills-related; cultural and linguistic; and social and institutional. The dimensions were used as flexible sensitizing lenses rather than predetermined variables or final themes. The analysis ultimately

generated a more relational account in which efficiency depended on completion of the digital pathway, access depended on interconnected resources, work was redistributed rather than simply removed, mediation could both enable and constrain, and trust and inclusion were shaped by transparency and user control.

Accordingly, the aim of this study was to explore how Bedouin employees and service users perceive the impact of technology integration in public institutions in Southern Israel on service quality, accessibility, and social inclusion. The main research question was: How do Bedouin employees and service users in public institutions in Southern Israel perceive the impact of technology integration on service quality, accessibility, and social inclusion? To answer this question, the study used individual semi-structured interviews with 26 purposively selected participants across health, education, and administrative services. The article contributes a contextual qualitative interpretation of digital public services and offers practical implications for designing pathways that remain efficient, understandable, accessible, and respectful of autonomy and privacy.

2. Literature Review

2.1 Digital Transformation in Public Institutions

Digital transformation in public administration is conceptually broader than digitization. Digitization refers to converting information or procedures into digital form, whereas digital transformation involves changes to processes, organizational culture, service models, data use, and relationships with citizens. Mergel *et al.* (2019) show that public-sector digital transformation requires more than automation because it affects the internal logic of administration and the institution's understanding of stakeholders. Lindgren *et al.* (2019) similarly argue that research should examine how digitalization changes the public service encounter, including the roles of employees, citizens, and technological systems. This perspective is particularly relevant where front-line employees continue to interpret, correct, or complete processes that are officially digital.

2.2 Technology Acceptance and Digital Public Service Quality

The Technology Acceptance Model explains adoption through perceived usefulness and perceived ease of use (Davis, 1989; Aksoy *et al.*, 2022). In public services, these constructs remain relevant: users are more likely to value a system that reduces travel, provides timely information, and simplifies repeated procedures. However, public service use is not always voluntary. Citizens may have to use a digital channel to obtain a benefit, register for a service, or follow an administrative requirement. Trust, compatibility, risk, and institutional accountability therefore become particularly important (Carter & Bélanger, 2005; Nematian *et al.*, 2025). A user may perceive the channel as useful but still hesitate because the handling of personal information is unclear or because previous errors were not resolved.

Service quality models broaden the analysis beyond adoption. E-S-QUAL identifies efficiency, system availability, fulfillment, and privacy as central elements of electronic service quality (Parasuraman *et al.*, 2005). For government services, e-GovQual emphasizes dimensions such as efficiency, trust, reliability, and citizen support (Papadomichelaki & Mentzas, 2012). More recent work on digital public service quality integrates system, operational, and information quality with accessibility, transparency, support, accountability, and inclusion (Alves *et al.*, 2025). These approaches are valuable because they recognize that successful service delivery depends on the interaction of the technical platform, the information communicated, and the support offered when the standard pathway fails.

2.3 Accessibility, Usability, and Digital Capability

Accessibility, usability, and digital capability are related but distinct. Digital availability means that a service is present through an electronic channel. Accessibility concerns whether different users can reach and interact with it without unjustified technical, linguistic, or functional barriers. Usability concerns the clarity, learnability, efficiency, and recoverability of the interface and process. Digital capability concerns the knowledge, skills, confidence, and resources required to complete the task. A service can be available but inaccessible, accessible but difficult to use, or well-designed while still demanding capabilities that some users do not possess.

Helbig *et al.* (2009) argue that electronic government must be understood through multiple levels of the digital divide rather than as a simple connectivity problem. In public services, effective access requires a viable channel, a compatible device, stable connectivity, understandable instructions, successful authentication, manageable attachments, and access to appropriate assistance. The failure of any one element can interrupt the entire pathway. This is why ownership of a smartphone cannot be treated as evidence that a person can complete a public transaction. The device may be adequate for receiving a message but unsuitable for reading a long form, converting a document, or uploading several files.

2.4 Digital Divide and Digital Inclusion

Digital divide scholarship has progressed from a primary focus on physical access to more differentiated accounts of motivation, material access, skills, use, and outcomes (van Dijk, 2020). Second- and third-level perspectives show that social inequalities continue after connection is achieved because users differ in the skills they develop, the activities they undertake, and the benefits they obtain (Scheerder *et al.*, 2017; van Deursen & Helsper, 2015). Lythreathis *et al.* (2022) further demonstrate that digital inequality is shaped by interacting socioeconomic, spatial, educational, and technological conditions. These insights are highly relevant to digital public services because a transaction may combine several demanding stages rather than a single act of access.

Digital inclusion shifts the analytical focus from the possession of technology to the capability to use technology for meaningful goals. Warschauer (2003) emphasizes the combination of physical, human, social, and content resources required for effective participation. Helsper (2021) connects digital inequalities to broader social inequalities, showing how existing resources shape the ability to transform digital engagement into educational, economic, civic, and social outcomes. In public services, inclusion means that the user can obtain a meaningful result without disproportionate cost, repeated failure, or permanent dependence on others.

Recent public-service research conceptualizes inclusion as an ecosystem issue involving governance, service design, and direct user support (Liu *et al.*, 2025). Djabatiko *et al.* (2025) likewise argue that inclusive digital transformation requires simultaneous attention to infrastructure, skills, institutional barriers, and trust. This literature challenges interventions that address one barrier in isolation. Translating an interface without simplifying administrative language, offering training without correcting opaque errors, or improving connectivity without preserving progress may improve one component while leaving the service pathway incomplete.

2.5 Social Inclusion and Public Value

Social inclusion in digital public services cannot be reduced to internet use or transaction completion. In this study, it concerns how the digital encounter shapes participants' sense of equity, trust, belonging, and participation in public institutions. Independence, the need for mediation, and the preservation of dignity function as interpretive indicators of this relationship. A user may receive the service but still experience exclusion if the process requires them to surrender control of their account or disclose sensitive information to an intermediary.

The public value literature extends evaluation beyond efficiency and individual satisfaction. Twizeyimana and Andersson (2019) identify improved public services, administrative effectiveness, trust, social value, and well-being as central dimensions of e-government public value. Hardill and O'Sullivan (2018) caution that online public service delivery has implications for social citizenship when the digital channel becomes a barrier to essential services. These perspectives suggest that the quality of digital government should be assessed not only by institutional savings or transaction speed, but also by whether users can understand the process, exercise agency, receive fair treatment, and maintain a meaningful relationship with the institution.

2.6 Trust, Information Privacy, and Digital Mediation

Trust influences whether users are willing to engage with digital government and how they interpret uncertainty. Carter and Bélanger (2005) show that trust and compatibility supplement usefulness and ease of use in explaining e-government utilization. Bélanger and Carter (2008) distinguish trust in government, trust in the internet, and perceived risk. This distinction is important because a person may be technically able to use a

channel while remaining reluctant to submit information or rely on the result. Trust can precede use, but it is also reshaped by the service experience, particularly by confirmation, consistency, responsiveness, and the visibility of responsibility.

Digital mediation is increasingly recognized as part of the actual infrastructure of e-government. Giest and Samuels (2023) show how social infrastructure and support programs help citizens navigate digital administrative burdens. Toro-Maureira *et al.* (2026) identify family members, peers, employees, and community actors as intermediaries in e-government. Mediation can be a legitimate bridge to access, especially for an unfamiliar task. Its consequences depend on how it is structured: whether it teaches, preserves consent, limits data exposure, and maintains the user's authority, or whether it becomes a permanent and unregulated condition for receiving the service.

2.7 Digital Public Services in the Bedouin Community in Southern Israel

Studies of Bedouin communities in Israel demonstrate that digital inequality cannot be separated from infrastructure, place, education, and available capabilities. Abu-Kaf *et al.* (2019) document a Bedouin digital divide, while Marciano *et al.* (2024) emphasize capabilities divide in technology adoption and use. These studies indicate that the value of technology depends on whether individuals can mobilize it within their material and social conditions. The findings also caution against interpreting device ownership or basic use as equivalent to effective participation.

Research on the Arab population in Israel similarly shows uneven engagement with digital government. Rosenberg (2019) links e-government use to broader patterns of social inequality, and Harari *et al.* (2026) identify educational, linguistic, spatial, and demographic barriers. In health services, Penn and Laron (2023) report barriers to telehealth use among the Arab population. These studies provide essential contextual evidence, but they do not fully explain how barriers combine within a single service pathway or how employees and service users interpret the same process from different positions.

2.8 Research Gap and Analytical Framework

The literature establishes that digital transformation changes public administration, that service quality combines system, information, and support dimensions, that access extends beyond connectivity, and that trust and mediation influence use. It also identifies digital inequalities within Arab and Bedouin contexts in Israel. However, an empirical gap remains at the intersection of these domains. Existing work rarely combines the views of Bedouin employees and service users in one qualitative analysis while examining service quality, effective accessibility, and social inclusion across health, education, and administrative services.

The study addressed this gap through an analytical framework that retained three outcome domains—service quality, accessibility, and social inclusion—and four cross-cutting dimensions—technical; cognitive and skills-related; cultural and linguistic; and

social and institutional. The dimensions guided attention to possible relationships without functioning as variables or predetermined final themes. This approach allowed the thematic analysis to identify patterns that cut across the original categories and to preserve contradictory or conditional experiences. The final themes therefore represent relationships within the data rather than a mechanical reproduction of the literature review.

3. Material and Methods

3.1 Research Paradigm and Design

The study was located within an interpretive perspective with a constructivist sensibility. Interpretive research assumes that social reality is understood through the meanings people construct in particular settings, while constructivism recognizes that meaning is shaped through experience, language, context, and the research encounter (Crotty, 1998; Schwartz-Shea & Yanow, 2012). This position was appropriate because service quality, accessibility, and social inclusion were not treated as fixed numerical properties. They were examined as meanings expressed by participants when describing speed, clarity, difficulty, support, fairness, trust, and institutional proximity.

A qualitative descriptive-interpretive design was adopted. The descriptive component preserved participants' accounts of the service pathway, whereas the interpretive component examined relationships among the conditions they described (Creswell & Poth, 2018). The design was selected because the main question asked how participants perceived technology integration rather than whether a predetermined statistical relationship existed. It allowed the study to examine mixed experiences in which the same digital service could reduce travel while introducing a new attachment problem, or provide faster information while increasing dependence on assistance.

3.2 Study Context and Participants

The study context comprised public institutions providing health, educational, or administrative services in Southern Israel within the social context of the Bedouin community. The study included two relational positions: Bedouin employees who encountered digital integration from within institutional procedures and Bedouin service users who encountered it at the point of access and use. This dual perspective made it possible to compare internal concerns such as record integration and front-line support with external concerns such as login, attachments, connectivity, assistance, and confirmation.

Purposive sampling was used to recruit participants with direct experience relevant to the research question, consistent with qualitative sampling for information-rich cases (Patton, 2015). The final sample comprised 26 participants: 13 employees and 13 service users. Nine participants were connected to health services, eight to educational services, and nine to administrative services. Variation in age, education, general

residential context, experience with digital services, and experience before digitalization was used to support contextual comparison rather than statistical inference. These characteristics were not treated as deterministic causes of capability or difficulty.

Table 1: Distribution of Participants by Group and Service Sector

Participant group	Health	Education	Administrative	Total
Employees	5	4	4	13
Service users	4	4	5	13
Total	9	8	9	26

Source: Prepared by the researcher based on the study data.

3.3 Data Collection

Individual semi-structured interviews were the sole data-generation method. This format provided a common set of topics while allowing participants to elaborate on examples, clarify meaning, and describe conditions that were not anticipated in a closed instrument (Brinkmann & Kvale, 2015). The interview guide covered participants' relationship to the institution, their experience of technology integration, perceived service quality, accessibility, assistance, privacy, fairness, trust, and social inclusion.

All interviews were conducted face-to-face during May and June 2026 and lasted approximately 45 to 60 minutes. They were conducted in Arabic to support natural expression and participant comfort. Responses were recorded contemporaneously by the researcher in a Word document without audio recording. The resulting material is therefore a direct written record of the interviews, not a verbatim transcript derived from recordings. This distinction is maintained throughout the article. Quotations used below were translated from Arabic into English for publication and were checked against the original written record.

Participants were coded P1 to P26 from the beginning of data management. Names, contact details, specific institutions, platforms, and localities were not included in the analytical presentation. Participants provided explicit oral consent after receiving an explanation of the study, voluntary participation, confidentiality, the right to decline a question, and the right to withdraw. No separate institutional or research ethics committee approval was issued, and the study does not claim otherwise. This absence is reported transparently as a limitation on independent ethical oversight.

3.4 Data Analysis

The data were analyzed using thematic analysis, understood as a systematic and interpretive process for developing patterns of shared meaning rather than extracting themes automatically from text (Braun & Clarke, 2006, 2021). The analysis followed an integrated deductive-inductive logic. The research questions and the four interpretive dimensions provided initial orientation, while coding remained open to meanings and relationships that were not specified in advance. This approach is consistent with hybrid

thematic analysis in which theoretically informed attention is combined with inductive development (Fereday & Muir-Cochrane, 2006).

The interview material was organized into 780 textual units. Relevant units were connected to 31 central codes, and 501 coding assignments remained textually supported after review. Excel was used to organize the interview units, code definitions, conceptual categories, final themes, comparisons, quotations, and links between claims and source text. These numbers describe the organization and traceability of the analysis; they were not used as frequencies, weights, or evidence of statistical importance.

3.5 Trustworthiness and Research Limitations

Trustworthiness was addressed through explicit alignment between the research question, interview guide, coding, themes, and final claims; comparison between employees and service users; comparison across sectors; and direct linkage of interpretations to the written interview record. The reporting distinguishes description from interpretation and includes conditional cases that restrict overly positive or negative conclusions. These practices support credibility, dependability, confirmability, and transferability in qualitative inquiry (Lincoln & Guba, 1985; Nowell *et al.*, 2017). Reflexivity was also necessary because the researcher conducted the interviews, recorded responses, coded the data, and interpreted the results (Berger, 2015).

The study nevertheless has important limitations. The direct written records do not preserve every word, pause, emphasis, or conversational feature that an audio transcript would retain. The study relied on interviews as a single source and did not use observation, document analysis, or another form of triangulation. The final themes were not returned to participants for member checking, and no independent coder was used. The sample was purposive and context-specific, so the findings are intended for analytical interpretation and possible transfer to comparable settings rather than statistical generalization. The absence of separate institutional ethical approval and of a complete contemporaneous audit trail of every coding decision further limits external verification. These boundaries are stated to define the evidential strength of the study rather than to invalidate its contextual insights (Tracy, 2010).

4. Results

The thematic analysis produced five interconnected themes. They are not ranked by frequency and should not be read as independent variables. Together, they describe a sequence in which a digital pathway promises efficiency, depends on a wider system of access resources, redistributes work and burden, often invokes mediation, and ultimately shapes trust, equity, and social inclusion through transparency and user control. Table 2 summarizes the organizing idea of each theme and its primary relationship to the research questions.

Table 2: Final Themes and Their Organizing Ideas

Theme	Organizing idea	Primary analytical relationship
Efficiency conditional on completion of the digital service pathway	Efficiency is produced by an end-to-end, integrated, and understandable pathway rather than by the presence of a digital step.	Technology integration and perceived service quality
Effective access as an interconnected system of resources	Access depends on the interaction of system stability, connectivity, device, attachments, authentication, language, capability, and support.	Accessibility and the explanation of differences
Redistribution rather than elimination of work and burden	Digitalization changes where work is performed among institutions, employees, users, and families.	Service quality, workload, and relational position
Mediation as a bridge to access and a limit on autonomy and privacy	Assistance can enable completion but may reduce independence or expose information when it substitutes for the user.	Accessibility, privacy, and equity
Transparency and user control as foundations of trust, equity, and social inclusion	Institutional proximity depends on understandable status, confirmation, questioning, correction, objection, and control.	Trust, fairness, belonging, and inclusion

Source: Prepared by the researcher based on the study data.

4.1 Theme 1: Efficiency Conditional on Completion of the Digital Service Pathway

Participants did not equate efficiency with the existence of a portal, message, or digital record. Efficiency was experienced when the service progressed from initiation to an understandable result without unexplained transitions or duplication. The integration of technology was generally described as gradual and hybrid. Digital channels became the starting point for appointments, notifications, registration, requests, and follow-up, but human intervention remained necessary when a case was unusual, the next step was unclear, or internal records did not align.

Employees emphasized the integration of screens, the coexistence of digital and paper procedures, and the internal responsibility for confirming what had happened. Service users emphasized knowing the status of the request, understanding the next action, and receiving confirmation that could be relied upon. These perspectives reflected different visible parts of the same pathway rather than disagreement about the value of technology. Across the sectors, the practical form of completion differed: appointments and records in health services, registration and documents in education, and application tracking in administrative services.

"I observe greater organization in the application pathway, but the parallel use of two methods consumes time in some cases. I therefore see a partial rather than comprehensive improvement." (P2, employee, health sector)

"Displaying the admission stage saved many telephone calls. However, the reason for returning the application is brief, so the student needs to ask again and part of the time saved is lost." (P8, employee, education sector)

"Tracking through the application number saved time, and I can organize my day on that basis. A long wait under a general status weakens this improvement." (P22, service user, administrative sector)

4.2 Theme 2: Effective Access as an Interconnected System of Resources

Effective access emerged as a relational outcome produced by several interdependent resources: system stability, connectivity, device suitability, attachment preparation, login and verification, interface consistency, Arabic availability, comprehensible administrative language, task-specific practice, and accessible support. Participants could not be divided into stable categories of digitally capable or incapable. A person who completed a familiar service independently could encounter difficulty in another service because the authentication method changed, the attachment requirements were unclear, or the error message offered no recovery route.

Employees observed how users interpreted messages, confirmed whether documents had arrived, and sought support. Service users described the practical sequence on a phone or computer: entering the account, receiving a code, preparing a file, uploading it, and waiting for confirmation. The interaction among these elements was often more important than any single barrier. A user could understand the language but depend on another person because the device or network could not sustain the upload. A digitally experienced user could still be unable to act when the system did not explain the error.

"Distance from the service center matters when a step requires continuous connectivity. A user may understand the language well but still need an intermediary because the phone or network does not support the process." (P4, employee, health sector)

"I use digital services easily and usually do not need assistance. Even so, I do not consider an ambiguous error something that experience alone can overcome." (P16, service user, health sector)

"Weak connectivity interrupts the upload, and some instructions do not explain how to reduce the file size or which format is required. The two problems are connected in this step." (P25, service user, administrative sector)

4.3 Theme 3: Redistribution Rather Than Elimination of Work and Burden

Participants described digitalization as a redistribution of work rather than its straightforward disappearance. Some traditional activities declined, including individual

calls to communicate routine information, physical visits made only for an inquiry, and searches through dispersed paper records. At the same time, new work emerged around interpreting notifications, confirming attachments, supporting login, reconciling screens, managing accounts, and repeating failed steps.

Employees saw the change through the content of front-line encounters and the use of their time. A message could replace the initial transfer of information but create a later request for interpretation. A mass digital announcement could reduce individual telephone calls but increase the time spent checking whether users understood the requirement and submitted complete documents. Service users experienced the redistribution through document preparation, account management, notifications, progress monitoring, and error recovery.

"The type of conversation at reception changed. Instead of asking only about an appointment, some people now arrive with a message and want to know what is required next." (P1, employee, health sector)

"The time spent making individual calls to communicate an announcement decreased, while the time I devote to ensuring that the requirement is understood and the attachments are complete increased." (P6, employee, education sector)

"Over time, I learned to separate and organize the messages, but family members became more dependent on me for follow-up instead of each person learning to manage their own account." (P26, service user, administrative sector)

This theme explains why institutional measures of reduced visits or calls may not fully represent the lived effect of digitalization. A task can disappear from one point in the system and reappear as interpretation, preparation, monitoring, or support elsewhere. Evaluating efficiency therefore requires attention to the complete distribution of work across the service ecosystem.

4.4 Theme 4: Mediation as a Bridge to Access and a Limit on Autonomy and Privacy

Mediation was a normal part of the actual access infrastructure. It took the form of family assistance from a relative with greater experience and institutional assistance from an employee or support point. Both forms could prevent exclusion by helping users interpret instructions, enter accounts, prepare documents, or complete an unfamiliar stage. Yet participants distinguished assistance that expanded the user's capability from assistance that substituted for the user.

The distinction was particularly important for privacy and autonomy. A transaction could be completed while the user remained uncertain about what had been submitted, shared credentials, or disclosed health and administrative information. Completion was therefore not sufficient evidence of fair access. Assistance was perceived

as more enabling when it converted a problem into an understandable step, preserved the user's decision, and allowed the user to continue the process. It became more limiting when another person took control of the device or account and the user remained outside the experience.

"Good assistance gives the user capacity rather than taking their place. Taking the phone and completing everything on the user's behalf may leave them outside the experience."
(P9, employee, education sector)

"When a person reveals data to an intermediary because they did not understand the form, they lose part of their control. I prefer assistance that preserves both decision-making and privacy." (P11, employee, administrative sector)

"I do not consider the service fair if obtaining it depends on having a relative enter the account instead of me." (P15, service user, health sector)

The theme establishes an evaluative standard for digital mediation: the appropriate question is not merely whether assistance was available or whether the transaction was completed, but whether the assistance increased the user's understanding and agency while protecting information. This standard links accessibility directly to equity and social inclusion.

4.5 Theme 5: Transparency and User Control as Foundations of Trust, Equity, and Social Inclusion

The fifth theme moved from immediate transaction outcomes to the user's relationship with the institution. Participants associated equity with a genuine ability to obtain the service, not with the formal availability of the same link to everyone. Trust was connected to an understandable status, confirmation that could be retrieved, consistency between the message and the institution's response, and a clear route for questioning or correction. Social inclusion was associated with the capacity to remain an active party in the service rather than a passive recipient of notifications.

The data did not support a simple conclusion that digitalization automatically increased or decreased trust. Participants described conditional relationships. Remote access, reduced travel, and visible tracking could create a sense that the institution was closer. Ambiguous messages, inconsistent verification, unexplained delay, or forced dependence on an intermediary could reproduce distance. Assistance did not necessarily undermine inclusion when it preserved the user's voice and privacy, but it weakened inclusion when it displaced the user or made access contingent on another person.

"My trust did not change merely because a digital service exists. It increases when I receive a confirmation that I can return to, and it decreases when the problem remains without a clear response." (P1, employee, health sector)

"The tracking number makes the user feel that the application has not disappeared after submission. That feeling weakens when the status remains general and there is no point for objection; understandable information is what preserves the connection with the institution." (P10, employee, administrative sector)

"The digital channel gives me independence and makes the institution feel available. However, different verification methods across services may exclude someone with less experience. I therefore assess inclusion by the flexibility of the pathway, not by its digital form alone." (P24, service user, administrative sector)

Transparency and control brought the five themes together. The same feature could affect several domains simultaneously: an understandable error message improved information quality, enabled access, reduced support burden, limited unnecessary mediation, and protected trust. Conversely, digital silence or an opaque rejection could become a quality problem, an access barrier, a source of repeated work, and an experience of institutional distance.

5. Discussion

The findings suggest that technology integration in public institutions was perceived neither as an automatically inclusive modernization nor as a uniformly exclusionary process. Its meaning was produced through the design and completion of the service pathway, the resources required to navigate it, the redistribution of work, the organization of assistance, and the user's ability to understand and control the process. This integrated interpretation extends the literature by connecting service quality, effective access, and social inclusion within one sequence rather than treating them as separate outcomes.

First, the concept of completion of the digital service pathway refines the conventional emphasis on usefulness and ease of use. Participants clearly perceived usefulness in reduced travel, improved tracking, and faster access to routine information, consistent with Davis (1989). However, usefulness could be partial within the same transaction. A notification saved time only until an unclear message generated a new inquiry; a tracking number improved organization only while the status remained informative. Ease of use was therefore not a stable property of the interface but a relationship among clarity, continuity, integration, and recoverability. This interpretation also develops the service encounter perspective advanced by Lindgren *et al.* (2019):

human interaction was not necessarily removed but relocated from routine information transfer to explanation and exception management.

Second, the findings support the DeLone and McLean (2003) distinction among system, information, and service quality while showing that users experience these dimensions as a single pathway. System stability, meaningful information, and responsive support could not compensate for one another indefinitely. The results align with e-GovQual and newer digital public-service quality frameworks that include reliability, citizen support, transparency, and inclusion (Alves *et al.*, 2025; Papadomichelaki & Mentzas, 2012). The study's contribution is to propose the completed pathway as the experiential unit through which these dimensions are integrated. This is particularly relevant to public institutions, where a failed later stage may prevent access to an essential service rather than merely reduce customer satisfaction.

Third, effective access as an interconnected resource system supports the move from first-level access to second- and third-level inequalities (Scheerder *et al.*, 2017; van Deursen & Helsper, 2015; van Dijk, 2020). The participants' experiences were not linear. A person could possess a device and relevant skills but fail at inconsistent authentication; understand Arabic but be unable to act on formal administrative terminology; or prepare a document correctly but lose progress because connectivity failed. This nonlinearity cautions against interventions that isolate user training from service design. The findings are also consistent with research on Bedouin digital inequalities and capabilities (Abu-Kaf *et al.*, 2019; Marciano *et al.*, 2024), while adding a task-level account of how place, device, network, language, and institutional support combine within actual public-service procedures.

Fourth, the redistribution of work makes visible a dimension that can be obscured by institutional efficiency indicators. Digital transformation changes organizational processes (Mergel *et al.*, 2019), but the present data show precisely how work moves: from calls to explanation, from paper handling to attachment verification, from office staff to users preparing files, and from individual users to family members managing multiple accounts. This finding resonates with administrative burden research and the role of social infrastructure in digital inclusion (Giest & Samuels, 2023). It also reflects the risk of adverse digital incorporation, in which formal inclusion in a digital system can impose additional costs on people with fewer resources (Heeks, 2022; Cebeci & Ghorbani, 2020). The implication is not that responsibility should remain entirely with the institution, but that new responsibilities should be explicit, feasible, and supported.

Fifth, the dual character of mediation adds autonomy and information privacy to the analysis of intermediaries. The findings affirm that family members, employees, and other intermediaries are part of real e-government use (Toro-Maureira *et al.*, 2026). However, mediation cannot be assessed solely by transaction completion. Its quality depends on whether the user retains consent, understanding, decision-making, and control of information. This extends the trust and risk literature (Bélanger & Carter, 2008) by showing how risk can arise within the helping relationship itself. It also provides a

more specific interpretation of barriers identified in telehealth and digital-government research among Arab populations in Israel (Harari *et al.*, 2026; Penn & Laron, 2023): assistance may solve an immediate access problem while simultaneously exposing private information or reinforcing dependence.

Finally, transparency and control connect the findings to public value and social citizenship. Twizeyimana and Andersson (2019) argue that the value of e-government includes improved service, trust, and social value. The current study suggests that these outcomes are supported when users can know the status of a request, understand what is required, receive confirmation, ask questions, correct errors, object to decisions, and retain authority over the account. This interpretation also reflects Hardill and O'Sullivan's (2018) concern that digital channels can affect citizenship when they obstruct access to public services. Social inclusion in this study was not a psychological score or a direct causal effect of technology. It was a contextual meaning expressed through equity, institutional proximity, autonomy, privacy, and the preservation of the user's voice.

The combined employee-user design was methodologically significant. Employees identified internal fragmentation, duplicated channels, record inconsistency, and the time required for interpretation. Service users identified the external sequence of login, attachments, connectivity, assistance, and confirmation. A problem that appeared internally as a minor message or missing field could become externally a repeated journey or dependency on a relative. Conversely, a user's difficulty did not always indicate low capability; it could reveal a design or coordination failure. Integrating both positions therefore reduced the likelihood of attributing the service outcome solely to either the user or the technology.

6. Conclusion

This study asked how Bedouin employees and service users in public institutions in Southern Israel perceive the impact of technology integration on service quality, accessibility, and social inclusion. The direct answer is that they perceived the impact as complex, contextual, and conditional. Digital integration supported service quality when it reduced unnecessary travel, improved access to information, enabled tracking, preserved records, and allowed routine tasks to be completed remotely. These benefits depended on an integrated and understandable pathway. They weakened when channels were duplicated, systems were inconsistent, statuses remained general, rejection reasons were unclear, progress was lost, or exceptional cases lacked accountable human support. Accessibility was not equivalent to the existence of a digital channel. It depended on the interaction of system reliability, connectivity, device suitability, attachment requirements, authentication, language, task-specific capability, and assistance. Digitalization also redistributed work among institutions, employees, users, and families. Mediation often bridged access, but it supported inclusion only when it increased the user's capability and preserved consent, privacy, and decision-making. Trust, equity, and

social inclusion were associated with transparency and control: the ability to understand the request status, obtain confirmation, ask, correct, object, and retain a voice in the process.

The study contributes theoretically by linking the completed digital pathway, interconnected access resources, redistributed burden, mediation, and user control in a contextual interpretive framework. Methodologically, it demonstrates the value of analyzing employees and service users together and of retaining mixed and conditional cases. Practically, it identifies concrete design priorities for public institutions. Services should be designed around the complete user journey rather than isolated screens; clearly state the status, next step, and reason for rejection or interruption; preserve progress during connectivity failure; optimize forms and attachments for mobile use; provide plain administrative Arabic in addition to formal translation; and establish organized human support that explains without displacing the user. Privacy safeguards should govern assistance, and secure family authorization should be examined through legal, technical, and ethical review before any implementation.

The conclusions remain bounded by the purposive and context-specific sample, reliance on one method, contemporaneous written records without audio recording, absence of independent coding and participant validation of final themes, and lack of separate institutional ethical approval. Future research could examine the five-theme framework in other peripheral or minority contexts, compare particular service sectors or platforms, combine interviews with observation and usability testing, and investigate how secure delegation can support family assistance without normalizing password sharing or loss of control. Longitudinal research could also examine whether improved pathway transparency changes independence, trust, and the distribution of work over time.

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Conflict of Interest Statement

The author declares no conflicts of interest.

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