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# INVESTIGATING HOW UX STRATEGIES FACILITATE DIGITALIZATION OF PUBLIC SERVICES：A CASE STUDY

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**ABSTRACT**
Developing digital systems is crucial to the digitalization of public services. However, the effort faces various strategic challenges, such as resource constraints and divergent stakeholder needs, making system development especially complex. User experience (UX) strategy is a user-centered approach to understanding user needs and aligning them with organizational objectives. This study explores Taiwan's Animal Exhibition Operators Management System as a case to investigate how this strategy can address these challenges and facilitate human-centered digitalization in public services. The findings reveal that the UX strategy effectively defines actionable pathways for achieving public sector goals, showcasing its tangible value. It enables strategic resource allocation, builds consensus among diverse stakeholders, and enhances collaboration between external teams and public agencies, thus advancing public service digitalization. This study introduces a strategy structure for designing public systems and demonstrates its practical impact from conception to implementation.

*Keywords: UX strategy, digitalization, public service*

## 1 INTRODUCTION

With the advent of the global digital era, Taiwan has proactively advanced the digital transformation of government, seeking digital solutions across various public services [1]. However, the digitalization of public services faces persistent challenges. When the government attempts data governance through digital platforms, inadequate planning can result in limited effectiveness. Since 2015, the Taiwanese government has sought to regulate animal exhibition enterprises through legal frameworks; however, public awareness of this issue remains limited [2]. Additionally, conflicting perspectives among stakeholders have hindered effective regulation, prompting the government to collaborate with external teams to develop the Animal Exhibition Operator Management System (AEOMS). This study examines this case to investigate how to plan a holistic user experience strategy for public service systems, thereby human-centered digitalization of public services.

User experience (UX) strategy is a comprehensive plan aimed at ensuring that products or services meet user requirements while providing an outstanding experience. It aligns business objectives, user needs, and technical feasibility, thereby offering organizations with a clear pathway to create meaningful and valuable user experiences. Integrating such a holistic strategy into the system development process of digital public services, not only ensures high-quality end-user experiences but also empowers designers to address potential challenges related to digitalization within the rigid frameworks of public institutions. Consequently, the research problem addressed in this study is the formulation and implementation of a UX strategy for system development in the public sector. Take the AEOMS as a case study. The study outlines three research objectives: (1) to identify the challenges encountered during the digitalization of public services in the context of case execution; (2) to propose a UX strategy structure and describe how the UX strategy can address these challenges; and (3) to evaluate the benefits and value of the UX strategy in promoting public services digitalization within the public sector.

# 2 LITERATURE REVIEW

## 2.1 Challenges of public services digitalization

Digitalizing public services involves using digital technology to enhance service efficiency, transparency, and accessibility, making it a crucial aspect of government digital transformation. However, implementation faces challenges beyond technology, necessitating a deep understanding of the public service domain [3]. The specific challenges vary across public service sectors [4]. This study examines obstacles in developing digital systems intended to replace paper-based processes.

A major issue is conflicting stakeholder perspectives, which often hinder digitalization. Differences in understanding digital systems lead stakeholders to have varying needs and expectations [5]. Civil servants, as central actors, may struggle to understand citizen needs, typically approaching digitalization with a top-down mindset [6]. Addressing these conflicts requires effective communication and balancing stakeholder demands. Additionally, existing legal frameworks can obstruct public service digitalization. Bureaucratic procedures, strict regulations, and multi-level decision-making processes complicate project execution [7]. Misalignment between regulations and current social needs further limits digital service implementation [8].

In summary, successful public service digitalization relies on a comprehensive understanding of stakeholders' needs and the challenges faced by public sector institutions to develop strategic plans that address the systemic constraints.

## 2.2 UX strategy in human-centered public service

In recent years, human-centered digitalization of public services has become a global governmental trend. The UN [9] emphasizes the principles of "leaving no one behind" and "promoting digital inclusion," advocating that digital governments should bridge the digital divide to ensure equitable access to digital public services. Likewise, the OECD [10] includes a "user-driven" approach as one of six core areas in its Digital Government Policy Framework, highlighting the importance of centering users in public service digitalization. However, research is currently lacking on how to concretely and strategically implement this user-centered concept in public digital service projects.

UX strategy offers a practical, user-centered methodology that could address this gap. Levy [11] describes UX strategy as a bridge between user needs and business strategy. It represents a process of integrating user-centric design with the strategic goals of digital products, ensuring alignment between business objectives and user expectations. According to NN/g [12], UX strategy prioritizes user experience quality and sets execution priorities, bridging UX design with business strategy to meet both user and organizational needs [11]. Applying such a strategy in public service system development shifts traditional commercial objectives toward public service goals, thereby aligning public sector projects more closely with user needs. This study investigates a public sector system development case that integrates UX strategy from planning to implementation stages, exploring its impact on advancing digitalization in public services.

# 3 METHODOLOGIES

This section describes the case and its execution process.

## 3.1 Case study

This study employs the 2023 project, *Development of an Animal Exhibition Operators Management System (AEOMS)*, as its case study. The project, part of the Ministry of Agriculture's initiative, *Diverse Pet Animal Welfare Assessment Mechanism*, seeks to enhance Taiwan's oversight of animal exhibition operators. An external team was commissioned to conduct the project from research to system design and full development. The external team's responsibilities were limited to system-related design, excluding tasks inherently tied to public sector duties, such as legal drafting and defining operational workflows, with recommendations provided only when necessary.

This study focuses on two critical experiences derived from the project's execution: the formulation of a UX strategy and the alignment and communication with the public sector. The researcher, who was actively involved as part of the project team, contributed to key activities, including stakeholder interviews, system function planning, and interface design. Data collection for this research consists of records from 17 stakeholder interviews, three progress reports presented to the public sector, 72 meeting

minutes, and one system requirement workshop. The stakeholders interviewed in this study are shown in Table 1.

*Table 1. Stakeholder Interview Participants*

| Stakeholder Type | Description | Number of Interviews | Duration (hours) |
|---|---|---|---|
| Central Government | Case owners and regulatory officials | 4 | 6 |
| Local Government | 4 local governments nationwide, including department heads and staff | 7 | 11 |
| Licensed Operators | 3 large facilities, including major aquariums and zoos | 3 | 4 |
| Unlicensed/Potential Operators | 2 small businesses, including cafes and farms | 2 | 2.5 |
| Animal Exhibition Domain Experts | Expert in animal exhibition | 1 | 1.5 |
| **Total** | | **17** | **25** |

### 3.2 Case Execution Process

The project was executed in three phases over nine months. Table 2 outlines the objectives, the role of UX strategy, key steps, and the duration of each phase.

*Table 2. Phases of Project Execution and the Role of UX Strategy*

| Phase | Objectives | Role of UX Strategy | Steps | Duration |
|---|---|---|---|---|
| 1 | Clarify the system goals | Construct User Experience Strategy | Conduct research → Build strategy → Prioritize tasks | 4 months |
| 2 | Design the system | Implement User Experience Strategy | Develop system architecture → Execute high-priority tasks | 3 months |
| 3 | Planning for next year | Review and implement User Experience Strategy | Review goals → Plan secondary tasks | 2 months |

*Figure 1. Interviewing the public sector and the operators during the case execution*

# 4 RESULTS

This section explores how UX strategies enable external teams to overcome the challenges of the digitalization of public services. The research results include the challenges faced within the case context, the UX strategy structure employed, and the contributions of the strategy in addressing these challenges.

## 4.1 Public services digitalization challenges in the case

While developing a UX strategy for digitalization, the external team struggled to set effective goals due to limited understanding and influence. Through case study, we identified two key challenges and offered specific recommendations to overcome them.

### *4.1.1 Stakeholder divergence leads to unclear system requirements*

Stakeholder interviews revealed that the diverse and conflicting needs of stakeholders are a key barrier to digital transformation. Even when the public sector is willing to invest in digital system development, it struggles to clearly define system requirements due to the challenge of assessing the benefits of the new system for each stakeholder.

> *"Digitalization is the direction we want to move toward, but many businesses are already reluctant to cooperate with the government. If we force them to switch to a new digital system, it might just give them another reason to resist." - Service administrator*

> *"The goal of animal welfare groups is to end animal exhibitions, while our goal is to manage animal exhibition operators, which in some ways contradicts each other." - Service administrator*

In this context, mapping the stakeholders in public services can help external teams identify the root causes of conflicting demands. Based on figure 2, we identified the different roles of stakeholders in public services and assessed the challenges they face in their interactions.

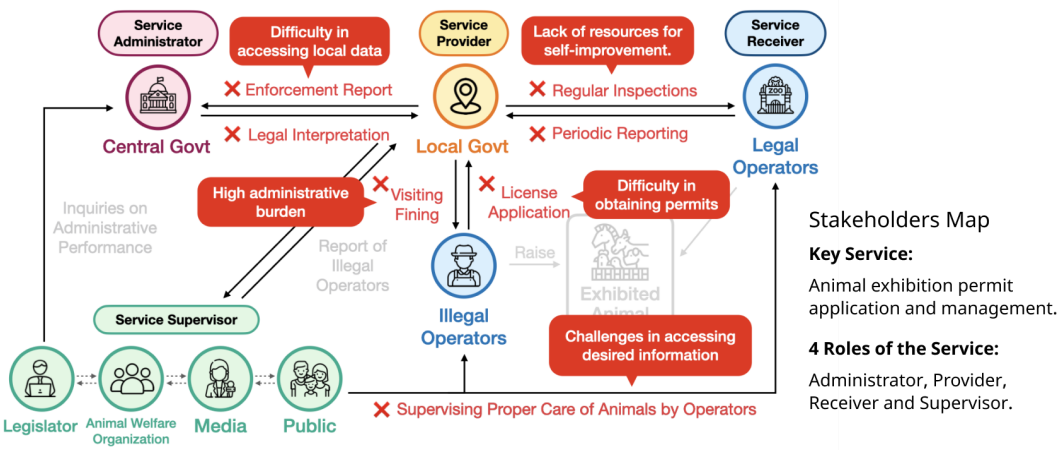


*Figure 2. Stakeholders map in animal exhibition permit application and management*

### *4.1.2 Incomplete administrative regulations lead to unrealistic expectations for the system*

During the process of understanding business operations from both senior and frontline public sector staff, we found significant differences in workflows between local governments, stemming from the lack of comprehensive regulations from the central government. While this gives local governments room for flexibility, it also complicates maintaining data consistency during digital transformation. Simple digitization cannot compensate for legal gaps.

> *"I have to request local governments to provide a list of animal exhibition operators each quarter, but many counties are reluctant to cooperate." - Service administrator*

> *"The central government may not even know what data is needed to manage operators. We create our own forms to record operator status and visit frequency." - Service provider*

> *"We have posted a permit application process on our website, but I'm unaware of the processes in other counties." - Service provider*

In this context, public sector officers, lacking a full understanding of information systems, may assume that the mere introduction of a digital system will collect all necessary data. This overlooks the willingness of data providers to use the system and the need for consistent data validation standards. As a result, systems developed under inadequate planning risk creating further issues in the future.

## 4.2 Facilitating public service digitalization through UX Strategy

To clarify the overall goals of the system and identify actionable items, we developed a UX strategy structure. This subsection elaborates on how the UX strategy formulated through this structure addresses the challenges encountered in the case study.

### *4.2.1 UX Strategy Structure*

As shown in figure 3, the structure consists of 6 levels according to the reasoning sequence:

- **Vision:** Defines the ultimate goal of the public service, serving as the guiding mission for the UX strategy.
- **Project Goal:** Explains how the project seeks to achieve the vision by designing and delivering an optimal user experience.
- **Stakeholders' Goals:** Identifies the specific objectives of each stakeholder involved, illustrating how the project addresses and aligns with their diverse needs.
- **Barriers and Plans:** Describes the process of deriving solutions from stakeholders' goals, with an emphasis on analyzing and formulating plans to overcome existing challenges.
- **Actionable Solutions:** Outlines practical and concrete solutions developed to achieve the project goals, focusing on identifying feasible actions under real-world conditions.
- T**asks:** Categorizes solutions based on their relationships, providing a recommended sequence of execution tailored to the public sector's priorities.

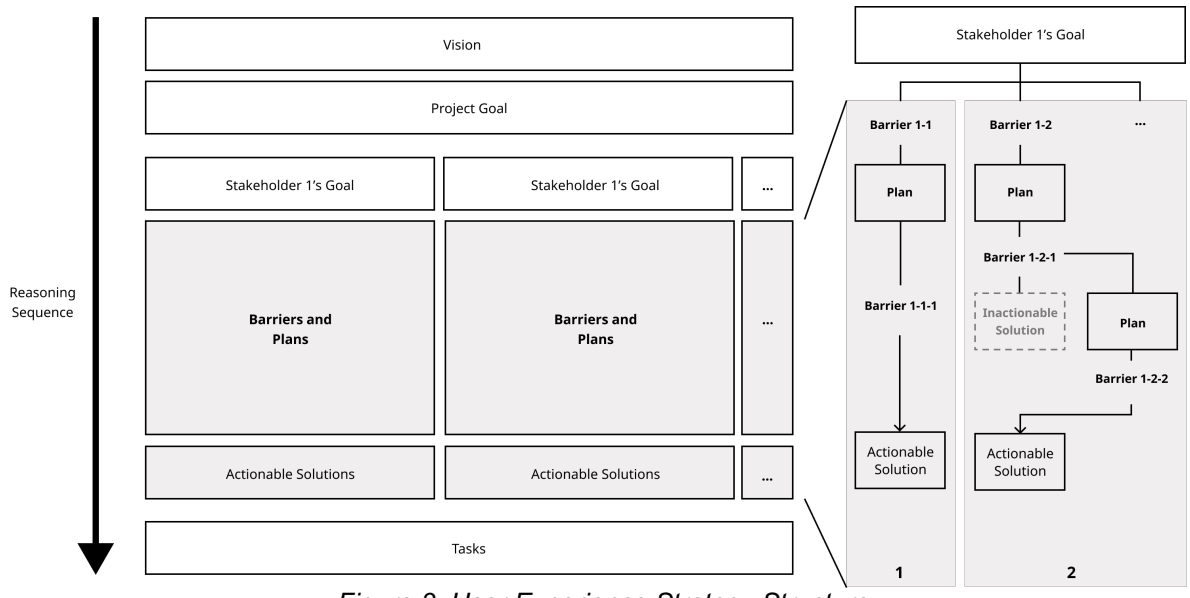


*Figure 3. User Experience Strategy Structure*

### *4.2.2 Setting Goals under an Inclusive Vision*

To achieve transformational impact, design researchers need to co-create a vision with the organization to guide targeted actions for change [13]. Although the stakeholders in the case study held divergent perspectives, multiple interviews and alignment meetings revealed a shared vision: "The public can safely visit high-quality animal exhibitions under government oversight." This vision was defined as the guiding element in the UX strategy. A vision of this kind must be inclusive, practical, and research-based, providing a shared direction for both design researchers and the public sector while fostering mutual trust.

Under this vision, the project goal must explicitly connect how the public sector's existing resources and team expertise contribute to achieving the vision. In this case, the project goal was defined as " Creating a seamless user experience to enable effective central management of local governments and efficient oversight of operators." Equally important is defining the next level: stakeholders' goals. To

demonstrate how the digital system addresses various stakeholder demands, we aligned the goals of all stakeholders involved as system users. This alignment became the foundation for categorizing key solutions. It also clearly shows how the actions proposed in the UX strategy respond to these stakeholders' needs and can serve as a reference for evaluating expected benefits and prioritizing tasks accordingly.
As shown in figure 4, these upper-level definitions were validated in meetings with the public sector, clarifying previously ambiguous system requirements and securing the public sector's support and trust.

> *"You (the external team) identified many details I wasn't initially aware of. I never thought of approaching system functionality this way." – Service administrator*

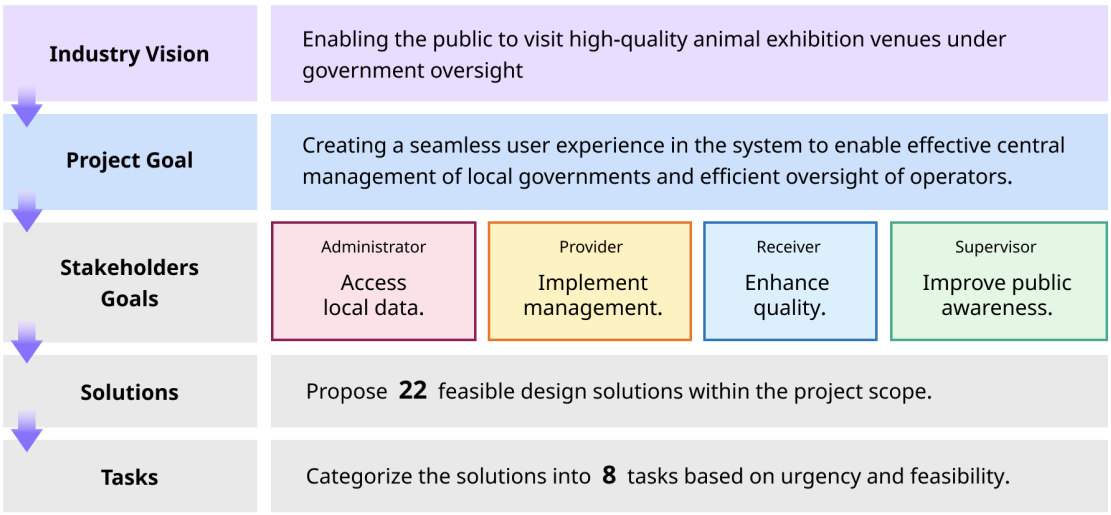


*Figure 4. Alignment of Vision, Goals, and Solutions for Public Sector System Design*

#### *4.2.3 Planning under Rigid Constraints*

To manage and align the public sector's expectations for the system, our interviews focused on two key areas: identifying immutable facts, such as established laws, and uncovering the current challenges faced by stakeholders. These insights played a pivotal role in the subsequent development of actionable solutions. Based on the diverse goals of stakeholders, the external team aimed to outline clear decision paths, justifying the prioritization of specific system functions. The "Barriers and Plans" phase further guided the team in identifying feasible paths to propose actionable solutions that align with higher-level goals, as illustrated in figure 5.
Through the UX strategy structure, the case study proposed 22 actionable solutions and 8 tasks. The tasks were grouped based on the interrelationships between the actionable solutions, focusing on three main aspects: whether a specific execution sequence must be followed, whether shared data requirements exist among solutions, and whether the solutions share the same level of urgency. The final categorization revealed that the UX strategy not only defined system functions but also identified areas requiring external resources, such as clearer regulatory definitions and additional training resources for operators.
This UX strategy transformed the traditional supervisory relationship between the public sector and external teams. By rationally distributing responsibilities and tasks according to each party's expertise, the public sector gained a clearer understanding that the success of the system requires their active participation.

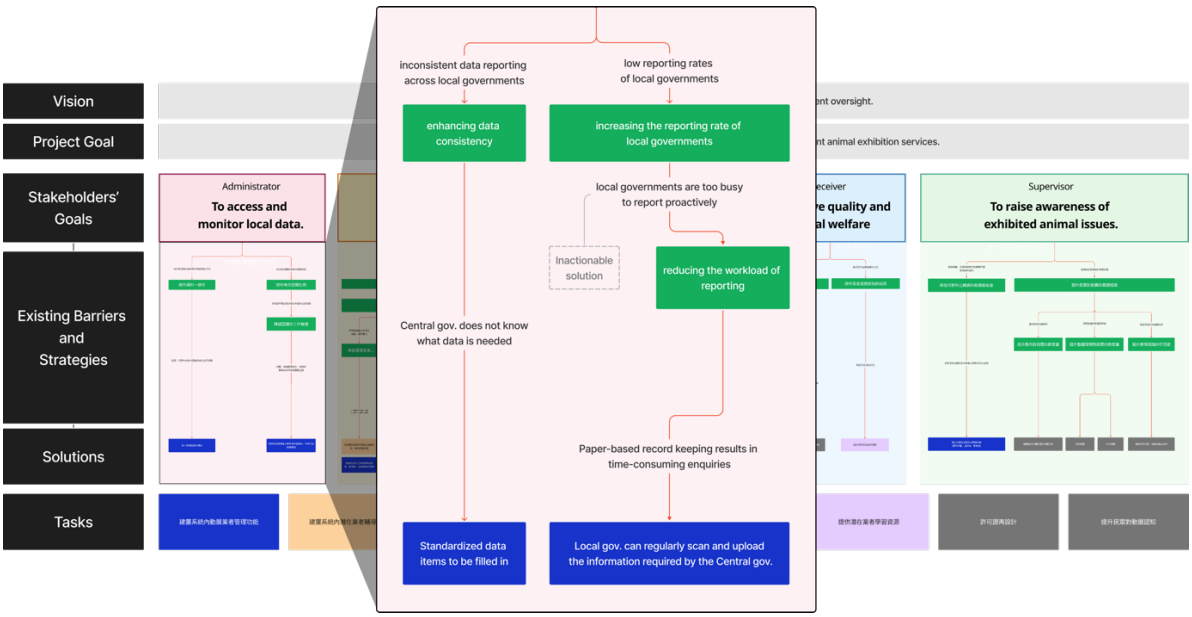


*Figure 5. The UX strategy of AEOMS*

# 5 DISCUSSIONS

## 5.1 Impacts of the UX strategy on Public Services digitalization

Public services digitalization is a long-term initiative, influenced by multiple factors, making it difficult to precisely assess what leads to success or failure. Drawing on the successful outcomes from this case study, this section focuses on exploring the specific ways in which the UX strategy effectively advanced digital transformation in the public sector.

### *5.1.1 Planning for Rational Resource Allocation*

With limited budget and time constraints, public sector organizations often struggle to fully understand actual needs, resulting in digital system development that only addresses surface-level issues. However, by establishing a UX strategy in advance, the public sector can engage in long-term thinking about the desired vision and strategically allocate resources to achieve incremental progress toward that goal. It is essential to align the measures of digital transformation with the public value they can generate for society [14] This approach offers a clear problem-solving flow, showing how specific resources can address particular problems and meet stakeholder goals. It allows public sector officers to reassess whether resources are allocated effectively and enables external system design teams to focus on the most urgent and critical tasks, maximizing resource efficiency.

> *"We originally planned to have all operators use the system this year, but given the complexities of data management, we will focus on features related to licensed operators instead." – Service administrator*

### *5.1.2 Building consensus through human-centered approach for Public Service Alignment*

In this case, both conflicting stakeholder views and imperfect legal frameworks significantly contributed to the public sector's lack of clarity on the next steps. As a user-centered strategy, UX strategy effectively visualizes research findings, serving as a crucial foundation for discussions between the external team and stakeholders. It not only highlights each stakeholder's needs within the service but also neutrally presents the perspectives of various stakeholders, helping them recognize the importance of building consensus at this stage. This positioned the external team as an influential third-party mediator, steering stakeholders toward compromises in their expectations to achieve the shared vision.

Furthermore, the UX strategy highlighted the value of user experience to the public sector, demonstrating how a well-designed user experience can align systems more effectively with governmental objectives and bridge the gap between user needs and public sector goals. Figure 6 demonstrates how we explained to the public sector the importance of system usability in gathering local data and how adhering to these design principles would help achieve their goals.

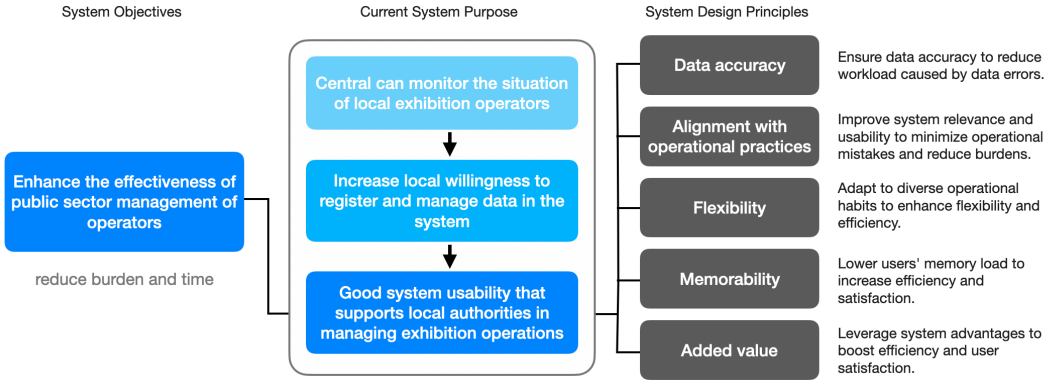


*Figure 6. Illustration of UX Value for Public System: Objectives, Purpose, and Design Principles*

## 5.2 Suggestions for Formulating a UX Strategy for Public Sector Systems

The design and development of public digital systems have long been regarded as a key tool for advancing public services digitalization. Planning a UX strategy tailored to address the challenges inherent in public sector structures can offer new opportunities for the many public systems that fail due to practical constraints. This section presents relevant suggestions.

### *5.2.1 Starting from the goals of multiple stakeholders*

The digitization of a public service necessitates changes to established habits among all stakeholders, which may provoke resistance to change. A digital system that fails to gain acceptance holds little value. Therefore, this study recommends conducting a comprehensive investigation into stakeholders' attitudes toward digitization, identifying their challenges, and understanding their expectations before developing a UX strategy. It is also advised to align actionable solutions with these stakeholders' goals, providing the public sector with a way to evaluate the impact of different tasks. This approach offers flexibility in prioritizing stakeholder needs, helping to mitigate conflicts and challenges that often arise during digital transformation.

### *5.2.2 Identifying the gap between challenges and goals as the entry point*

As an external team, a lack of understanding of public sector structures can lead to operational constraints or wasted effort managing frequent changes in requirements. This study recommends identifying ground rules beyond the external team's influence—such as legal requirements governing workflows or access limitations within existing databases—before formulating the UX strategy. These unchangeable constraints provide clear direction for system design and enhance the practicality of proposed solutions. Prioritizing these gaps ensures that every developed feature directly addresses specific needs and challenges, facilitating the effective implementation of digital transformation in real-world public sector contexts.

In summary, gaining the trust of the public sector through a comprehensive UX strategy is essential for advancing digital transformation. External teams must understand the reasons behind stakeholder disagreements and assess how these differences impact system design and development. Through the UX strategy structure, these insights can be synthesized into a coherent structure to allocate resources effectively and achieve project goals. This approach fosters better task distribution between the public sector and external teams, facilitating a more constructive and collaborative partnership.

# 6 CONCLUSIONS

This study, through a case study of AEOMS, explores how UX strategy facilitates digital transformation in the public sector by supporting external teams. We propose a UX strategy structure and analyze how the UX strategy formulated based on this structure addresses challenges arising from divergent stakeholder interests and incomplete regulations in the case. The study reveals that the implementation of UX strategy provides strong evidence of UX value within the domain of its designed products, enhancing rational resource allocation, fostering consensus, and expanding influence, ultimately promoting more positive collaboration between the public sector and external system design teams.

This provides a new approach for addressing structural and strategic challenges in e-government-based digital transformation, aiding in demand coordination, improving development efficiency, and achieving a human-centered public services digitalization.

This study is based on a single case, which may limit the generalizability of the findings, and it primarily focuses on short-term impacts. Future research could expand to a wider variety of projects and incorporate metrics that evaluate both public sector performance and user needs to assess the quantitative impact of this strategy. These metrics are particularly useful for measuring the Project Goals and Stakeholders Goals outlined in this strategy. Examples include metrics defined by the UK's Digital Government Services, such as cost per transaction, digital take-up, and user satisfaction [15].

In conclusion, this study provides new perspectives and tools for digital transformation in the public sector, highlighting the critical role of UX strategy in overcoming complex challenges and advancing human-centered digitalization in public services.

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