

REVIEW

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Digital Self-Service Business Systems: A Scoping Review of Customer Autonomy, Service Efficiency, and Managerial Control

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Abstract

Digital self-service systems have become central to contemporary digital business, reshaping how customers access, perform, and evaluate service tasks. Across retail, hospitality, banking, healthcare, transport, and platform-based services, organisations increasingly rely on kiosks, mobile apps, chatbots, online portals, and automated interfaces to move routine activities from employees to customers. This shift changes the service encounter from an employee-led interaction into a digitally mediated process in which customers are expected to participate more actively. The objective of this scoping review is to map the literature on digital self-service business systems through three interconnected dimensions: customer autonomy, service efficiency, and managerial control. Rather than treating self-service technologies only as technical tools, the review frames them as business systems that redistribute work, responsibility, and decision-making among customers, employees, and managers. The review therefore focuses on how digital self-service systems create value, where they create friction, and how firms attempt to govern service quality at scale. The review follows a scoping synthesis approach informed by PRISMA-ScR principles. Some peer-reviewed journal articles were included to capture recent developments in self-service technology, service automation, customer participation, chatbot service, frontline technology, service robots, and scoping review methodology. The synthesis charts dominant technology types, service contexts, customer outcomes, operational claims, and managerial control mechanisms. The review contributes a structured map of the digital self-service literature and identifies gaps in how autonomy, efficiency, and control are studied together. Existing research is rich but fragmented, with many studies concentrating on customer acceptance, service failure, or specific technologies rather than integrated business-system governance. Future research should examine how firms can design self-service systems that balance customer agency, operational productivity, ethical responsibility, and service quality assurance.

Keywords Managerial control, Digital self-service, Customer autonomy, Service efficiency, Scoping review, Self-service technology

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Introduction

Digital self-service business systems have moved from peripheral service options to core organisational infrastructures that mediate everyday customer interactions. The literature shows that firms increasingly deploy self-checkout, online portals, mobile applications, automated kiosks, service robots, and chatbot interfaces to

enable customers to complete service tasks without direct employee involvement [1]. This transformation is not only technological; it reconfigures the service encounter by changing who performs the work, how service quality is experienced, and how managers supervise distributed digital interactions [2].

A central promise of digital self-service is that customers gain greater autonomy over when, where, and how they access services. Studies on frontline technology and automated service encounters suggest that digital interfaces can increase convenience, perceived control, and participation when customers possess the ability and willingness to use them [3]. However, the same systems can shift cognitive, emotional, and procedural labour onto customers, creating a satisfaction–effort trade-off that is especially visible when self-service fails or when customers require support [4].

For firms, digital self-service systems are often justified through efficiency, scalability, and cost reduction. Research on technology-empowered frontline interactions indicates that automation can standardise routine processes, reduce dependence on labour-intensive encounters, and create new forms of service productivity [5]. Yet managerial benefits are not automatic, because digital self-service also introduces risks related to service failures, responsibility attribution, customer resistance, and the difficulty of maintaining quality without continuous employee mediation [6].

A scoping review is therefore needed because the literature on digital self-service is broad, conceptually heterogeneous, and dispersed across service research, marketing, information systems, hospitality, retailing, and operations management. Existing studies examine customer acceptance, frontline automation, service robots, chatbot disclosure, self-service recovery, and scoping review methods, but fewer works integrate these insights into a business-system perspective [7]. This article maps what is known about digital self-service systems by organising the evidence around customer autonomy, service efficiency, and managerial control.

Scoping Review Method

This review adopted a scoping review logic because the aim was to map the extent, range, and nature of research rather than to estimate a single effect size or test a narrow causal relationship. The methodological orientation followed PRISMA-ScR guidance, which emphasises transparent identification, screening, eligibility assessment, and reporting for heterogeneous bodies of literature [8]. Additional guidance on scoping review conduct and protocol development informed the charting of concepts,

evidence types, and research gaps across service-management and digital-business studies [9, 10].

The search strategy focused on peer-reviewed journal articles published from 2017 to 2026 that addressed digital self-service, self-service technology, customer participation, service automation, service quality, managerial control, or scoping review methodology. Search terms combined concepts such as “digital self-service,” “self-service technology,” “customer autonomy,” “service efficiency,” “managerial control,” “service failure,” “chatbot,” “frontline technology,” and “scoping review.” The final evidence base comprised 30 articles selected for relevance to the review’s three organising dimensions and for their contribution to understanding digital self-service as a business system.

The screening process first excluded non-journal items, non-peer-reviewed material, and studies outside the review’s conceptual scope. Eligible articles were then charted according to publication year, technology type, service context, customer role, operational claim, managerial control mechanism, and service quality issue. In PRISMA-style summary terms, the process moved from targeted identification of relevant records to screening for conceptual fit, eligibility assessment against the review themes, and final inclusion of 30 peer-reviewed journal articles for scoping synthesis [8, 9].

Digital Self-Service Business Systems

Digital self-service business systems refer to digitally mediated arrangements through which customers perform service tasks that were previously completed or strongly supported by employees. The literature includes traditional self-service technologies, such as kiosks and self-checkout systems, alongside newer forms of automated and AI-enabled service, including chatbots, service robots, and digitally supported frontline interactions [11]. This range shows that self-service should not be understood as one technology category but as a broad organisational model for redistributing service work.

The reviewed studies cover several service contexts, including retail, hospitality, restaurants, tourism, e-services, customer service, and organisational frontlines. Bibliometric and critical review work indicates that self-service technology research has expanded from adoption and acceptance questions toward broader concerns about

customer experience, operational design, and service-system transformation [12, 13]. In this literature, digital self-service systems are frequently positioned as boundary objects connecting marketing, operations, information systems, and service management.

The technology landscape can be organised around interaction mode, task complexity, and the level of automation embedded in the customer interface. Low-complexity systems, such as self-checkout or standardised online portals, usually support transactional tasks, while chatbots, robots, and AI-enabled interfaces extend self-service into advisory, conversational, and problem-resolution domains [14, 15]. **Table 1** categorises the types of digital self-service business systems and their defining features.

Table 1. Typology of Digital Self-Service Business Systems: Technology Types, Interaction Modes, and Service Contexts

System type	Typical interaction mode	Primary customer task	Common context
Self-checkout and automated retail terminals	Customer operates a fixed interface in a physical service setting	Scanning, payment, verification, transaction completion	Supermarket, retail stores, transport quick-service environments
Digital kiosks	Customer navigates menu-based or guided screens in a service location	Ordering, registration, check-in, ticketing, information retrieval	Hospitality, restaurants, healthcare reception, public services
Online customer portals	Customer accesses a web-based account or service	Account management, document submission, claims, inquiries	Banking, insurance, utilities, e-government, business services

	service dashboard	bookings, service requests	
Mobile self-service applications	Customer uses smartphone-based interfaces	Ordering, payment, tracking, booking, loyalty management, support requests	Retail delivery, banking, service, telecommunications
Chatbots and conversational agents	Customer interacts through text or voice dialogue	Information search, troubleshooting, complaint intake, routing, basic advisory support	Customer service, e-commerce, banking, healthcare administration
Service robots and embodied automated agents	Customer interacts with a physically present automated agent	Greeting, guidance, delivery, information provision, routine assistance	Hospitality, healthcare reception, retail
Hybrid human–digital self-service systems	Customer begins with digital self-service but can escalate to employee support	Complex problem solving, failure recovery, exceptions, reassurance	High-end services, customer care, healthcare, financial services, hospital

Across these system types, the literature increasingly treats digital self-service as part of a broader transformation of the service encounter rather than merely a channel substitution. Work on frontline technology infusion shows that digital tools create new archetypes of customer–employee–technology interaction, ranging from technology-assisted service to highly automated self-service [11]. This mapping also reveals uneven coverage: customer-facing technologies such as chatbots and robots receive growing attention, whereas managerial dashboards, monitoring

systems, and control infrastructures behind self-service interactions remain less visible in the literature.

Figure 1 illustrates how digital self-service business systems operate as an integrated service model in which customer autonomy, operational efficiency, and managerial control must be balanced to sustain service quality.

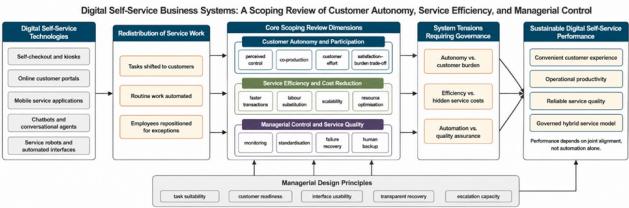


Figure 1. Integrated Digital Self-Service Business System: Balancing Customer Autonomy, Service Efficiency, and Managerial Control

Customer Autonomy and Service Participation

Customer autonomy is one of the most consistent themes in the digital self-service literature, but it is not treated as a uniformly positive outcome. Studies of self-service acceptance show that customers are more likely to use digital interfaces when they perceive themselves as capable of completing the task and when the system gives them a meaningful sense of control [1]. This suggests that autonomy depends not only on access to technology but also on customers' perceived competence, confidence, and willingness to participate in service production.

Self-service also changes customers from passive recipients into co-producers of service outcomes. Research on value co-creation and co-destruction shows that customer participation can generate convenience, speed, and empowerment, but it can also produce frustration when customers must solve problems that would previously have been handled by employees [16]. In this sense, digital self-service expands customer agency while simultaneously transferring procedural responsibility to the customer.

The satisfaction effects of autonomy are therefore conditional. In e-service settings, customer readiness strengthens the link between participation and favourable service outcomes because prepared customers are more able to convert self-service responsibility into perceived value [17]. **Table 2** summarises the key findings on

customer autonomy, participation, and the satisfaction–effort trade-off.

Table 2. Customer Autonomy and Service Participation in Digital Self-Service: Empowerment, Co-Production, and Psychological Outcomes

Autonomy dimension	How it appears in digital self-service	Potential positive outcome	Potential negative outcome
Perceived control	Customers choose timing, channel, pace, and sequence of service completion	Greater convenience, independence, and confidence	Anxiety when customers feel responsible for errors or cannot reverse actions
Customer competence	Customers rely on digital skills, service knowledge, and task familiarity	Higher adoption and smoother task completion	Exclusion of customers with low digital literacy or limited confidence
Co-production	Customers perform tasks once handled by employees	Increased engagement and perceived involvement	Work transfer effort burden and resentment when the task feels imposed
Satisfaction–effort trade-off	Customers evaluate convenience against required cognitive and procedural effort	Satisfaction when self-service is faster or easier than employee service	Dissatisfaction when effort exceeds expected benefit

Psychological ownership	Customers feel they have shaped or controlled the service process	Stronger attachment to successful outcomes	Stronger blame or regret when outcomes fail
Failure vulnerability	Customers encounter breakdowns without immediate employee mediation	Opportunity for quick self-correction if tools are well designed	Helplessness, anger, abandonment or distrust

The literature also highlights the psychological complexity of self-service failure. Studies comparing self-service and full-service contexts show that customers may evaluate failures differently depending on whether they attribute the problem to themselves, the firm, or the technology [18]. This creates a managerial challenge because autonomy may increase satisfaction during smooth interactions but intensify dissatisfaction when customers feel abandoned during breakdowns.

Service Efficiency and Cost Reduction

Digital self-service systems are frequently adopted because they promise faster transactions, reduced labour intensity, and greater scalability. Research on customer contact in digital environments argues that firms can redesign service processes by moving routine tasks into customer-operated channels and reserving employee intervention for exceptions or high-value interactions [19]. This logic supports the business case for self-service as a mechanism for resource optimisation rather than merely a customer-facing convenience.

Efficiency gains are particularly visible in service contexts where transactions are repetitive, standardised, and time-sensitive. Studies of supermarket self-service and restaurant self-service technologies show that such systems can increase perceived speed and convenience when customers understand the process and when frontline employees remain available for support [20, 21]. However, these studies also imply that efficiency is partly

co-produced by the customer, because poor usability or low readiness can turn an efficient system into a bottleneck.

The literature cautions against assuming that digital substitution automatically creates operational value. When customers resist self-service, require repeated assistance, or abandon the process, firms may experience hidden costs through service recovery, customer dissatisfaction, or employee workload displacement [22]. Evidence on self-checkout discontinuance further suggests that removing a self-service option can provoke negative customer reactions when users have incorporated the technology into their service routines.

Service efficiency should therefore be assessed through both firm-side and customer-side metrics. Chatbot studies show that automation can improve scalability and consistency in customer service, but the quality of interaction, disclosure practices, and user compliance influence whether customers actually accept automated support [15, 23]. From a scoping perspective, the evidence indicates that operational efficiency depends on alignment among task design, customer readiness, system reliability, and managerial escalation capacity.

Managerial Control and Service Quality

Managerial control becomes more complex when service delivery shifts from employee-led encounters to digitally mediated self-service systems. In traditional service settings, managers can supervise employees, observe interactions, and intervene directly, but digital self-service distributes service activity across interfaces, algorithms, customers, and remote support structures [5]. This means that control must be embedded into system design through standardised workflows, monitoring tools, service scripts, data capture, and escalation protocols.

Service quality in digital self-service depends heavily on how firms manage failures and exceptions. Research on self-service recovery shows that customers evaluate not only the initial failure but also whether the firm provides adequate psychological support, recovery options, and human assistance when the technology does not work as expected [4, 24]. As a result, managerial control should not be understood as rigid automation alone; it also includes the capacity to restore trust and service continuity when self-service breaks down.

The rise of service robots and automated social presence further complicates accountability. Studies of robot service encounters show that customers may attribute responsibility differently depending on whether the service outcome is produced by a human employee, an automated agent, or a hybrid arrangement [25, 26]. **Table 3** outlines the managerial control mechanisms and their relationship to service quality in self-service systems.

Table 3. Managerial Control and Service Quality in Digital Self-Service: Monitoring, Standardisation, Failure Management, and Human Backup

Control mechanism	Managerial purpose	How it supports service quality	Risk if poorly designed
Interface standardisation	Ensures customers follow a consistent process	Reduces variability, clarifies steps, and improves predictability	Rigid processes fail when customers have non-standard needs
Real-time monitoring	Tracks usage patterns, delays, abandonment, and errors	Allows managers to detect friction and intervene in high-risk interactions	Excessive monitoring may overlook qualitative customer frustrations
Automated prompts and guidance	Supports customers during task completion	Reduces confusion and helps customers avoid mistakes	Overly complex prompts may increase cognitive load
Failure recovery protocols	Defines what happens when the self-service process fails	Improves trust by making recovery visible and predictable	Customers may feel abandoned if recovery is hidden or slow
Human backup and escalation	Provides employee support for complex or	Preserves service quality when automation	Understand backup can produce loss of

	emotional cases	reaches its limits	queues and dissatisfaction
Quality analytics	Uses data to assess completion rates, complaints, satisfaction, and recurring failures	Converts digital traces into managerial learning	Metrics may overemphasize speed while ignoring customer burden
Responsibility clarification	Communicates who is accountable for outcomes and recovery	Reduces ambiguity in automated or robot-mediated encounters	Customers may blame the firm more strongly when responsibility is unclear

Hybrid service models appear especially important for balancing automation and quality control. Research on robots, frontline employees, and automated service technologies indicates that human support still matters when customers face uncertainty, emotional discomfort, or complex service problems [7, 27]. The managerial implication is that digital self-service should be governed as a layered service system in which automation handles routine work while employees remain available for assurance, exception management, and relationship repair.

Research Gaps and Future Directions

The first major gap is the limited integration of autonomy, efficiency, and control within a single analytical framework. Many studies examine customer acceptance, participation, or satisfaction, while others focus on frontline automation, service robots, or chatbot interaction quality [11, 14]. Future research should examine how managerial efficiency goals affect customer autonomy and how control mechanisms shape both service quality and perceived customer burden.

A second gap concerns longitudinal evidence. Much of the literature captures adoption, usage intention, or immediate service evaluations, but fewer studies investigate how customers' relationship with self-service systems changes after repeated use, failure experiences, discontinuance, or forced migration from human service to digital channels [22, 28]. Longitudinal research would help explain whether self-service autonomy becomes empowering over time or

whether accumulated effort, exclusion, and frustration reduce trust.

A third gap concerns the dark side of self-service. The reviewed literature identifies issues such as customer effort, responsibility ambiguity, psychological need frustration, chatbot disclosure effects, and unequal readiness, but these themes remain scattered rather than systematically theorised [23, 24]. Future studies should examine digital exclusion, emotional labour transfer, service abandonment, and the ethical limits of shifting work from firms to customers.

A fourth gap concerns the design of managerial control mechanisms for self-service systems. Current studies show that human backup, service recovery, responsibility attribution, and quality monitoring are important, but there is less evidence on how managers should combine these mechanisms across channels and technologies [25, 29]. Future research should develop integrated governance models that assess not only whether self-service is efficient, but whether it is fair, resilient, transparent, and capable of sustaining service quality at scale.

Conclusion

This scoping review has mapped the literature on digital self-service business systems by organising 30 peer-reviewed articles around customer autonomy, service efficiency, and managerial control. The review shows that digital self-service is not simply a technology adoption issue but a broader business-system transformation that redistributes tasks, responsibilities, and quality risks among customers, employees, and managers.

The synthesis indicates that self-service systems can empower customers and improve operational productivity

when tasks are suitable, interfaces are usable, and support structures are available. At the same time, these systems can create customer burden, hidden operational costs, responsibility ambiguity, and service-quality vulnerabilities when firms pursue automation without sufficient attention to participation, failure recovery, and human backup.

The central contribution of this review is a structured map of the tensions that define digital self-service: autonomy must be balanced with effort, efficiency with experience, and managerial control with customer trust. Future research and managerial practice should therefore move beyond treating self-service as a cost-saving channel and instead design it as a governed service ecosystem that integrates customer agency, operational performance, and quality assurance.

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