



A Study on the Generation Mechanism of Digital Burden Perception among Grassroots Civil Servants in the Digital Transformation of Public Services

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Abstract. This paper explores the paradoxical nature of digital transformation in public services, in that it seemingly adds to the perceived strain of the grassroots civil servants. Inasmuch as it is hoped that digitalization will simplify the administration, loyal employees tend to face considerable psychological and functional stress. This study uses a grounded theory to examine the production process of perception of digital burden based on the three-level analytical framework of “institution-technology-individual”, through the adoption of the grounded theory approach. The results show that this burden is a multi-dimensional construct that involves operational, cognitive, emotional, and relational pressures. It is created as a result of the combined influence of institutional (pressure-driven systems and distorted assessment mechanisms), technological (technological overload and platform fragmentation), and individual (the digital literacy gap and differentiated coping strategies) factors. The results offer practical opportunities to redesign assessment systems, simplify digital platforms, and improve targeted digital capacity building by explaining the role of these three levels in shaping the grassroots experiences collectively. These points provide a theoretical contribution to the study of digital governance and practical advice on how to reduce the hidden costs of digital transformation on the frontline civil servants.

Keywords: Digital Burden Perception, Grassroots Civil Servants, Digital Transformation, Administrative Burden, Grounded Theory.

1 Introduction

Digitalization is generally considered one of the ways to increase government efficiency and make the supply of public services as efficient as possible. Since the era of one-stop online services to instantaneous reaction to complaints, digital technology has been highly integrated in grassroots governance. In theory, this will streamline operations, enhance productivity, and decrease workload. Digital governance enables information exchange and tries to establish mutual models of collaboration among the decision-makers and society to improve the quality of the provided services [1, 2]. Nevertheless, despite the fact that digital transformation makes governance stronger, new challenges are also introduced. Recent studies reveal

that a certain percentage of grassroots civil servants are genuinely under a considerable level of digital burden, that is, heightened psychological expenses brought about by technological alienation, reflected in digital stress and opposition [3]. Liang and Zhang found such patterns as digitally suspended burden and efficiency-loss burden [4]. This perceived pressure has an adverse impact on work enthusiasm and quality of service, resulting in phenomena like technological suspension [5].

Why does digitalization not necessarily decrease burdens? The solution lies in going down to the grassroots. The current studies discuss this through the administrative burden and technology implementation theories, which involve institutional factors and characteristics of technology. As an example, Lian and Zou have discovered that digital systems bring about cumbersome processes, unless they are supported by institutional structures [6]. Liu and Yang disclosed the internalization of interaction friction that is digitalized as administrative burdens [7]. Nevertheless, there are two weaknesses in the existing research: First, the studies pay more attention to citizen-facing administrative burdens and less attention to the psychological burden of civil servants [8]. Second, a quantitative study does not involve a detailed, contextualized explanation of burden expression and coping [3]. It is worth noting that the digital divide can be internal to the civil service. Is there an impact of digital competence difference on the perception and management of technological pressure by civil servants? This is a question that should be investigated.

On this basis, the proposed study posits the following research question: How is the perceived digital burden of the grassroots civil servants created in the process of digital transformation? In particular: (1) What are its particular manifestations? (2) What is the interplay between institutional, technological, and individual factors in the generation of it? (3) What of the coping of civil servants? This paper utilizes the grounded theory approach, in which in-depth interviews are conducted in order to uncover the generative logic and coping mechanisms as seen through the prism of the actors. The importance is two-fold: on the one hand, it carries the conceptual definition of the understanding to the analysis of the mechanisms, creating an institution-technology-individual framework; on the other hand, it suggests recommendations on how to optimize the digital governance and reduce digital stress.

2 Literature Review and Analytical Framework

2.1 Digital Governance Research: From Technology Empowerment to the Burden Paradox

The studies of digital governance offer a macro-level background. The paradigm of Digital Era Governance by Dunleavy et al. emphasizes the redefinition of the government by Information Technology (IT) [9]. Kirana and Majid note that IT makes information flow efficient in service provision [1]. Technology embedding, however not always a smooth sail. In case of technology, logic, and institutional logic mismatch, issues such as technology levitation occur. Recent studies are concerned

with the dark side of digital governance. Ge discovered that such dimensions as one-sided perception of technology and lack of coordination of the organization together form the generation logic of digital burden [10].

2.2 Administrative Burden Research: From the Citizens' to the Civil Servants Perspective

The theory of administrative burden first addressed the cost of learning, psychological, and compliance by citizens. This view is now turned inward by scholars. Kang created a model that perceived institutional alienation and technology overload significantly positively influence digital burden perception, and personal literacy mediates the relationship between them, mediated by institutional perception pressure, and moderated by institutional perception pressure [3]. Liu and Yang also indicated a generation process in the form of a chain, where the frictions of interaction are internalized as the digital administrative burdens in the form of learning, compliance, and psychological costs [7].

2.3 Research on Digital Competency Disparities: The Digital Divide and Its Moderating Effect

The studies of digital competence gaps offer valuable theoretical resources. Firtan et al. discovered that the digital divide plays a major moderating role between e-participation and digital accountability [11]. As Zhang et al. emphasize, the digital divide indicates differences in access, skills, and literacy [12]. Wen and Lian discovered that the education level moderately positively influences the digital empowerment, and it turns out that the advantages of it are not universal [13]. This digital empowerment differentiation logic is essential in the internal differences of civil service capability.

2.4 Analytical Framework: A Three-Tier Model of Institution-Technology-Individual

Combining the foregoing, this paper suggests a three-level analysis scheme: Institutional Level: Concentrates on systems of pressures and evaluation instruments. Ge demonstrates that these pressures are enhanced through platforms through quantitative assessments and traceability requirements [10]. Technology Level: Occupies itself with technological overload and platform fragmentation. According to Kang, technology overload is information overload and complexity in operations [3]. Liu and Yang unveil the interactive friction, and it is internalized as a cumulative burden [12]. Personal Level: Concentrates on the gap of digital capabilities and coping mechanisms. The mediating variable used by Kang is personal literacy [7]. Based on the works of Firtan et al., one can guess that digital capabilities play a crucial role in distinguishing the way people handle the same pressures and surroundings [11].

These three levels are not separated, but they interact dynamically. The effect of institutional pressure is transmitted and amplified by technology, and it is moderated by individual capabilities. The bottom-up approach is the approach that will be used in this study to bring out this interactive process by relying on grounded theory.

3 Specific Manifestations of Digital Burden Perception

Digital burden perception is not a hypothetical construct, but a tangible experience that comes in four types that are interconnected. In this section, each type is expounded on using the interview data of grassroots civil servants, and how the burdens are felt in the daily digital work.

3.1 Operational Burden: Repetitive Data Entry, Multiple Platform Switching, Frequent Updates

It is the most direct manifestation. There is often a complaint of repetitive data entry: resident information has to be entered into several incompatible systems, which is time and energy-consuming. The requirement to use many platforms raises complexity through data silos and fragmented building, causing employees to go through systems in a passive manner. Regular system upgrades will also result in incremental costs of learning as the staff is forced to study new interfaces and processes all the time, which is at the expense of service time.

3.2 Cognitive Burden: Complex Rules, Ambiguous Processes, High Comprehension Costs

It is an indication of the clash between technological logic and human thinking. Endless instructions and unneeded levels of approval represent complex rules. The unclear online processes lead to ambiguous processes; the staff members are not adequately trained to use new systems, and they have to guess how it is worked and it may lead to hesitation and errors. High comprehension. High costs of comprehension lead to a discrepancy between policy documents and platform operations, and necessitate staff to translate policy to system actions, which is a cognitive task that staff are poorly prepared to execute.

3.3 Emotional Burden: Anxiety, Feeling Monitored, Feeling Controlled by Technology

This is a more profound psychological expression. Fear of accountability because of operational mistakes or delays in data transfer is the source of anxiety, which is enhanced by system notifications and monthly rankings. The sense of surveillance is the result of platform tracking features, which allow leaders to view real-time progress. The sense of being governed by technology comes into play where the pace of work is determined by the platform, which results in the staff feeling like instruments of the system and not the users of the system.

3.4 Relational Burden: Pressure on Public Communication, Response to Superiors, and Colleague Collaboration

This is the relationship aspect of digital burden. The strain on social communication is that online communication does not have the same level of warmth that face-to-face communication provides, and it narrows down the aspects of the problems that are present in the real world. This may result in grievances and alienation. The force to act under superiors is due to the monitoring of platforms, where any lag will result in instant calls and punishment. The necessity to cooperate with colleagues is increased

by the need to have transparent, immutable digital documentation, which decreases the flexibility and understanding that existed previously to provide coordination.

4 The Generation Mechanism of Digital Burden Perception

The perception of digital burden is an interaction between institutional, technological, and individual factors that are dynamic. In this chapter, the interconnection between these three levels to create perceived burden is examined using theoretical concepts and empirical data of grassroots governance.

4.1 Institutional Level: The Distortion of the Pressure-Driven System and Assessment Mechanism

The system of pressure, which is regulated by the system, converts the macro-level pressure on governance into the micro-level pressure on individuals through the accurate transmission via the digital platforms. In the pressure-driven system in China, the pressure is passed to the higher-level governments via quantitative indicators. Digital platforms enhance this by having real-time monitoring and rankings. Liang and Zhang discovered that institutional pressure in the form of individual burden is the expression of technological development at a faster rate that exceeds the capacity of the grassroots [4]. This is confirmed by the empirical research by Kang, who reveals that the effect of institutional and technological variables on the digital burden is positively mediated by pressure-driven institutional perception [3].

The falsification of the evaluation system promotes the culture of traceability and data gaming, which adds workload. The distorted indicators of assessment move the emphasis on “work effectiveness” to the data itself. As Sun and Cong state, the main cause of burden is digital assessment pressure and digital traces instead of real work performance [14]. Ideal examples indicate that the existence of hidden rankings and overinspections leaves cadres in a kind of numerical game where they have to concentrate on producing data traces to hold them accountable instead of addressing real issues.

4.2 Technological Aspects: Technological Overload and Platform Fragmentation

Technological overload causes the cognitive resources of civil servants to be continuously stretched, resulting in an information-processing load. Technological overload encompasses information, functional, and notification overload. Kang discovered that it has a great positive contribution to the digital burden [3]. Sun and Cong explain that digital system use skills are needed, and some employees, particularly those who are less digitally literate, do not have them at hand [14]. This enhances learning, compliance, and psychological costs, which constitute the fundamental route through which technology overload influences perceived burden.

Fragmentation of platforms and incompatibility of systems result in redundancy and burden on operations. Pieced together digital systems, which are frequently built separately by various departments, generate drastic silos of data [14]. The problem of data sharing across departmental boundaries is discouraged due to the ownership

issues and departmental interests. This makes grassroots personnel fill in forms in multiple fragmented platforms time and again, bending the reporting of data on a decision support tool into tedious administration work. Liang and Zhang observe that failure to consider grassroots capacity in building platforms results in a loss of efficiency [4].

4.3 Individual Level: The Digital Literacy Gap and Divergent Coping Strategies

Digital literacy gap causes a great divergence among the grassroots civil servants in the coping process of the technological stress. Operational skills are not the only aspects of digital literacy. Kang discovered that personal literacy is part of the channel between the institutional/technological factors and the digital burden [3]. According to Sun and Cong, lack of digital literacy is the leading reason of burden. Less digitally literate staff experience a competency imbalance, and more competent staff adopt faster [14].

Differentiated coping strategies influence the buildup or relief of digital burden, establishing a competency-burden cyclical correction mechanism. Civil servants who have high digital skills are facing the same pressures and apply proactive management practices, as digital tools are their assistants and will reduce the burden. The low digital-skilled individuals are trapped in a vicious circle of technology fear- operation errors- more documentation- more stress, which further supports the fear of technology. This cyclical cycle of reinforcement implies that digital competence can become a moderating variable that will either buffer or strengthen the influence of institutional and technological variables.

4.4 Three Intertwined Levels: The Generation Path of Digital Burden

These three levels are dynamically interacting to create the generation path: the Institutional Level provides the rules and pressure through quantitative evaluations and accountability, constituting the institutional soil. The mechanism of transmission is provided by the technological level. The cognitive resources are disrupted by technological overload; operational burdens are augmented by platform fragmentation. Technology defines the perception of institutional pressure and its amplification. The ultimate pressure transformation is determined by the individual level. The gap between digital capability causes the difference in coping strategies, which result in the buffering or escalation of the burden. To conclude, the institutional pressure flows through technology; the institutional pressure is heightened by the inadequacies of technology, and the individual capabilities cool the whole process. The outcome of the interaction between the institutional logic, technological logic, and individual action logic is the digital burden perception.

5 Conclusion

Based on the analysis of the particular manifestations and the mechanisms of the perception of the digital burden among the grassroots civil servants, the following key conclusions can be made: First, perception of the digital burden is a multi-

dimensional and complex experience. Digital burden of grassroots civil servants is not a unidimensional experience, but a multifaceted one which is interrelated with four levels: operational, cognitive, emotional, and relational. Operational burden is expressed in repetitive technology-level labor, including repetitive data entry, switching among platforms, frequent system updates; cognitive burden is expressed in psychological costs of learning and using rules, including complex rules, ambiguous processes, high understanding costs, emotional burden is expressed in negative emotions like anxiety, feeling monitored, feeling dominated by technology; relational burden is expressed in communicative pressure, superior responsiveness and collaboration with colleagues. The four dimensions support one another and collectively create the burden experience of the grassroots civil servants in digital transformation. Second, it is the interplay of institutional, technological, and individual factors that produces the perception of digital burden generation. The institutional factors behind the emergence of the digital burden are the pressure-based system and the misrepresentation of the assessment systems. The pressure-based system, accurately relayed via digital platforms, shifts macro-level governance pressure into micro-level individual burdens; the perversion of assessment systems breeds a culture of record-keeping and a culture of data game, which places grassroots civil servants in a dilemma of working on data and not working on the people. At the technological level, technological overload and platform fragmentation are direct causes of digital burden. Technological overload causes the progressive division of the cognitive resources of civil servants, forming an information processing load; platform fragmentation and incompatibility of systems cause duplication of work, which leads to higher operational costs. At the individual level, the digital capability divide creates a high level of differentiation between the grassroots civil servants in terms of how they respond to technological pressure. This distinction in coping patterns influences the buildup or reduction of digital weight, which creates a cycle of reinforcing capability-burden. Third, the three levels are interwoven as they form a whole generative route of the digital burden perception. Technological platforms convey institutional pressure, technological gaps enhance institutional pressure, and personal capabilities moderate the impact of institutions and technology. In particular: Under a pressure-driven system, quantitative measures, documentation requirements, and accountability pressures are specifically transferred to the grassroots level by technological means, a technological overload and platform fragmentation compel civil servants to make an additional effort to fulfill the assessment criteria, and civil servants who are highly digitally literate can relieve some of the load by proactively managing strategies, whereas civil servants who are less digitally literate are more readily ens Hence, the digital burden perception is a mere consequence of the interaction of institutional logic, technological logic, and individual action logic.

The work contributes to the theory in various ways. To begin with, it enriches the conceptual connotation of the perception of digital burden by introducing a four-dimensional scheme (operational, cognitive, emotional, and relational) to turn an abstract idea into a functional analytical scheme. Second, it develops a three-tiered institution-technology-individual integrated framework, which exposes the interaction effects of institutional pressure, technological overload, and the digital capability gap

to create perceived burden. Third, it presents the concept of the digital capability gap to civil servant research by showing that digital competence is not merely a skill but also a moderating variable, thus broadening the usage of digital divide theory. Fourth, it identifies how the leverage provided by the pressure-based systems takes advantage of the digital platform to transmit information accurately and how flawed assessment mechanisms create a culture of record keeping and a data game, which connects the pressure-system research with the digital governance research. In practice, the findings are actionable information on how to maximize assessment systems, simplify the online environment, and purchase the targeted digital capacity development to reduce the invisible cost of digital transformation on frontline civil servants.

In order to ease the digital burden, four feasible steps are suggested. To start, ensure that the system design is optimized by changing the assessment focus to an outcome-based one, instituting fault-tolerance measures, and simplifying redundant grassroots reporting activities. Second, enhance technology platforms by enhancing data sharing and inter-departmental systems, ease of use, lowering the cost of learning, and creating feedback mechanisms that engage frontline civil servants in platform design. Burden-reduction clauses should also be incorporated in technology procurement contracts. Third, strengthen personal digital resilience through differentiated training of low-literacy personnel, alleviating the challenge of technophobia, and providing peer learning opportunities, where expert colleagues support their peers. Fourth, enhance overall coordination through consolidating platform construction through top-level design, establishing shared data standards, establishing a specialized oversight agency, and routinely clearing out redundant or underused systems. These combined approaches consider institutional, technological, and individual aspects at the same time to successfully mitigate the latent costs of digital transformation on grassroots civil servants.

The limitations of this study are as follows. The qualitative approaches adopted here are strong in the disclosure of mechanisms but are incapable of quantifying the contribution of factors or testing statistical relationships; mixed-method methods may resolve this. Conclusively, the perception of digital burden in grassroots civil servants is an interactive process that is multi-factorial. This work shows the inner logic of this process, and there are numerous questions that are yet to be considered in more detail in further research.

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