A Stabilization Model for E-Government Innovation

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Abstract

E-government innovations, which accompany both technological and administrative systems innovation, have often been driven more by technical fads than by social consensus. The structuration perspective on the adoption of technology has focused mainly on the organizational process, relatively ignoring the society-wide structuration that is more relevant to public organizations. In this paper, we focus on the structuration process of an e-government innovation, particularly the society-wide structuration through which enabled technical features are given meaning and legal institutionalization of use. Through the case, we found that an e-government system adopted for efficiency may suffer from the lack of an appropriate supporting legal structure, pushing the system into instability. We also found that the sophistication of an e-government system is based not only on its technological features but also on the evolution of social discourse. Finally, we discussed theoretical issues to further the knowledge of the structuration process of e-government innovations.

1. Introduction

Organizational innovation driven by technology has been considered pivotal to the improvement of organizational performance, regardless of whether an organization is for-profit or public [1-3]. In the public sector, in particular, e-government innovations have accompanied New Public Management reform since the early 1990s [1, 4]. The public sector’s use of comprehensive management information tools was expected to result in better efficiency and transparency of government [3, 5-7].

However, there has been little evidence that this promise has been realized [8, 9]. Furthermore, scholars of organizational innovation have found that innovation requires a lot of organizational changes in structure, values, and behaviors [10, 11]. For example, new technology has to be understood and interpreted by the users in an appropriate way, which can take a significant amount of time [12, 13].

From this finding, scholars have developed a socio-technical systems perspective to understand the acceptance of new technology by the users [14-19]. They have examined the social process through which a technology achieves social meaning, and have argued that this institutionalizing process is key to the acceptance and performance of the technology.

The previous research, however, has not explicitly considered the value system of the society as a whole. Instead, it has focused mainly on the intra-organizational process between technology and human behavior [16, 18, 19]. With regard to public organizations, it is important for a new technology innovation to be accepted by the public as well as by their employees. In particular, the social construction process of the meaning of technology often is reflected in the legal system or interpretation of the law [20]; however, there have been few studies that explicitly investigated the mutual structuration process between new technology and the legal system.

In addition, while new technology can be adopted relatively fast [2], the adaptation process of the related legal system can lag because the legislature and public managers cannot always anticipate legal challenges caused by the discrepancy between behavior that is required or enabled by technology and behavior allowed within the legal/social framework.

Then, how is an e-government innovation stabilized in terms of the process of social structuration, particularly between technical and legal systems? To answer the question, we chose an e-government innovation case in the area of education in South Korea. An analysis of the education sector in South Korea can offer insights insofar as 1) the education information is sensitive, 2) diverse, strong, and visible stakeholder groups are involved in the policy process, and 3) e-government innovations in the area require nationwide implementation. In 2002, South Korea’s Ministry of Education (MOE) adopted a comprehensive web-based information system called the National Education Information System (NEIS), in which all elementary and secondary school and educational administration agencies were linked for the purpose of storing, processing, and sharing students’ academic information. The adoption of the system triggered heated social debates on a variety of
issues, including the system’s stability, privacy, and overlapping expenditures. After a few lawsuits and hearings, the debate settled down, but it took four years to revise the technical and legal details relating to the system.

In the following section, we first discuss the theoretical background of structuration and expand the theory to fit better with e-government research. Then we analyze the NEIS case. Finally, we conclude this paper by discussing the theoretical and practical implications of the case to develop further the knowledge on the systems analysis of e-government innovation.

2. Theoretical background

2.1. Innovation and social learning

According to Walker et al. [21], innovation is usually defined as “the generation (development) or adoption (use) of new ideas, objects, or practices” (p. 369). Because innovation infuses uncertainty to an organization, it takes time for an organization to reap the benefits of innovation [12, 13, 22]. The concept of exploitative learning indicates that an innovation should be followed by refinement of knowledge and skills to maximize the promised performance of a new technology [22]. Therefore, organizational innovation is partly understood from the perspective of organizational learning, which includes legitimization of goals and values, exploration of new opportunities, and refinement of skills [22-24].

The consequences of e-government as an organizational innovation are not constrained within the public organization that adopted it. While a great amount of literature understands e-government from the organizational perspective, there has been a paucity of research that approaches e-government innovation from a broader viewpoint. Given that public organizations need to gain legitimacy for their actions from citizens, it is necessary to approach e-government innovation from beyond organizational learning to social learning. This is particularly relevant when an e-government innovation will affect civil rights. In a broader sense, although e-government innovation has been driven by the ideal of New Public Management towards efficiency [1], the consideration of the legitimation process driven by citizens’ input recalls the value such as participation and deliberation argued by New Public Service [25].

Social learning is understood as the process and consequence of both individual and collective learning by stakeholders with regard to a social problem [26, 27]. May [28] referred to social policy learning as “lessons about the social construction of policy problems, the scope of policy, or policy goals” (p. 332). This understanding implies that a social learning process entails social structuration of public value pertinent to a policy, which is usually defined as a framework through which to understand what the public values [29]. The awareness of social or public values in social learning turns our attention to the structuration of values in innovation. Although scholars of social learning usually focus on the cognitive aspect of learning such as the development of a shared mental model [26, 27], in this paper we emphasize system coherence and stabilization as a consequence of social learning, in terms of reaching agreement on the values and goals of a newly adopted technical system. The following section expands this discussion.

2.2. Socio-technical systems perspective

The concept of social learning is well linked with the socio-technical systems perspective in understanding the adoption of a new technology in an organization. According to DeSanctis and Poole [14], there are three schools of thought to approach advanced information technologies and organizational change: decision-making, institutional, and social technology. First, the decision school emphasizes overcoming human weaknesses through the adoption of new technology and enhancing organizational performance through increased productivity and efficiency [30, 31]. They focus more on the technical features of an information system and its implementation.

By contrast, the institutional school puts more emphasis on the development of social understanding of technology [14-19]; a technology is not simply implemented but socially constructed [19, 32]. However, DeSanctis and Poole [14] argued that the purely institutional approach undervalues the role of technology in organizational change (p. 124); instead, they emphasized the mutual influence of technology and human behavior.

At the base of the second and third approaches is the concept of structuration, a theory proposed by Giddens [33, 34]. Although there have been diverse perspectives to reinterpret the concept of structure and structuration in the field of information system [17], structuration is described by Giddens’ [33] own terms as “conditions governing the continuity or transformation of structures, and therefore the reproduction of systems” (p. 66). The point is any social structure is under continuous transformation and reproduction by human agency. Although useful, this concept of structuration fails to consider that not
all features of a system can be transformed and reproduced in the short term; what can be transformed is not the physical system but the human perception of and behavior around the physical system or the social dimension of the system, that is, something residing in human minds [35, 36]. Similar to what Orlikowski [18] called a *soft* determinism, this point invokes the necessity to distinguish between what is relatively or temporally fixed in a technical system and what is subject to social construction.

In the line of the social technology school, DeSanctis and Poole [14] proposed a useful distinction between structural *features* and *spirit* of a technology. According to them (p. 126), structural features are “the specific types of rules and resources, or capabilities, offered by the system,” whereas spirit is “the general intent with regard to values and goals underlying a given set of structural features.”

“The spirit is the “official line” which the technology presents to people regarding how to act when using the system, how to interpret its features, and how to fill in gaps in procedure which are not explicitly specified.” (p. 126)

This distinction is useful when considering the system components of an e-government system, which usually include both a technical system and a managerial system. The point is which subsystem enables or proposes a “prescription” of another subsystem, and whether the latter reproduces, if possible, the former in turn. The problem is that this discussion does not consider the wider context of an organizational system – the social system that is more closely related to the *spirit* of the technology.

### 2.3. Structuration of technical and legal systems

Although the socio-technical systems perspective and the adaptive structuration theory contribute to understanding organizational change driven by new technology, there is no reason to confine the structuration process to what occurs only within the pertinent organization, especially when it is about e-government innovation in public organizations. As for e-government, a new technology should also be understood and interpreted by citizens who are served by the organization that uses it. In this sense, the spirit of the technology is constructed not only at the organization level but also at the society level.

A difficult issue in thinking about social construction process at the society level is that public organizations often face diverse stakeholders whose interests do not necessarily converge. Different stakeholder groups, particularly in the case of experts and laypeople regarding high-technology, sometimes cling to irreconcilable values and goals [37]. Second, the information that is stored in the technology is related to the constitutional issue of human rights protection as well as managerial efficiency [38]. Thus, an organizationally optimal system whose emphasis is on managerial efficiency may not be equal to the socially optimal system that puts higher emphasis on responsiveness and responsibility. Finally, although the consensus on the *spirit* of the technology within an organization can be dealt with by management, the consensus in the society should be institutionalized in terms of public laws and regulations to ensure accountability [38]. Furthermore, the interpretation of a specific regulation sometimes has to be settled by the courts. In short, the revision of the legal system may reflect how the society develops a consensus on the spirit of the technology.

As the legal system of a society reflects its public values, the coherence between a technical system and the corresponding legal system can be an indicator that a technical innovation has gained social legitimacy. Accordingly, one of the advantages of discussing the coherence between technical and legal systems is that it can show how the former is stabilized over time in terms of both structural features and spirit.

The coherence issue could be particularly important when an e-government innovation is driven by “tech fad,” that is, managerial motivation to adopt the most updated technology in the belief that it will enhance organizational performance and legitimacy [2, 39, 40]. Scholars have found that user resistance and inefficiency are easily found in this type of technical innovation [3, 10], which is evidence of the lack of consideration for the corresponding spirit of the technology. In this case, the social consensus and political due process required for revision take time to be reflected in the legal system. Orlikowski [19] showed how a technology could be stabilized through intra-organizational social processes, such as negotiation, persuasion, and debate, toward community consensus (p. 405). The same can be said with regard to the stabilization of an e-government innovation at the society level: stabilization in the sense that through negotiation and sharing of meanings of the technology, citizens and public managers can reach a consensus on how the innovation should be implemented.

Accordingly, we can assume a three-stage stabilization model of social construction of an e-government innovation: 1) a technology-driven adoption of a new e-government innovation, 2) instability of the whole system caused by a disparity between the structural features of the technology and
its spirit, and 3) the social construction of the spirit and subsequent overall system stabilization in terms of both structural features and spirit (Figure 1). First, during the adoption stage, an e-government innovation is driven by the availability of new technology such as the Internet. This initiative, however, should accompany public managers’ pro-innovation bias aiming to ensure managerial values such as legitimacy, efficiency, and customer convenience [41]. Because the adoption of an e-government innovation is technology driven, it is likely the pertinent legal system lags behind it; that is, a discrepancy emerges between the endorsed spirit of the law and the spirit of the new technology. This leads to the second stage of destabilization when diverse stakeholder groups and government agencies begin to play the game of interpreting the spirit of the technology. The real line box in Figure 1 denotes the set of structural features and the spirit of the innovation, and the dotted line box indicates the set of the legal system and its spirit. In the overlapping area, different spirits are argued and compromised through the structuration process. Then, in the third stage of stabilization, society reaches an agreement on the spirit of the technology, and accordingly the structural features of the technology and the legal system are revised to be compatible. In summary, Figure 1 shows that the structuration process of a system involves enhancing coherence between the structural features and the spirit of the system. Figure 1 also shows that the sophistication of the legal system is an indicator of how the spirit of the system is constructed over time.

Figure 1. Structuration of e-government innovation

In the next section, we apply the analytical framework above to the case of the NEIS. The case showed a typical process that followed the three stages of an e-government innovation suggested above.

3. The Case of the NEIS

3.1. Data and method

In this section, we analyzed the NEIS case. We collected documents including media and academic articles, government reports, and Web documents and statistics, and the contents of court decisions. We also obtained public hearing reports that included the arguments of different stakeholder groups, expressed in their own language. To analyze the overall history of the NEIS, we depended mainly on media and academic articles. For the analysis of the structuration process, we depended on all the data sources, particularly the decision of the court and the National Human Rights Commission (NHRC), and the public hearing reports. We performed document analysis to identify the history of the NEIS; pertinent stakeholder groups; their values and behaviors; and issues and the legal interpretation of public values. Finally, we searched any judicial or administrative litigations and media coverage in terms of frequency and conflict issues to detect any sign of stabilization of the process.

In the following analysis, we first explain the adoption of the NEIS. Second, we analyze the social debate during the destabilization stage to identify conflicting views on the spirit of the system. Finally, we discuss the issue of whether the NEIS has achieved stabilization.

3.2. Adoption of the NEIS

In 1983, Korea’s e-government system was established through the National Backbone Computer Networks Plan. Following the plan’s inception, the issue of personal information protection became a contentious matter [42]. In 1987, with the implementation of the National Administration Information System Project, computerization of the public service was implemented.

In 1997, the School Information Management System (SIMS) was developed to promote the management of electronic public education information and to enhance international competitiveness [43]. For SIMS, the Stand Alone (S/A) system was applied to unit schools, and Students’ School Records (SSR), which had been processed by paper were electronically processed by the S/A system. However, the computers were not linked to one another, so sharing the records was possible only
3.3. Destabilization: Conflict in interpreting the spirit of the system

The second stage of structuration is characterized by destabilization of the whole system. At the core of the stage was the issue of technology threatening privacy.

There has been a history of defining privacy or personal information. It was not until the 1960s that modern society began to pay attention to the issue of collecting and processing personal data [46]. The Organization for Economic Cooperation and Development (OECD) [47] defined personal data as “any information relating to an identified or identifiable individual (data subject).” Privacy has been defined as “the claim of individuals, groups, or institutions to determine for themselves when, how, and to what extent information about them is communicated to others” [48]. The Right to Information Privacy has been strongly emphasized with regard to personal information protection. In this vein, along with the advancement of information technology, the OECD, the United Nations (UN), and the European Union (EU) adopted guidelines and directives to protect personal data and information. These principles include the lawful and fair collection of data, purpose-specific collection and use, consent-based collection and use, accurate and up-to-date data retention, data security against possible risks, and data subjects’ right to have access to correct information [47-50]. In addition, the UN also signed the Convention on the Rights of the Child, which states: “No child shall be subjected to arbitrary or unlawful interference with his or her privacy” [51].

In South Korea, discourse on issues relating to information privacy was not prominent until the early 2000s, in spite of the government’s efforts toward e-government. When the MOE formally announced the establishment of the NEIS in 2002, the Korean Teachers and Education Workers’ Union (KETWU), a group of teachers, strongly expressed their opposition to the NEIS. Concerns over sensitive personal data protection ensued, especially in the three sensitive areas of academic affairs, admissions, and health records. The three areas were the main focus of debate between the MOE and opponents of the plan. Opponents of the NEIS argued that leaks or abuse of personal information could be disastrous since the database server stored all the information in a centralized way [52]. In addition, they pointed out six problems inherent in the system: budget waste, cursory user training, increased workload, confusion through external storage devices. While the S/A system was being used, the Client Server (C/S) system was under construction, and was in operation from 1998. The C/S system was an intranet-based, closed management system that enabled information sharing within unit schools. In accordance with the functions of SIMS, the C/S system handled more tasks, such as school affairs, educational administration, and academic affairs as well as SSR. However, the C/S system still had limitations in sharing information online. In addition, each school was responsible for the information security of its own system [44, 45]. Nevertheless, since the system was not linked to an outside network, the issues of information security and information privacy were not considered seriously.

In 2000, the MOE started preparing for the NEIS by reflecting advancements in basic technology such as the Internet. In May 2001, the NEIS gained momentum after it was chosen as one of 11 e-government subjects. The NEIS had many different aspects compared to the S/A and C/S. Its most distinctive feature was its use of the Internet. In July 2002, the NEIS was directed to operate as a single-server system that linked unit schools and Offices of Education, as planned in 2000. The linkage between the main server in the Metropolitan and Provincial Offices of Education and computers in each school had the potential to improve efficiency. In addition, according to the MOE’s initial plan, the NEIS was designed to deal with 27 administrative areas encompassing academic affairs, admissions, health records, personnel management, accounting, property, and facilities, as well as areas covered by SIMS. Since all of the information was planned to be stored in the main server, real-time delivery became possible. Data that were accumulated in the main server were to be secured by users’ electronic certification and with a so-called enhanced security system at the server level [44, 45].

To summarize, the establishment of the NEIS was driven by technological innovation. The National Backbone Computer Networks Plan in 1983, the National Administration Information System Project in 1987, and 11 e-government subjects in 2001 established the momentum to adopt more advanced information technology in the management domain of the public education system. In the process, e-government innovation transitioned from one technology to another very quickly; that is, from S/A to C/S, and to the NEIS, demonstrating a typical practice of a technology fad. In addition, there was no evidence of a careful examination of the need to revise the corresponding legal system accordingly, resulting in a discrepancy between technology and the legal system. The spirit of the technology needed more time to be socially constructed. This point is discussed in more detail in the following section.
caused by the simultaneous use of the C/S and the NEIS, overlapping of test operations and system development, and infringement of privacy rights, which could be caused by entering excessive amounts of information on the system [43]. In spite of the opposition, the NEIS was partly launched in November 2002.

It is important to note that when this conflict occurred, there were no specific rules to regulate the NEIS. The Framework Act on Education (revised on December 31, 2002) only contained “the government duty to devise a policy necessary for electronically processing the administrative affairs” of schools and related institutions. Furthermore, “electronic media” were not included for regulation as a form of the “private information file” until February 2003 through the Act on the Protection of Personal Information Maintained by Public Institutions. All these showed the absence and lag of an appropriate law against new management enabled by technology, providing space for conflict between different interpretations of the spirit.

In February 2003, standing against the MOE, teachers of the KETWU refused to register their electronic certification and submitted a petition to the NHRC to stop the NEIS operation [43]. Meanwhile, the MOE fully launched the NEIS in March 2003. In May 2003, the NHRC recommended the MOE separate information relating to the three sensitive areas from the NEIS and store them in the C/S system [45]. It is noteworthy that the NHRC drew its logic from the Constitutional Law, OECD guidelines, and the Convention on the Rights of the Child. In May 2003, the stakeholder groups accepted the recommendation.

Nevertheless, society had not reached a shared understanding of the spirit, nor was the legal system complete. In November 2003, the confusion in interpreting the spirit of the system became clear when a few universities announced they would receive high school students’ data only through the NEIS, that is, only in electronic form. Although facing resistance from the KETWU, the MOE decided to store all the students’ data electronically on CD-ROMs and distribute them to the universities that requested them for their admission administration. With regard to this process, some high school students brought a lawsuit against the MOE to prevent the distribution of personal data. The court declared that producing and distributing CD-ROMs that stored the personal information of high school students to universities could potentially infringe on the privacy of students [43]. The court considered the issue of consent relating to the data subjects when disclosing personal information.

It took time, however, before the court’s interpretation of the spirit was enacted. The Framework Act on Education (revised on March 24, 2005) and the Elementary and Secondary Education Act (revised on March 24, 2005) reflected data subjects’ right to consent with respect to the provision of data to third parties after more than a year.

In summary, during the destabilization stage, the discrepancy between the new structural features of the technology and the legal system incurred a conflict of spirit interpretation among diverse stakeholders. Each system implied contrasting spirits of efficiency and privacy protection, while the legal system was not actually reflecting the spirit in its entirety. Conflict on the legitimate interpretation of the spirit eventually highlighted the value of privacy protection, which in turn put pressure on both systems, resulting in the revision of both at the same time. Then, the structuration process moved to the third stage of stabilization.

### 3.4. Stabilization and potential of restructuration

The NEIS case highlights a rather fortunate instance: the court and the independent committee’s (NHRC) concurrence with students and teachers that the spirit of the legal system devoted to privacy protection outweighed the benefits of efficiency, and that the corresponding structure of the technology would be revised. After the lawsuit, in December 2003, the MOE and the KETWU agreed to separate the three areas of academic affairs, admissions, and health records. The final agreement and government policy were set in March 2004. Afterward, the Education Informatization Committee, a prime minister-affiliated organization, responded to all these issues and decided to relaunch the NEIS with a major revision [45]. The NEIS has now been in operation since 2006 without any remarkable social discourse, which is an indicator of system stabilization. Consequently, the structural features of the technology, the spirit of the technology, and the corresponding legal system seemed to obtain an appropriate degree of coherence. Theoretically, this means that any structuring behavior by an agency may contribute to the reproduction of the structure; practically, this means that only incremental revision of the system would be required or desirable.

However, whether or not the system has stabilized should be judged carefully. Although the NEIS Operational Rule allows students’ access to the NEIS, there has been no way for students to access the NEIS without going through the teachers or parents. Some
practical issues may arise while using the system since the issue of workload has not been solved.

Emerging pressure from an external environment on information standards should also be considered. International organizations are now discussing the right to erasure, the right to be forgotten, informed consent, and privacy that shall be protected by default [53]. The legal system in Korea provides only limited protection, with some exceptive clauses. New ideas concerning information privacy could cause conflict with the structural features of the NEIS in the near future.

3.5. Summary

As suggested in Figure 1, we can identify three stages in the stabilization process of the NEIS. First, in the adoption phase, technology-driven innovations were rapidly applied. The corresponding legal system was incomplete or ignorant of new privacy issues so the design and implementation of the system was driven mainly by efficiency concerns. In addition, conflicts were latent since social values that could be damaged by the applied technology had not yet been perceived. In the NEIS case, the increased workload of teachers and unascertained effectiveness were the major reasons for opposition at the initial stage of adoption; however, these were not society-wide issues.

Second, in the destabilization phase, a discrepancy between the structural features and the spirit became eminent. In the NEIS case, issues of information privacy, collection, and disclosure of the personal data, and efficiency versus privacy protection emerged around the conflict between the MOE and the KETWU.

Third, in the stabilization phase, conflict decreased or became rather dormant. With the relaunch of the NEIS in 2006, the socially constructed spirits of the system were reflected in the revised technical and legal systems. Some contents regarding information privacy were also reflected in the government’s efforts to improve the decrees and orders. Data subjects’ right to have access to their own information, the right to request correction, the right to issue consent on disclosure of information, and security management were ensured and enhanced.

4. Discussion

Through the analysis of the case of the NEIS, we attempted to understand the structuration process beyond the boundary of an organization and toward the society as a whole, whose understanding of the system is assumed to be reflected in the legal system. In this section, we discuss a few implications of the NEIS case regarding the structuration between an e-government innovation and the overall legal system.

4.1. Technology-driven innovation

One of the most eminent facts regarding the NEIS is that this new technical innovation was initiated as a technology fad. The adoption of the system was implemented quickly before the corresponding legal issues were discussed, and when another still new technology innovation (C/S system) had just been adopted. Not surprisingly, debates on premature and redundant expenditures on technology escalated, and user resistance to confusion and workload increase caused by the new system was remarkable.

This case shows the potential short-term cost of an e-government innovation driven by a technology fad. First, research has shown that technical innovations are often adopted not for performance enhancement but for legitimacy [2, 39, 40]. This case illustrates that premature adoption of a new technology could even hurt the legitimacy of the adoption. In this case, teachers were still getting used to the C/S system adopted only a few years before. The problem was that the C/S system was designed right before the Internet became widespread. Resistance came from both teachers and public managers in the MOE [20] but the innovation was imposed from the top, resulting in deficit of legitimacy in the following stage of conflict.

Second, the case shows that premature innovation may not yield the expected benefit in the short term. This means that the cost of adopting a premature innovation could exceed the benefit. Although it was partly implemented in 2003, the full implementation of the NEIS was postponed until 2006 at considerable social cost. Retrospectively, the eagerness of public managers to adopt and implement the system as soon as possible was counter-productive.

4.2. Arguing the spirit by citizens

The premature innovation required subsequent adjustment of the legal system. The NEIS case shows that citizens, not public managers, may play the key role in this process in structuring the spirit of the technology. Although there had been some adjustment of the legal system driven by government, citizens’ resistance or litigation was what impelled public managers to consider a revision of the law. The CD-ROM distribution case clearly showed the differing perspectives between citizens and public managers; while the former valued privacy higher, the latter valued efficiency and convenience higher [52]. The question of what should be the spirit of the system was raised only when a few students filed a lawsuit.
Interestingly, public managers’ argument for convenience claimed that the implementation was done on behalf of the students and universities who were their clients [54]. That is, public managers argued that distributing CD-ROMs served students’ interest [53]. Here public managers rejected interpreting the behavior as pursuing their own interest. The silent majority of students whose information was contained in the CD-ROMs also made the issue more complex: did they agree or not? In other words, to what extent should the court decision be applied? This raises an important question of who are eligible to interpret the spirit of the system and how their ideas should be expressed in the structuration process.

Overall, the NEIS case shows that in the social construction of a public information system, citizens’ role is important in defining the spirit of the system. Public managers tended to define the spirit of the system from a narrow managerialist perspective that is, efficiency and convenience; however, the decision on such critical issues as what information should be contained and processed, who has the right to access the information, and who is responsible for managing the system was challenged by citizens and ultimately regulated by the court.

4.3. Stabilization or reorientation

The structuration process, that is, coevolution between the structural features of the system and the spirit of the system at the society level, is an on-going process. However, not all technologies face the same degree of structural change at all stages in terms of both structural features and spirit. All systems experience the rotation of a long-term stable stage and a short-term reorientation stage [55].

In this sense, the NEIS case raises a question of when we can claim that the system has been stabilized. As aforementioned, stabilization of a system can be understood as a product of the social process of sense-making through negotiation and persuasion [19]. That is, from a structuration perspective, fewer social debates may be an indicator of system stabilization.

In the case of the NEIS, it seems that the system has been stabilized, since there have been few controversial social issues raised since 2006. Many legal issues are still latent, but have not explicitly been raised in recent days. This does not mean, however, that all the structural features and spirit have finally become compatible. It may mean only that the structuration has reached a local equilibrium at which stakeholders are not keenly interested in those dormant issues; any attempt to change the status quo does not yield a better result. If the spirit of the system can be questioned at any time, the status of the system may return to a reorientation period.

5. Conclusion

In this paper, we attempted to expand the structuration theory of technical innovation in an organization to include the structuration process among technology, public managers, citizens, and the legal system. To illustrate the structuration process we chose the legal system pertinent to technical innovation. Our analysis of the NEIS case showed that e-government innovation was first driven by the availability of new technology and the consideration of efficiency without a corresponding revision of the pertinent legal system (the adoption stage); the structural features of the technology and the legal system were found to be in conflict in terms of their spirit, and the decision on such critical issues as what information should be contained and processed, who has the right to access the information, and who is responsible for managing the system was challenged by citizens and ultimately regulated by the court.

This research is based on a unique case. So, future research may be conducted to compare other e-government technologies, focusing on differences in how their structuration processes unfolded, and what factors contributed to the difference. Other research may focus exclusively on the relationship between citizens’ and public managers’ perceptions about the spirit of a technology. Finally, sophisticated methodology is warranted to measure the structuration process.

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