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Exploration and Path Analysis of The Negative Impact of Digital Tools in The TOE Framework

—— Based on Fuzzy Set Qualitative Comparative Analysis (fsQCA) Method

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[Research Objective] In the context of the rapid development of digital governance, understanding and analyzing the burden level of digital tools in the process of serving digital governance from multiple perspectives is an important prerequisite for improving the capacity and accuracy of government digital governance, promoting sustainable public participation, and maximizing digital value in the new era. [Research Method] By constructing a model of the burden of digital tools caused by technical, organizational and environmental factors on the public based on the TOE framework, using SPSS for data testing based on 275 research questionnaires, and using fuzzy set qualitative comparative analysis (fsQCA) to explore the linkage ways and paths of the burden-increasing effect of digital tools in a holistic perspective. [Research findings] does not constitute a necessary condition for high levels of digital tool affordances under a single condition, but improving users' digital literacy plays a more general role in optimising the efficiency of digital tool use. According to the results, there are five dominant patterns that have a significant impact, i.e. the driving paths that lead to high levels of digital tool affordability are characterised by a "homogeneous approach". In the cross-group study, significant differences were found in the driving paths of high digital tool affordability by group, depending on the level of digital tool mastery. This paper suggests that the government should continue to pay attention to affordability levels, rationalise the use of financial resources, improve the level of digital tool adaptation, and innovate the existing performance evaluation system for digital governance indicators.

Keywords : Configuration effect, QCA, Burdensome impact, Digital tool

1 INTRODUCTION

Digital tools, as the main vehicle for fine urban governance, are being used in major cities across China to improve governance accuracy and management efficiency. According to the 14th Five-Year Plan for National Economic and Social Development [1]it is directly proposed to apply digital technology on a large scale in the practice of providing public services, to enhance the level of government digital management, to improve government governance paths and to optimise management models. Guangdong Province, the country's largest economic province, has even proposed to build a national digital government benchmarking model by 2035, using digital technology to promote coordinated regional development and help rural revitalisation and government services.[2] As can be seen, digital tools have become the main tools of China's urban governance approach to meet the needs of the public.

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The precision of urban governance has gradually shifted from territorial units to social individuals, inextricably linked to the application of digital tools; on the whole, it is similar to the shift of state power from a total domination of governance to a reliance on technological governance.[3] In the current urban governance scenario, digital technology can be used as an essential tool for achieving governance goals and as an executive tool for the government to carry out administrative governance, with more communities in China joining the wave of digital reform. In the context of smart cities and smart government, a new generation of digital tools designed to increase the effectiveness of management is being used as an important weapon to solve urban governance problems at the grassroots level. The "e-government reform" based on the digital wave has to some extent improved the administrative efficiency of the government, making it easier for people to access public services and increasing public satisfaction.[4] In urban governance and digital governance, digital tools are mainly used in smart terminals, government apps and information platforms to improve the efficiency of government work.[5, 6] The purpose of using digital tools in urban governance is to promote data interoperability to modernise urban

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governance at the grassroots level. [7] This paper will focus on the issues and implications of the use of digital tools in urban governance.

Although digital tools play an indispensable role in the process of modernising governance, the tools themselves have a multiplier effect that needs attention. (1) The intervention of digital tools creates an operational burden. In Fu's study, it is pointed out that the use of information technology has not brought about substantial results, but instead has created operational dilemmas that complicate the intervention of information technology tools, resulting in a multiplier effect.[8] (2) Digital tools tend to produce formalism. In Professor Mao Shoulong's study, it was mentioned that digital tools like WeChat and DingTalk have become carriers of information technology applications. Although they have improved work efficiency, the steep increase in the number of "chat groups" in the tools has increased the busyness of grassroots cadres.[9] In terms of goal achievement, the application of digital tools is to increase the frequency of data exchange, enhance data connections and build data networks to enhance efficiency and cooperation in governance. However, for the users of digital tools, although it can bring about an increase in efficiency and convenience, it has an impact on the users' ability to complete their work. When evaluating the effectiveness of governance in poverty alleviation, some scholars found that many users of digital tools were asked to respond to WeChat 24/7, repeatedly fill out forms and documents, and take "ineffective" or "formalistic" photos to demonstrate their effectiveness, resulting in The effect of digital tools is extremely negative.[10]

The application scenarios and governance effectiveness of digital tools in urban construction have also been widely studied in academia. The main focus is on the selection of digital tools (Wang Qingyi, 2021), the path of urban smart governance (Zhang Hengming et al., 2021), the analysis of the enhancement of digital tools for governance effectiveness (Wang Ze et al., 2021; Wang Wenjing et al., 2021) or case studies based on a single sample (Deng Nianguo et al., 2020; Yu Zucheng, 2021; Gao Enxin, 2021). However, most of the studies focus on a single case or a single subject as the entry point, establishing a framework of "the current situation of digital governance - the shortcomings found in the use of digital tools in urban governance - the factors that constrain the achievement of the government's digital governance goals", based on which the main points are summarised and The framework is based on a summary of the main points and descriptive conclusions, as well as the paths for improvement in a particular context, but lacks in-depth analysis based on empirical research. The application of digital technology in urban governance has essentially changed the inherent mechanism by informing the processing unit, concretising the processing subject, flattening the processing level and quantifying the interaction.[11] This is particularly true in the context of epidemics, where the use of data, systems and probabilistic thinking can help to modernise the governance system through the scientific governance that cities can achieve.[12] In addition although some scholars have carried out digital governance tools to establish a performance evaluation system and have conducted empirical research and analysis.[13] [14] However, due to the limitations of the analytical perspective and framework, no holistic analysis has been conducted on the causes of the differences in the effectiveness of digital governance, and the driving role and paths of multiple factors on governance objectives under a group perspective are lacking. Research on the level of digital tool adoption in urban governance is still at a relatively early stage, and an analytical perspective that focuses on technology or organisation (government) limits the understanding of configuration analysis and interaction studies on the level of digital tool affordances in the context of multiple influencing factors.

The study of digital burden is still at the stage of theoretical exploration and there are different analytical perspectives, research methods and levels of inquiry. In the group analysis perspective, the causal complexity of the outcomes behind the organisation as a management agent is pointed out, and since the factors that contribute to the burden of digital tools are interdependent, the causes of the burden of digital tools can be explored through a variety of permutations resulting from interactive matching. The Technology-Organisational-Environment (TOE), which is widely used in explanatory models of technology acceptance, therefore avoids overlooking the interaction of multiple factors that balance each other. This paper aims to investigate the causes of the burden level of digital tools by examining the three directional variables of technology, organisation and environment, and by using the results of the Digital Tool Burden Survey to identify ways and means of mitigating the burden of digital tools through the use of fuzzy set qualitative comparative analysis, and to answer the following questions: (1) What sets of conditions exist that create a digital burden in a "different way"? (2) Which conditions or combinations are more important for governments to use digital tools to improve governance? (3)

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How does the timing of digital tool mastery affect the conditional set of digital tool burdens? On this basis, by exploring the composite conditional linkage matching of the TOE framework, an attempt is made to elaborate the burden-enhancing role behind the application of digital tools in urban governance and to complement the existing research framework. This study will help to expand the perspective of research related to the use of digital tools in urban governance by the government as an organisational subject, and deepen the understanding of how the government can optimise the path of digital tool use and enhance the effectiveness of governance to promote the goal of fine-grained urban governance.

2 OVERVIEW AND RESEARCH FRAMWORK

2.1 Practical experience and research advances in digital tools

In its definition of governance, the Commission on Global Governance defines 'governance' as the sum of the many ways and means by which different regimes, public or private sectors and individuals work together to resolve conflicts and align multiple interests through a continuous process of cooperative action.[15] The introduction of governance theory began in the 1990s, and the concept of governance has continued to be concretised and refined, extending to governmental governance, rural governance, contractual governance and so on. Numerous scholars have studied digital tools from three main perspectives.

First, digital tools are used to support case studies. The use of digital technology can improve government decision-making and help governments to provide public services efficiently in order to fulfil government functions and achieve administrative governance goals, and is an effective expression of modernising governance capacity.[16] The earliest example of the application of digital tools in urban governance was the use of a computer-supported system by Xiang WN in 1980 to help analyse regional urban planning problems.[17] In 2006 M. Holzer proposed the EDGE Model of Governance framework, which reshapes the relationship with digital technology policy design based on the way governance is done under bureaucracy.[18] Liu Xuesong mapped out the impact of digital technology use on online public opinion based on a holistic governance framework[19] Zhang Chunyan explores the path of authoritative press releases in the context of public emergencies based on the theory of grid-based governance[20] The inner logic and connection between the use of digital technology and public values based on state and administrative values; Xu Huan[21] A study of how digital technology empowers grassroots governance based on holistic governance[22] Ouyang Hang explores the organisational design of holistic government and digital government construction in the context of digital technology based on a network-based interconstruction framework.[23] The information technology-based governance platform is a tangible vehicle for digital governance, and the interconnection of governance technologies and existing systems is embedded in the overall urban governance.[24] Longely Paul et al. argue that the use of digital tools helps citizens to participate in government governance[25] The use of digital tools has been shown to facilitate the organic coupling of government public services, according to Ye Hao, who studied the case of Hangzhou's digital tools in a government call platform.[26] Some scholars have also pointed out the role of digital tools in the promotion of national governance and diplomatic relations.[27]

Secondly, the means of applying digital tools and the development of organisation building. Building digital technology is inextricably linked to the organisation, but requires more flexibility and resilience.[28] In the iteration of the application scenario of digital tools, they are also widely used in the areas of education and teaching, clinical treatment, digital media development and other areas of public service delivery. 2008 Zhu Qianwei proposed that the birth of holistic governance under the New Public Management practice facilitated the use of information technology tools.[29] Therefore, in the field of public management, firstly, the inquiry of holistic governance was spawned. In chen yongsheng's study, he pointed out that the use of digital governance technology is a transcendence of new public management, which can effectively enhance the government's digital governance capacity and strengthen government responsiveness.[30] Zhang wenjing has demonstrated the coupling with digital governance through the lens of holistic governance[31] Zhao Shiqiang pointed out that by using digital technology capabilities to merge and link resources across levels in governance, functions and the public and private sectors through a holistic governance perspective, it can circumvent the shortcomings of New Public Management and serve as a relatively effective organisational management model for the use of digital technology in

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urban governance.[32] With further iterative upgrades in technology, holistic governance, grid-based governance and digital governance based on the same context have been pushed to the forefront of research, pointing out that all need to put meeting the needs of the public as the first priority and public values as the normative value orientation pursued by government[33] Sun Min argues that the reform of public governance in the UK has driven Deng Liwei's reform and innovation of digital governance theory, and also pioneered the discussion of the existence of a reverse effect of the use of information technology on public management.[34]

Thirdly, performance assessment of the effectiveness of governance of digital tools and its influencing factors. Scholars have launched a series of studies mainly through operational capacity, environmental constraint degree, value orientation, network resources, information resources and human resources.[35, 36] The emergence of digital tools has undoubtedly pushed the accuracy of government governance to a new level. Based on the background of digital technology use practice, digital technology brings governance efficiency while also triggering more thinking about management details. How to optimise the administrative and social order through technology better embedded in the government governance process to achieve the set governance goals. However, the mismatch between the speed of application of digital tools and the speed of administrative governance structures has led to silos of information links; the "strong crowding out" effect of the use of digital technology tools in community governance not only poses data security and ethical risks, but also causes the subjects of power - the communities themselves - to be crowded out by the technology, which is often provided by third-party companies. --The community itself is crowded out by technology.[37] As for the impact of the multiplier effect of digital tools, Fu Jianjun's research on IT efficiency found that cases of digital tool application led to an increase in governance steps, resulting in a steep rise in user costs.[8] In the digital era how should the government achieve the promise of governance and the development and revision of accountability[38, 39] In this study, Wang Shaoquan argues that the complications caused by the development of information technology have led to an erosion of trust between the government and the public affecting the authority of the government, while also increasing the likelihood of public violations in the governance of public crises.[40] The use of digital tools, according to Zhong Weijun's analysis of rootedness theory, can lead to an increase in the utility of grassroots level, resulting in the use of technology that fails to achieve governance goals.[41] The current dilemma of urban governance is both structural and functional[7] In the same vein, Chen Napo's study also expresses the problems in the application of digital governance, pointing out that the decreasing level of application of digital tools from top to bottom is essentially due to a gap in technical mastery, which also leads to multiple and cumbersome working documents.[42] We should therefore be aware of the burden-adding effect of digital tools, especially for the direct users of the technology itself, which is undoubtedly another formalistic burden if the use of technology diverges from its objectives. The ease of access to digital tools and the lack of digital mastery at the grassroots level puts new pressures on the use of digital technology by grassroots users.[41]

In summary, scholars have explored the realities and expansion of digital tools. However, the vast majority of them are based on a single technology, a fixed field, and a single policy perspective to propose policy recommendations for the application of digital tools, focusing on descriptive analysis or a single case study. The literature based on empirical analysis is more often focused on a single dimension of key factors, neglecting to consider and discuss the users' technical capabilities, the organisation's situation and the environment in which the tools are used, and lacking systematic research on the synergistic effects of the interaction between factors. Therefore, it is still necessary to analyse the mechanisms and influencing factors of digital tools on users in the application scenarios of digital tools in urban governance, in order to provide a reference basis for the government to realise refined governance and digital construction.

2.2 Digital tool burden level model construction

In urban governance, the application of digital tools cannot be separated from the interaction of technology, organisation and environment. Urban governance includes various research perspectives such as holistic governance perspective, multi-dimensional collaborative governance and policy network analysis[7] Urban governance is also faced with technological dilemmas, thinking dilemmas, organisational dilemmas and value dilemmas.[43] Individuals are not motivated to participate in urban governance, organisations do not share information with each other, and the environment does not provide enough space for technology to develop. At the same time, the environment lacks appropriate planning

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and the organisation's financial resources are insufficient, resulting in a failure to match the wisdom of the city with the goals of governance.[24, 44] Wang Qingyi's research also points out the importance of policy to urban governance, that policy needs to be both combinatorial and clear, and that policy itself is not an independent characteristic but is intertwined and integrated with each other.[13] Xu Jianyu points out the need to pay attention to the causal dependency between technology and organisational society in urban governance.[45] In summary, it can be seen that there are different links or linkages between technology and organisation, organisation and environment, and technology and environment. Therefore, it is necessary to analyse the role of digital tools in increasing negative impacts based on the triple linkage analysis of technology, organisation and environment.

Although a few studies have been conducted to discuss research on the public's digital affordability levels [41, 46] However, there are still relatively few samples that can provide a model to explain the differences and causes of digital burden levels and their formation paths. The existing studies still suffer from the following shortcomings: First, although there are studies that address the burden-increasing effects of information technology tools, there is a lack of theoretical studies that provide sufficient information on how governments should enhance digital governance and the choice of governance differentiation paths. Secondly, the analysis of factors targeting the burden-enhancing effects of digital tools should be a multifactorial interlinked match rather than an independent one among the factors. The unified symmetrical relationship between variables in the existing studies does not fully match the government's choice of paths to enhance the efficiency of digital tools. Therefore, this paper will try to explain the organic interaction between the factors by combining the relationship of three different perspectives of Environment, Technology and Organization through the fsQCA research method. In 1990 Tornatzky, together with Fleischery, developed the TOE framework perspective[47] The TOE framework was originally used to examine the impact of innovation technology influences on firm adoption.[48] It is essentially a comprehensive analytical framework based on the context of technology adoption.[49] This paper is based on the TOE framework. This paper builds on the TOE analytical framework by combining the institutional context of the Chinese government with digital governance practices to construct a theoretical framework model of the level of affordability of digital tools. (Figure 1)

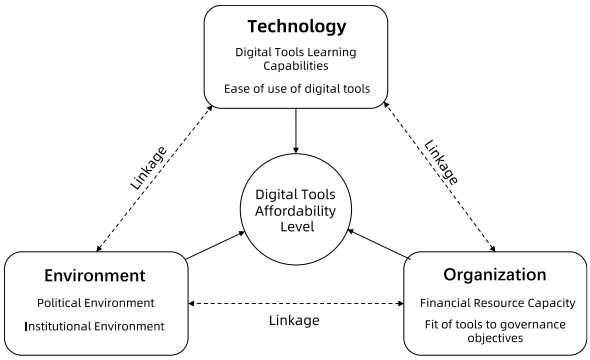

Figure 1: Research model

2.2.1 The impact of technological factors on the burden of digital tools

The technology factor consists of two secondary conditions: the ability to learn digital tools and the ease of use of digital tools. The technology factor emphasises the link between its own objective characteristics and the organisation, focusing on whether the technology itself can match the organisation's architecture, whether it can be aligned with the organisation's ability to apply it, and whether it can bring potential benefits to the organisation (Chau & Tam, 1997). In the relationship between technology and organisations, the extent to which organisations embrace and adopt technology is influenced by the factors of the technology itself (Tam & Tam, 2019). Therefore the level of individual digital competence will determine the acceptance of new technology applications. And according to Fu's study, the degree of digital technology acceptance decreases from the top to the bottom of the section hierarchy structure[11] Therefore, the information literacy of digital tool users will determine whether digital tools can be used appropriately. In addition, Xue Zelin points out that the provision of accurate public services through digital platforms should take into account both

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regional and community characteristics.[53] The use of multiple digital tools to achieve governance goals has been found to increase the burden on grassroots workers.[45] Therefore, the degree of accessibility of digital tools also affects the achievement of digital governance goals to a certain extent. The effectiveness of governance objectives can only be achieved if the digital tools themselves have relatively good learning capabilities and if the level of accessibility of the tools meets the needs of the governance objectives. This allows the use of digital tools to be non-formal and sustainable.

2.2.2 The influence of organisational factors on the burden of digital tools

Organisational factors specifically include two secondary conditions: the capacity of financial resources and the alignment of the use of digital tools with governance objectives. The use of digital tools in the public sector goes through the step of procurement and is often supported by corresponding financial allocations.[54] Some studies have found that where local governments have limited financial resources, the choice to develop mobile apps and make them mandatory for users to install and force them to follow public numbers, among other steps, can further burden users.[13] The ability of government financial resources can therefore directly influence the choice of high quality or high-quality digital tools. In addition, the use of digital tools is often accompanied by the conception and construction of governance objectives by the governing body, but it is important to note that the degree of synergy between digital tools and governance objectives plays a positive or inhibiting role, for example, Wang Ze et al. also found that in the implementation of refined governance, there is a mismatch between governance objectives and actual operations, resulting in the inability to complete the construction of the smart grid[27] The use of digital tools has been found to be contrary to the original intention of governance, as shown in the case study of Nanjing by Wu Xuhong.[40] Therefore, the use of technology tools for urban governance must be applied in a specific context in order to have a positive effect and achieve a high degree of matching of governance objectives.

2.2.3 The influence of environmental factors on the burden of digital tools

Environmental factors specifically include two secondary conditions: the political environment and the institutional environment. The external macro-environment, including national policy development, provincial and municipal policies or policies of grassroots organisations, has a direct impact on the use of technology. The political environment has a direct impact on public organisations and can also influence the outcome of organisational activities, so the use of digital tools cannot be separated from the role of the political environment.[55] With regard to the political environment, Hu et al.[13] found that the vertically imposed "political environment" in the current hierarchical system has caused institutional pressure on grassroots personnel; Zhong Weijun[44] Zhong Weijun found that the embedded use of digital tools is mainly influenced by the political environment through the analysis of rooting theory. The institutional environment refers to the set of relevant institutional arrangements that constrain and incentivise government behaviour, and is an important macro-environmental factor influencing the adoption of innovation by local governments.[56] The non-independent nature of policy is precisely a reflection of its requirements for the level of governance[16] In the context of a stable political environment, the organisation of a benign institutional environment can help users to stimulate endogenous motivation and promote the ability to learn digital tools in technological conditions, thus reducing the burden of digital tools.

In the above analysis, the "technology-organisation-environment" research framework includes six secondary conditions: the ability to learn digital tools, ease of use of digital tools, financial resources, the ability to use digital tools and governance goals, and the political and institutional environment. The framework includes six secondary conditions: digital tool learning capability, ease of use of digital tools, financial resource capability, alignment of digital tools with governance objectives, and political and institutional environment. Of these, digital tool accessibility, financial resource capacity, political environment and institutional environment are objective endowment conditions, as they depend primarily on the subject of urban governance, more so on the local government itself. The ability to learn digital tools and the degree to which digital tools are compatible with governance objectives are subjective conditions of change, as they are conditions that can be directly improved by local governments through organisational training and changing service companies.

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3 DATA MEASUREMENT, SOURCES AND ANALYSIS

3.1 Data construction

The data in this paper comes from eight provincial and municipal regions, including Changsha, Hunan Province, Guangzhou, Guangdong Province, Shenzhen, Guangdong Province, Beijing, Hangzhou, Zhejiang Province, Nanjing, Jiangsu Province, Chongqing and Shanghai, and the survey was conducted among members of the public who use digital tools in real-world arenas. According to the China Institute of Information and Communications Technology's China Urban Economy Research Report (2021)[57] According to the China Institute of Information and Communications Technology's China Urban Economy Research Report (2021), the cities that are more advanced in the use of digital technology in urban governance are concentrated in the southern and central-eastern parts of the country, so these regions were chosen to be representative for this data analysis. The survey was conducted electronically from 13 January 2022 to 1 February 2022 by means of a field survey and an online questionnaire, using new media communication technology. The survey returned 279 questionnaires, 4 invalid questionnaires were deleted and 275 valid questionnaires were returned. According to the sample data, the ratio of male to female participation in the survey was close to 1:1.4, with 115 males (41.8%) and 160 females (58.2%) participating in the survey; in terms of age group, the survey was mainly focused on the 18-35 years old range, accounting for 84.0%; in terms of background education, there were as many as 204 people with bachelor's degree or above, accounting for 70.6%; in terms of occupation, they mainly chose In terms of occupation, the main group of digital tools users was school students (55.3%), while other occupational groups were also randomly selected for the study in order to make the study more universal; the duration of using digital tools was mainly concentrated in 1-3 years and 3-6 years, accounting for 36.4% and 31.6% respectively. The specific distribution characteristics and data of the sample are shown in Table 1.

Table 1: Samples Situation

Variables		Number of people/person	Proportion/%	Variables		Number of people/person	Proportion/%
Gender	Male	115	41.8	Occupation	Current students	152	55.3
	Female	160	58.2		Government /Civil Servants etc.	13	4.7
Age	Under 18 years old	19	6.9		Business managers	11	4.0
	18 to 35 years	231	84.0		General staff	31	11.3
	35-64 years	22	8.0		General Workers	14	5.1
	Over 64 years old	3	1.1		Self-employed/contractors	14	5.1
Academic qualifications	Below junior high school	17	6.2		Freelancers	36	13.1
	High School / Secondary School	36	13.1		Agriculture, forestry, and fishery workers	2	0.7
	University specialist	28	10.2		Retirement	2	0.7
	Undergraduate	158	57.5	Using digital tools time	Less than 1 year	41	14.9
	Masters	25	9.1		1 to 3 years	100	36.4
	PhD	11	4.0		3 to 6 years	87	31.6
					6 to 9 years	26	9.5
					Over 9 years	21	7.6

3.2 Measurement of Variables

By combing the relevant research content and literature on digital tools and combining the TOE framework, the variables influencing the level of affordability of digital tools are categorised into technical, organisational and environmental factors, which mainly include six relational variables influencing the ability to learn digital tools, the convenience of

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digital tools, the ability of financial resources, the matching degree between tools and governance goals, and the political and institutional environment. This paper takes the public's attitude and behavioural intention towards digital tools as the outcome variables, thus forming a questionnaire for the study of the public's affordability of using digital tools in urban governance. In order to ensure the scientific rigour of the research factors on its results, a pre-study of 51 questionnaires was conducted first. After the questionnaires were collected, six valid factors were extracted using principal component analysis in factor analysis using SPSS 26.0. Combining the researcher's intention and feedback, the questions with low factor loadings on the original topic items were eliminated, resulting in a total of 16 questions for the published questionnaire for the study on the burden level of digital tools. As there was an inverse relationship between the construct variables and one of the dependent variables of the study, the reverse questions were chosen mesign. There are three questions on digital tool learning ability, with the sample question "Do you think it is not easy to master a new digital tool"; three questions on digital tool convenience, with the sample question "Do you think that digital tools do not help you in your life or work? "There are three questions on financial resource capacity, with sample questions such as "You do not think that the input-output ratio of spending on digital tools is better than that of traditional tools"; there are three questions on matching tools to governance goals, with sample questions such as "In order to accomplish (objectives), you usually only need to use digital tools once in rare cases"; 2 questions on the political environment, with examples such as "Your organisation or unit mandates the use of digital tools instead of traditional tools"; and 2 questions on the institutional environment, with examples such as "Your organisation/unit rarely has specific training on digital tools and you have to find your own way around".

3.3 Statistical analysis of correlation

The correlation coefficients for the variable measures of the public's influence on the level of burden of digital tools are shown in Table 2. As observed in Table 2, there is a significant correlation between each of the antecedent variables and the level of affordability of digital tools, in line with the expected results.

Table 2: Correlation Statistical Analysis

Variables / PPMCC	Digital tools Capabilities	Digital tools Convenience	Financial resources Source capacity	Fit of tools to governance objectives	Political environment	Political environment
Digital tools capabilities	1					
Convenience of digital tools	0.535**	1				
Financial resource capacity	0.506**	0.528**	1			
Fit of tools to governance objectives	0.541**	0.572**	0.585**	1		
Political environment	0.386**	0.428**	0.433**	0.561**	1	
Political environment	0.369**	0.404**	0.472**	0.515**	0.553**	1

3.4 Reliability and validity analysis

To test the reliability and validity of the questionnaire results, the factor loadings obtained from the factor rotations were analysed using SPSS 26.0 and then the AVE (Average Variance Extracted) and C.R. (Composite Reliability) values were calculated using the following formulae to measure the validity of the data The validity of the data was measured by calculating AVE (Average Variance Extracted) and C.R. (Composite Reliability) values using the following formulae Combined with the reference values in the literature[58] The composite reliability C.R. is greater than 0.6 and the coefficient of each variable $Cronbach's\ \alpha$ coefficients were no less than 0.6 and all AVEs were greater than 0.36 (acceptable). The structural validity test conducted through factor analysis showed a KMO (Kaiser-Meyer-Olkin) value of 0.855, which is greater than the standard value of 0.7, and a significance level of less than 0.001 in the Bartlett's

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sphericity test, indicating a good correlation between the individual question items. Therefore, the individual variables based on the TOE framework can be measured effectively and are acceptable in the validity test.

Table 3: Reliability and Validity Analysis

Variables	Content of variable measurements	Factor Load	C.R.	AVE	*Cronbach's α*
Digital tools Learning ability	You think it's not easy to master a new digital tool	0.858	0.82	0.61	0.866
	You are not willing to spend your time learning new digital tools (to improve work/study efficiency)	0.678			
	You don't consider yourself to be digitally literate	0.781			
Digital tools Convenience	You feel that digital tools do not help you in your life/work	0.818	0.85	0.65	0.890
	You feel that the use of digital tools imposes an additional cost burden on your life/study	0.742			
	You feel that digital tools are less efficient than traditional tools	0.848			
Financial resources Capabilities	Organisations are less willing to spend on digital tools to help with overall goal achievement	0.739	0.79	0.57	0.882
	You don't think the input-output ratio from spending on digital tools is better than traditional tools	0.815			
	Your organisation/unit is less likely to purchase high quality/industry leading digital tools	0.707			
Fit of tools to governance objectives	The digital tools you are using are not meeting your needs	0.788	0.78	0.55	0.808
	In order to accomplish your goals (tasks), you usually use digital tools only once	0.604			
	You don't think it takes less time to complete a task with a digital tool than with a traditional tool	0.808			
Political environment	Your organisation/unit will enforce the use of digital tools instead of traditional ones	0.798	0.76	0.61	0.868
	Your organisation/unit often issues circulars/policies/notices on the use of digital tools	0.765			
Institutional environment	Your organisation/unit is less likely to have specific training on digital tools, so you will have to figure it out yourself	0.679	0.67	0.50	0.910
	Your organisation/unit does not have a dedicated digital tool manager/incentive policy	0.739			

3.5 Analytical methods and calibration of variables

3.5.1 Qualitative comparison methods

Traditional quantitative analysis of data explores the relationship between dependent and independent variables, seeking a dyadic relationship between them, unfolding mainly at a two-dimensional level. In contrast, the QCA analysis approach, which focuses on a subset of relationships, allows the researcher to explore causal complexity, that is, Multiple Conjunctural Causation (MCC). The choice of this research method was driven by several considerations.

Firstly, the dimensions that influence the level of affordability of digital tools are not homogeneous and include the ability to learn digital tools and the ease of use of digital tools as technological variables; political and institutional factors as environmental variables; and the capacity of financial resources and the matching of tools to governance objectives as organisational variables. The analysis or combination of factors based solely on their correspondence is not sufficient to deal with real-life situations. Since in reality factors have a multiplicative impact on outcomes, it is in line with the idea of the QCA approach to analysis that the interdependence and pairing of conditions leads to the emergence of causal complexity. Therefore, it is more appropriate to apply the QCA approach to global analysis and to enhance the path of using digital tools.

Secondly, even when aiming to achieve the same outcomes or governance goals, the choices and decisions of governance actors will differ with respect to different contextual factors. For example, in order to reduce the burden of digital tools, differences may arise when considering how to improve the personal information literacy capacity of groups of people of different ages and with varying amounts of time spent using digital tools.

Thirdly, based on various analyses in the literature, there are multiple paths and models used to reduce the burden of digital tools, again suggesting that there may be path options to achieve the same 'governance effect' hidden in the

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available results. In traditional quantitative analyses, the study can only be carried out in a binary dimension, and the equivalence cannot be fully confirmed. In qualitative comparative analysis, affiliation and the study of asymmetric causality allow for a better interpretation of the results. In summary, the QCA approach is more suitable for exploring the path selection and exploration of digital tool affordance tools.

3.5.2 Variable calibration

QCA can be divided into three categories according to the different types of variables: clear set qualitative comparative analysis, multi-value set qualitative comparative analysis and fuzzy set qualitative comparative analysis. In this paper, we develop a study of the burden level of digital tools based on the fuzzy set qualitative comparative analysis (fsQCA) method.

In qualitative comparative analysis of fuzzy sets, the relationship between the antecedent condition and the outcome of the data can be regarded as an aggregation, and the degree of match between the condition and the outcome can be referred to as the affiliation score. The process of assigning an affiliation score to each pooled relationship based on specific criteria can be considered as calibration. In this paper, based on guidance from the literature, a direct calibration method is used to set the three anchor points of the six conditional variables on data from the Likert 5-point scale, as suggested by Fiss[59] The anchor points were set to "5" for full affiliation, "3" for crossover, and "1" for full disaffiliation. For the outcome variables based on equation (1)

$$PERCENTILE(array, k)[k = 0.95,0.50,0.05] \quad (1)$$

Following the Ragin Advocate[60] The results were calibrated according to the 95%, 5% and 50% intersections of the Ragin's formula, and the resulting values "22.85" were set as fully affiliated, "18.00" were set as intersections and " 7.12" was set as fully unaffiliated. As a result of setting the crossover point, fsQCA will ignore individual cases with a standard score of 0.50 in the calculation. This adjustment does not have a significant impact on the data results.

4 DATA RESULTS AND ANALYSIS

4.1 Analysis of the need for individual conditions

Prior to the group analysis of the data results, a pre-test of the effect of individual factor variables on the results is carried out, with the aim of determining whether the presence of a single or independent condition can lead to the emergence of a high level of digital level burden. Therefore a necessity condition analysis is performed based on fsQCA 3.0 operations. The level of digitisation burden was set as the outcome variable and the 12 antecedent condition variables were set with the inverse antecedent condition variables as the conditions, the data results are shown in Table 4 and the formulae are assessed in equation (2) below. According to Du Yun Zhou[61] 's recommendation, if the consistency value of the antecedent condition variable is not higher than 0.90, we can generally regard the condition variable as not being a necessary condition for the outcome to occur. In combination with the data, the results for each of the antecedent condition variable data values were below 0.90, indicating that none of the independent variables directly contributed to the situation of digital burden. Therefore, we can perform a group analysis of the individual pathways that contribute to the digitisation burden situation.

$$Consistency(Y_i \leq X_i) = \sum(\min(X_i, Y_i)/\sum(Y_i) \quad (2)$$

Table 4: Analysis Analysis of The Need for Antecedent Conditions

Conditional variables		Resulting variables	
		High level of digital burden	Low level of digital burden
Technical factors	Digital tools learning capabilities	0.818	0.591
	～Digital tools for learning skills	0.652	0.855
	Convenience of digital tools	0.850	0.634
	～Digital tools for convenience	0.649	0.823

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Conditional variables		Resulting variables	
		High level of digital burden	Low level of digital burden
Organizational factors	Financial resource capacity	0.833	0.599
	～Financial Resource Capacity	0.640	0.851
	Fit of tools to governance objectives	0.854	0.610
	～Matching tools to governance objectives	0.652	0.814
Environmental factors	Political environment	0.797	0.559
	～Political environment	0.664	0.819
	Institutional environment	0.814	0.594
	～Institutional environment	0.659	0.825

4.2 Sufficiency analysis of conditional grouping

When we analyse the calibrated data as a group, we generally obtain three solutions: simple, intermediate and complex. The meaning of "solution" can be understood as a large collection of cases supported by data. Complex solutions are based on the results of traditional logical operations and do not contain logical residuals; simple solutions cover all logical residuals but lack the assessment of rationality; and intermediate solutions include logical residuals that have research value. Based on previous scholarly research and complexity, this paper will report on the intermediate solutions, aided by the use of simple solutions for labelling core and edge conditions.

In group analysis, the allowable range of consistency scores differs from the analysis of necessity conditions. According to Fiss[59] s recommendation, the raw consistency score was set at 0.8; while the resulting case frequency threshold needs to be determined based on the sample pool size, according to A Capatina[62] study when the sample size is less than 60, the frequency is chosen to be 1. Combined with the actual sample size of this analysis, the frequency is chosen to be set at 2; combined with Thomas[63] The final 11 paths that yielded results with high levels of digital tool burden were obtained in this paper, as shown in Table 5. The overall consistency of 0.918 and the overall solution coverage of 0.903 indicate that the framework can be well interpreted.

Table 5: Configuration Analysis of Digital Tool Burden Level

Conditional Configuration	**Technology**	**Technology - Organisation**			**Technology - Environment**		**Organisation - Environment**		**Technology - Organisation - Environment**		
	S_1	S_2	S_3	S_4	S_5	S_6	S_7	S_8	S_9	S_{10}	S_{11}
Digital tools learning capabilities	●	●	●		●	●				●	
Convenience of digital tools	⊛	•		•	•				●		•
Financial resource capacity	⊗	●	●	●				●	●	●	●
Tools and governance objectives Match	⊛		●	●		⊗	●	●			
Political environment	⊗					●	●		●		
Institutional environment	⊗				●	⊗	•	●		●	●
Consistency	0.907	0.983	0.987	0.982	0.991	0.970	0.986	0.985	0.990	0.993	0.983
Original coverage	0.449	0.663	0.669	0.691	0.647	0.479	0.665	0.660	0.636	0.627	0.655
Unique coverage	0.001	0.004	0.012	0.009	0.004	0.001	0.004	0.001	0.003	0.004	0.008
Consistency of solutions	0.918										

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Conditional Configuration	Technology	Technology - Organisation			Technology - Environment		Organisation - Environment		Technology - Organisation - Environment		
	S_1	S_2	S_3	S_4	S_5	S_6	S_7	S_8	S_9	S_{10}	S_{11}
Coverage of solutions	0.903										

Notes: ● and - indicate that the condition exists, * and ⋇ indicate that the condition does not exist, ● and * indicate that If "blank" appears, the condition may or may not exist.

As can be seen from Table 5, the combination of technology, organisation and environment produced 11 paths with high burden levels of digital tools, and all 11 path consistency score levels were greater than 0.90 (above acceptable levels). The paths with the same core conditions are grouped and organised into five types, namely technology-dominant, technology-organisational-dominant, technology-environment-dominant, organisation-environment-dominant, and technology-organisational-environment dominant.

According to the S_1 configuration: "digital tool learning capability* ~ digital tool accessibility* ~ financial resource capability* ~ tool fit with governance objectives* ~ political environment* ~ institutional environment" it can be seen that digital tool learning capability plays a central role. It means that when the digital tool learning capability variable is present, the other conditional variables do not have much influence on the level of digital tool affordability, as this variable itself constitutes a sufficient condition for a high level of digital tool affordability. In this grouping, the presence of digital tool competencies (technology) is more critical for high levels of digital affordances, hence the name 'technology-based'. This also gives the digital tool enabler the insight that the individual's ability to learn about digital tools can objectively break the endowment conditions of organisational and environmental factors and reduce the constraints of high digital tool burden levels. In this grouping, a consistency score of 0.907, a raw coverage of 0.449 and a unique coverage of 0.001 can be achieved, indicating that this path explains approximately 44.9% of cases with a high level of digital tool burden, and only 1% of cases with a high level of digital tool burden.

According to the S_2 and S_3 configurations: "Digital tool learning capacity * digital tool accessibility * financial resource capacity" and "Digital tool learning capacity * financial resource capacity * tool fit with governance objectives" respectively, it can be seen that both technical and organisational factors Both of them play an essential role and are therefore categorised as "technical-organisational". In the case of high levels of digital tool burden, a high level of digital literacy and organisational conditions (financial resource capacity) to meet the productivity needs of society can break through the environmental constraints to achieve a lower level of digital tool burden governance. In the paths of S_2 and S_3 , both digital tool learning capacity and financial resource capacity are core conditions that lead to high digital tool burden levels. This indicates that in some specific contexts, the digital literacy of the public and the financial resource capacity of the target organisation can jointly influence the situation of the digital tool burden level. In the S_2 path, the ease of access to digital tools plays a supporting role; in the S_3 path, the alignment of tools with governance objectives is the core condition, suggesting that even when individuals are digitally literate and organisations have sufficient financial resources, the use of digital tools that are not well aligned with governance objectives can lead to high levels of digital tool affordability. The consistency scores for the two paths range from 0.983 to 0.987, with raw coverage covering 66.3% and 66.9% respectively.

The S_4 path "financial resource capacity * tool fit to governance objectives * ease of access to digital tools" observes that the variables under the organisational factor are all critical influencing factors, while ease of access to digital tools is a secondary condition. It can be seen that under the influence of strong organisational factors, ease of access to digital tools can emerge as an auxiliary condition leading to the outcome of high levels of digital tool affordability. Since the driving path is still composed of financial resource capacity (organisational), fit of the tool to governance objectives (organisational) and ease of access to digital tools (technical), it is classified as 'technical-organisational'. The consistency score for this grouping is 0.982 and this path explains about 69.1% of cases with high affordability of digital tools, while 9% of cases with high affordability of digital tools can only be explained by this path.

The paths in S_5 and S_6 are "digital tool learning capability * digital tool accessibility * institutional environment" and "digital tool learning capability * ~ tool fit with governance objectives * political environment * ~ institutional environment" respectively, both of which have the characteristic that "Learning capacity of digital tools" is a core

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condition. Therefore, the influence of the digital tool learning capability variable as a technological variable in the 'technological-environmental' path cannot be underestimated. In the S_5 pathway, the ability to learn with digital tools and the institutional environment are the core conditions, and the accessibility of digital tools is a secondary condition. This means that the institutional design of the unit or organisation itself, the training plan and the level of digital literacy of the individual will be the main influencing factors when the level of burden of a particular digital tool is high. The S_5 path has a consistency score of 0.991 and an original coverage of 0.647. The S_6 path indicates that the low level of individual learning capacity for digital tools and a more restrictive political environment can be achieved without focusing on the fit between the tools themselves and governance objectives. The S_6 path has a consistency score of 0.970 and an original coverage of 0.479.

In the S_7 path "Fit of tools to governance objectives * political environment * institutional environment", the political and political environment plays a central role and the institutional environment plays a complementary role. When high levels of public affordability of digital tools are induced, there is a possibility that the problem of matching tools to governance goals may arise and that the environment may not provide sufficient support. This path can be described as 'organisation-environment' driven. The alignment of tools with governance objectives and the political environment play a dual role in this pathway, with the institutional environment playing a more supportive role. The consistency score for this pathway is 0.986 and the original coverage is 0.665.

Although both the S_8 path and the S_7 path are 'organisation-environment' led, there is a distinction in the choice of specific paths, with S_8 emphasising 'financial resource capacity * degree of matching of tools to governance objectives * institutional environment'. This suggests that the combination of organisational factors and institutional environment variables, again breaking down the limitations of technical factors, leads to higher levels of digital tool burden. In this pathway, the variables of organisational factors become the dominant core and the capacity of financial resources the central constraint. This suggests that high levels of digital tool burden will occur if the organisation's financial budget or financial investment cannot support the development or acquisition of appropriate digital tools, and if the available information tools do not fit well with governance objectives, and thus the user is in an organisational environment that does not provide adequate digital training or incentives. The consistency score for this path is 0.985 and the original coverage is 0.660.

S_9 path is "ease of access to digital tools * financial resource capacity * political environment", since ease of access to digital tools (technology), financial resource capacity (organisation) and political environment (environment) belong to three different condition variables, the path is named "technology -organisation-environment" dominant. In this grouping, ease of access to digital tools, financial resource capacity and political environment all play a central role, indicating that the lack of ease of access to digital tools and the lack of financial resource capacity of the unit are constrained by environmental factors, which can easily lead to higher levels of digital tool burden. Administrators should therefore focus on the ease of access to digital tools, as well as on the allocation of resources and the availability of relatively generous digital learning spaces. The consistency score for this pathway is 0.990, with a raw coverage of 0.636.

The$_{10}$ path "digital tool learning capacity * financial resource capacity * institutional environment" emphasises that, in addition to the central role played by financial resource capacity, digital tool learning capacity and the institutional environment can also work together to influence the burden-boosting effect. In this grouping, if the digital learning capacity of individuals is insufficient, and the unit lacks financial support and appropriate digital training or incentives. Even if the digital tool improves efficiency for the practice, has the right fit and a well-developed political environment within the organisation, it is more likely to result in higher levels of digital tool burden. The consistency score for this pathway is 0.993 and the raw coverage is 0.627.

The S11 path "ease of access to digital tools * financial resource capacity * institutional environment" emphasises the dual role of financial resource capacity and the institutional environment, with the ease of access to digital tools playing a complementary role to the technical conditions. When organisations lack sufficient financial resources to support them, the low fit of digital tools themselves to achieve their goals and the imperfect institutional environment will also make the public will have the phenomenon of higher burden levels of digital tools. As the driving path consists of the ease of access to digital tools (technology), the capacity of financial resources (organisation) and the institutional environment

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(environment), it is also named "technology-organisation-environment type". The consistency score for this path is 0.983 and the raw coverage is 0.665.

5 DIFFERENTIAL ANALYSIS OF DIGITAL TOOL EXPOSURE TIME ON DIGITAL BURDEN LEVELS

The high level of digital tool burden among individuals, depending on the time of mastery or familiarity with digital tools, is more markedly heterogeneous due to the influence of regional development levels, resource allocation and individual capacity endowments. The layers of complexity and uncertainty of mastery that come with technological change lead to new demands and challenges for the existing governance system.[64] This paper therefore discusses the duration of exposure to digital tools in three groups: 1 to 3 years, 3 to 6 years and more than 6 years.

5.1 Analysis of the level of digital burden for digital tools that have been in use for 1 to 3 years

In total, there were 77 sample sizes in the survey population with 1 to 3 years of exposure to digital tools. Since the total sample size has changed, the results of the model analysis would have been affected if the data calibration points of the first unclassified data analysis had been used for the grouping analysis. Therefore, according to equation (1) and based on Ragin's advocate[60] The results were calibrated at 95%, 5% and 50% of the intersection points according to the formula, and the resulting values "24.73" were set as fully affiliated points, "18.00" were set as intersection points and "12.13" were set as fully affiliated points. 12.13" were set as fully unaffiliated points.

The fsQCA analysis was conducted based on this sample grouping and the results of the grouping analysis were obtained as shown in Table 6. According to the results, there were three paths and the overall solution consistency reached 0.970, while the overall solution coverage reached 0.774.

Table 6. Configuration analysis of the burden level of users who have been using digital tools for less than 3 years

Conditional Configuration	Technology - Environment	Technology - Organisation - Environment	
	S1	S2	S3
Digital tools learning capabilities	●	•	
Convenience of digital tools	●	●	●
Financial resource capacity		●	●
Tools and governance objectives Match		●	●
Political environment	●	●	●
Institutional environment	●		●
Consistency	0.979	0.974	0.970
Original coverage	0.713	0.690	0.677
Unique coverage	0.061	0.037	0.024
Consistency of solutions		0.970	
Coverage of solutions		0.774	

Notes: ● and • indicate that the condition exists, * and ⊁ indicate that the condition does not exist, ● and * indicate that the core condition, • and ⊁ indicate that the auxiliary condition. If "blank" appears, the condition may or may not exist.

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According to Table 6, for people with relatively short exposure to digital tools (less than 3 years), a number of variables need to coexist in order for high levels of digital tool burden to occur.$_1$ path is a 'technology-organisation' driven path. In this path, it can be seen that the dual core of technical and environmental conditions is more likely to cause beginners to feel a more pronounced burden increase in the use of digital tools.

In the two "technology-organisation-environment" oriented paths S_2 and S_3 , the path S_2 includes "digital tool learning capacity * digital tool accessibility * financial resource capacity * tool fit with governance objectives * political environment "where digital tool learning capacity appears as an auxiliary condition. In contrast, the S3 path is "digital tool accessibility * financial resource capacity * tool fit with governance objectives * political environment * institutional environment". Comparing the S_2 and S_3 paths shows that there can be potential substitution of variables between digital tool learning capacity and institutional environment, controlled by common digital tool accessibility, financial resource capacity, tool-governance goal fit and political environment variables. All three pathways above reveal that, in response to the emergence of high levels of digital tool affordances, there is relative sensitivity to various variables under the framework for those newly exposed to digital tools. And because of the high consistency of the solution, it suggests that the overall coverage of the pathways covers the vast majority of first-time exposures to high burden levels and is more representative of how such populations would be affected by the conditional factors described above.

5.2 Analysis of the level of digital burden for digital tools used for 3 to 6 years

As the digital age evolves, the digital tools we come into contact with in our daily lives are essentially inseparable from the increased arithmetic power of chips. According to Moore's Law, every 24 months between chip iterations, chip performance and capacity can double. Based on publicly available information, the entire product cycle from chip design to product design and export is usually between 12 and 24 months or even longer. Therefore, for users of digital tools who have already acquired some basic knowledge, they can feel the transformative impact of time on digital tools. Therefore the intuitive perception of the level of burden of digital tools will be different from the other two control groups. The sample size of those who have used digital tools for 3 to 6 years is 55. Again for the reasons stated in the previous section, the data was again calibrated to the sliced data based on equation (1). The following results were calculated based on the formula and the resulting values "22.15" were set as fully affiliated (95% affiliation), "17.83" were set as crossover (50% affiliation) and " 12.62" was set as fully unaffiliated (5% affiliation).

The fsQCA analysis was carried out based on this sample size, and the results of the Configuration analysis are shown in Table 8. According to the results, there were five paths and the overall solution consistency reached 0.930 and the overall solution coverage reached 0.718.

Table 7. Configuration analysis of the burden level of users who have been using digital tools for 3 to 6 years

Conditional Configuration	**Technology - Environment**			**Technology - Organisation - Environment**	
	S_1	S_2	S_3	S_4	S_5
Digital tools learning capabilities	●			●	●
Convenience of digital tools	•	●	●		•
Financial resource capacity		•		•	
Tools and governance objectives					
Match	●		•	●	•
Political environment	●	●	●	●	
Institutional environment		●	●	⋆	●
Consistency	0.959	0.965	0.952	0.962	0.951
Original coverage	0.578	0.550	0.577	0.434	0.501

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Conditional Configuration	Technology - Environment			Technology - Organisation - Environment	
	S_1	S_2	S_3	S_4	S_5
Unique coverage	0.011	0.027	0.009	0.016	0.033
Consistency of solutions			0.930		
Coverage of solutions			0.718		

Notes: ● and • indicate that the condition exists, * and ⊁ indicate that the condition does not exist, ● and * indicate that the core condition, • and ⊁ indicate that the auxiliary condition. If "blank" appears, the condition may or may not exist.

As can be seen in Table 8, there are five groups (paths) of paths to high digital tool affordability for people with a certain digital capability base. The S_1 path shows that even for people who are aware of digital tool use, digital tool learning capability, tool fit with governance objectives and political environment as core conditions and digital tool accessibility play a supporting role in driving high digital tool affordability outcomes. $_4$The S_2 path shows that the triple effect of digital tool accessibility, the political and institutional environment, and the catalytic effect of financial resource capacity can also lead to high levels of digital tool affordability. The S_3 path has the same core conditions as the S_2 path, but can also lead to high levels of digital tool affordability if the tool is matched to governance objectives. The S_5 path shows that even in environments with low levels of institutional pressure, the combination of digital tool learning capability, tool-governance goal fit and political environment can lead to high levels of digital tool burden. Comparing the analysis of the S_1 and S_4 paths, it can be seen that digital tool ease (technology) and financial resource capacity (organisation) can be substituted for each other when having the same governance tool match, personal digital tool learning capacity and political environment. The five sets of paths with high affordability levels suggest that different core drivers and supporting conditions under technological, organisational and environmental factors can lead to higher affordability levels of digital tools in a "different way" for a certain group of digitally competent users.

5.3 Analysis of the level of digital burden for digital tools used for more than 6 years

The number of samples in the entire sample where the digitising tool was in use for more than 6 years was 28 in total. The 28 samples were recalibrated based on equation (1). The following results were calculated and derived from the formula, setting the resulting values "20.61" as fully affiliated (95% affiliation), "17.67" as a crossover point (50% affiliation) and " 7.49" was set as fully unaffiliated (5% affiliation).

The fsQCA analysis was carried out based on this sample size and produced the results of the Configuration analysis as shown in Table 7. According to the results, there were eight paths and the overall solution consistency reached 0.937, while the overall solution coverage reached 0.864.

Table 8. Configuration analysis of the burden level of users who have been using digital tools for over 6 years

Conditional Configuration	Environment		Technology - Organisation	Technology - Environment		Technology - Organisation - Environment		
	S1	S2	S3	S4	S5	S6	S7	S8
Digital tools learning capabilities		•	●	⊁	●		●	●
Convenience of digital tools	⊁	⊁	⊁	•	•	•		⊁
Financial resource capacity	⊁	⊁	●	⊁	⊁	•		●
Tools and governance objectives Match	•	⊁	●	⊁		•	●	⊁
Political environment	●	●	⊁	●	⊁	●	●	

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Institutional environment	•	⊁	⊁		●		●	●
Consistency	0.979	0.964	0.982	0.949	0.992	0.993	0.993	0.985
Original coverage	0.533	0.475	0.475	0.516	0.483	0.572	0.511	0.522
Unique coverage	0.017	0.004	0.023	0.018	0.039	0.056	0.025	0.059
Consistency of solutions				0.937				
Coverage of solutions				0.864				

Notes: ● and • indicate that the condition exists, * and ⊁ indicate that the condition does not exist, ● and * indicate that the core condition, • and ⊁ indicate that the auxiliary condition. If "blank" appears, the condition may or may not exist.

Table 8 shows that in the S_1 and S_2 paths, the political environment plays a significant central role, even beyond the constraints of digital tool accessibility and financial resource capacity or digital tool accessibility, organisational factors and institutional environment. $_4$In the S_3 path, it is shown that the combination of digital tool learning capacity, financial resource capacity and tool-governance goal matching can lead to high digital tool burden levels, regardless of the level of digital tool accessibility and the influence of environmental variables. The S_5 path emphasises the dual centrality of the learning capacity of digital tools and the institutional environment to overcome the limitations of the financial resource capacity and the institutional environment catalyzed by the ease of access to digital tools. In the three "technology-organisation-environment" paths (S_6 , S_7 and S_8), the dominant role of digital tool learning capabilities, political environment and institutional environment variables is reflected. This shows that as experienced users of digital tools, they have a significant advantage in terms of their knowledge of the entire digital tool, while the perceived burden of the digital tool tends to be concentrated on 1 or 2 core conditions. In order to mitigate the burden-increasing effect of digital tools, attention can be paid to the combination of political environment building and institutional environment optimisation under environmental factors, in addition to enhancing digital literacy (digital tool learning ability) with the users themselves.

6 CONCLUSION AND RESPONSE

6.1 Data Discussion

6.1.1 Overall conditional configuration analysis path characteristics

As can be seen from the conditions of the distribution of core and auxiliary conditions in Table 5, financial resource capacity and digital tool learning capacity are variables common to the majority of paths, indicating that an organisation's financial resource capacity determines to some extent the level of digital tool affordability; at the same time the digital tool learning capacity factor under the technology variable confirms that digital capacity is hierarchical in nature[11] The factor of digital tool learning capability under the technology variable also confirms that digital capability is hierarchical in nature, with differences in each individual's mastery of digital tools leading to situations that run counter to governance objectives. The ability to learn digital tools has a significant impact on the level of digital affordability, and the individual's digital information literacy can even directly trigger the emergence of high levels of digital affordability. In addition, the factor of digital tool accessibility plays a secondary role in all four paths and a significant role in one path, suggesting that digital tool accessibility is more often a synergistic effect with other factors, rather than a direct result of digital tool accessibility alone. In contrast, the influence of the political environment in a given field can overlook the influence of the institutional environment and the matching of tools to governance objectives, with the situation where the ability to learn digital tools directly leads to high levels of digital tool burden.

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6.1.2 Differentiated conditional grouping analysis path characteristics

The analysis of the secondary condition groupings based on different levels of digital tool mastery, combined with Tables 6, 7 and 8, reveals that, firstly, for those who are new to digital tools, they are relatively more sensitive to digital tool use and show multiple points of clustering in all three paths leading to high levels of digital tool burden. Secondly, for digital tool users with some basic knowledge (3 to 6 years), they are more sensitive to technical and environmental factors, while the role of factors under organisational variables is more of a secondary or catalytic role. Thirdly, in the path analysis of experienced digital tool users, there are locally significant characteristics, with factors playing a significant role in multiple paths, usually at 1 to 3 points. It is also more often the case that multiple factors can be broken down, leading directly to higher levels of burden than with digital tools, and it is also important to note the complementary role of the convenience of digital tools in the pathways.

6.2 Conclusions of the study

This paper uses the fsQCA method to perform a Configuration analysis of 275 people who use digital tools in urban governance, in an attempt to reveal the core conditions and dynamic interaction mechanisms that influence the level of affordability of digital tools in urban governance, by exploring the linkages and driving paths of technological, organisational and environmental factors on the level of affordability of digital tools. The findings of the study are as follows.

(1) In general, technical, organisational and environmental factors cannot be considered as separate elements for the level of burden of digital tools, and the analysis of the necessity of individual conditions shows that a single element cannot constitute a necessary condition for a high level of digital burden. There are a total of 11 driving paths for a high level of digital tool affordability, as well as five matching patterns to them. These can be categorised as independent explanations by the user's own elements (digital tool learning capabilities), co-explanations by the user's own elements and organisational elements, co-explanations by the user's elements and environmental elements, adaptations by organisational and environmental elements, and adaptations by the user's elements, organisational elements and environmental elements. Among these, the technology-led path plays a significant role in optimising the role of digital tools in adding value. The influence of the learning capacity of digital tools is even more pronounced in specific contexts.

(2) Behind the level of digital tool burden is a synergistic catalytic effect of multiple elements, the interdependence, integration and synergy of which lead to a situation of digital tool burden in a "different way". For example, under certain circumstances, a high digital tool burden can occur when users of digital tools are not constrained by the fit between the tool and governance objectives and the conditions of the institutional environment, if they have insufficient capacity to learn digital tools themselves or if they are in a stressful political environment.

(3) Significant heterogeneity in the study of digital tool affordances exists between users with different lengths of digital tool use, as the years of exposure to digital tools vary among restricted users. The significant differences in the pathways driving the level of digital tool affordances of the public also represent distinctly different conditions contributing to the heterogeneity of digital tool affordances.

6.3 Management inspiration

The findings of this paper suggest several areas of policy recommendations for how governments can reduce the level of digital burden on the public.

Firstly, the government should continue to pay attention to the level of digital affordability of the public and enhance the management and integration of resources among various elements of technology, organisation and environment. The rapid development of digital technology has forced the government to integrate resources and propose new governance methods as soon as possible, so as to establish a good interactive relationship with the public and build a composite government digital intelligence governance model. The first step is to focus on the objective endowments of the organisation's location, to collect the local conditions and to build a top-level planning perspective based on the different users of digital tools, using a "holistic" perspective and combining the dynamic linkages between the three factors. By establishing a top-level plan, the governance concepts of the various government departments are unified and a holistic

approach to policy and implementation is taken. Digital literacy or information literacy of the public can be improved in two ways. On the one hand, digital literacy training for the whole population should be organised. Using the existing grid-based community governance, each community can conduct digital literacy training at regular intervals and in an organised manner, thus circumventing the "digital divide" and providing the public with adequate technical and human resources support. On the other hand, the government can take the initiative to adhere to the principle of "serving the people" and always stand for the people and the users. The government should develop and shape its digital governance system from a "people-centred" perspective, and incorporate the convenience and satisfaction of the public in using digital tools into the performance evaluation system of government departments, for example, by developing the "elders model" and "youth model". Youth model", etc., to reduce the difficulty of using digital tools from the government's perspective and thus achieve more universal digital governance goals.

Secondly, the use of financial resources should be planned rationally and the degree of adaptation of digital tools should be improved. In the 14th Five-Year Plan, many cities have proposed the construction of a digital government or accelerated the construction of a smart city brain, all in the hope that the government will quickly undergo digital transformation and upgrade to adapt to the rapid development of social productivity. However, the government should pay more attention to the rational use of financial resources. On the one hand, it needs to integrate the concept of digital governance into the shaping of public values, so as to build a bridge of trust with the public; on the other hand, it can make use of the features of digital technology to record and monitor the use of funds in the whole process, such as blockchain technology, which can realise the traceability of the whole process and increase the transparency of financial expenditure. In addition, the government should also reasonably analyse public demand, reduce the public's learning burden or operational burden from the source of technology such as R&D, design and production, and invest R&D funds or project funds in how to improve the match between digital tools and governance objectives. For example, Guangdong's government service platform "Guangdong Province Affairs" integrates 2,389 services covering people's livelihoods (as of March 2022), which can help users share information across the platform and reduce operational burdens and time costs - citizens who need to apply for Social security cards can be applied for directly with a single click, and personal identity photos stored in the public security system can be called directly.

Thirdly, the construction of an ecologically sustainable political and institutional environment system requires an innovative performance evaluation system for existing digital governance indicators. Current research by the People's Think Tank has found that "information formalism" or "smart bureaucracy" has emerged in government governance.[65] The serious formalism has led to a multiplier effect at the grassroots level. Many governments have over-emphasised quantifiable indicators, such as the number of online collaborations and web page hits, in building their original government performance evaluation systems, but they have lost sight of the 'people-centred' value centre and lacked the dialectical alignment between instrumental correctness and value rationality. The government should therefore strengthen its top-level design, focus on openness and transparency, improve efficiency, regulate financial expenditure, and focus on effectiveness rather than superficial data in its assessment indicators. In this way, a tolerant political environment can be established for users of digital tools to improve the accuracy and efficiency of governance objectives. In addition, the government should develop a joint responsibility and accountability mechanism, and incorporate the value of "people-centredness" into the performance evaluation system, so that the whole process of using digital tools for governance is carried out. The satisfaction index of users should be linked to the incentive and punishment policy of the corresponding government officials to create a dynamic and virtuous cycle.

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