國立政治大學資訊管理學系

碩士學位論文

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企業整合系統之設計原則分析：平衡管控和彈性

Understanding the Design Principles of Enterprise Integration Systems: A Balance between Control and Flexibility

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中華民國一〇四年九月

Acknowledgements

Here I'd like to express my sincerest appreciation to my advising professor, Shari Shang, who has been highly patient and advisory during this journey of knowledge exploration. It would be hard to catch sight of my direction and goal without Shari's constant encouragement and confidence. Moreover, I also want to take this chance to thank my friends, Allen Lin, Chris Chang, Veronica Lin, and Yi-Shiun Chang, who have made great contributions on this paper's case studies by sharing their valuable experiences and business connections with me. Finally, I shall also share this achievement with my family and my closest classmates, Jason Liang and Jerry Chuang, for their timely suggestions and company during this journey.

Abstract

Nowadays, enterprises widely adopt integrated information systems to obtain various types of advantages for the ultimate goal of increased competitiveness; however, there are common circumstances under which the expected outcomes fail to be realized because of inappropriate control and flexibility system configurations. This research extends Adler and Borys' 1996 discussion on coercive and enabling systems to situations of misuse, which is construed as over-control and over-flexibility in this work.

To shed light on our research questions of "what," "why," and "how" dimensions regarding integration system over-control and over-flexibility, this paper's research method is established with the following four steps. First, a literature review is conducted to acquire a fundamental understanding to the issues and the possible resolving approaches regarding the two often contrary system configurations. Second, multiple case studies are carried out with five enterprise interviews to gain insight into real-world situations. Third, a cross-case analysis is continued to discuss the similarities and the differences between previous research and empirical cases, and finally, conclusion of this paper is built to aggregate and summarize our findings.

In response to our research questions, most of the problems that are discussed in previous studies are identified in our empirical cases, and several novel approaches to resolve the problems in different contexts are proposed as our findings, which could be discussed from the perspectives of system design, people, and policy. For system over-control cases, this paper proposes that in certain circumstances, system should remain control, and beside system perspectives, employee empowerment, responsibility redesign, and external experts' support should also be considered as possible approaches. With regard to system over-flexibility cases, employee education should be carried out in parallel with system redesign, and user requirements and flexibility policy should be carefully reviewed at early system design stage.

Keywords: Integration information system, control, flexibility

摘要

現今企業廣泛地採用整合資訊系統，旨在能夠獲得多方面的效益，並且達到提升競爭力的最終目的。然而，由於不恰當的系統控制與彈性配置，無法實現期望成效的情況十分普遍。本研究延伸 Adler 和 Borys 於 1996 年對於強制性系統和實現性系統的討論至過度應用的情境，並在本作中以「過度控制」和「過度彈性」詮釋。

為了回答整合資訊系統過度控制和過度彈性之「何種」、「為何」、及「如何」等面向的研究問題，本作用下列四步驟建立研究方法。首先進行文獻探討，以獲得時常相互衝突的兩種系統設置之問題還有可行解決方案的基礎認知。第二，透過訪談五家企業進行多重個案研究，以增進對現實情況的洞見。第三，展開跨案例分析討論過往研究和實務案例之間的異同，最後，建立結論彙整與總結本研究的發現。

響應於我們的研究問題，本研究對大部分於過往研究中提及的問題皆有所發現，並且提出在不同情境中的幾種新式解決方案。這些解決方案可以分為系統設計、人員、以及政策等三方面探討。對於系統過度控制的案例，本研究提出在特定的情境中，系統有維持控制的必要，而在系統的觀點之外，員工責任的重新配置以及外部專家的支援亦可被視為可能的解決方式。至於系統過度彈性的案例，員工教育訓練必須與系統重新設計須並行，並且使用者需求以及彈性政策在早期的系統設計階段必須詳加檢視。

關鍵字: 整合資訊系統、控制、彈性

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1. Introduction

1.1 Research Background

Enterprises adopt integrated information systems, such as enterprise resource planning (ERP) systems, customer relationship management (CRM) systems, and business process management (BPM) systems, for the purpose of enhancing efficiency and innovation capability and standardizing operations across business units and functions (Kim, 2012). In one respect, by controlling each business process through an integrated information system, enterprises bring order to activities (Jørgensen and Messner, 2009), enhance the transparency of their data across organizations (Nicolaou, 2010), and hence, acquire more information for making efficient and responsive decisions (Chen and Li, 2013; Mukhina, 2015). From a different point of view, flexibility is also strengthened when information systems support enterprises in making business changes, achieving higher service levels, and delivering customized products more rapidly. Enterprises need both control and flexibility powered by integrated information systems to strengthen business capability.

However, excessive control may occur when business processes are required to follow rigid information system configurations (Lu and Ramamurhy, 2011), such as, for instance, when a business decision has to be approved and reviewed by multiple units and levels in a hierarchy because of the default setting in an information system, which significantly lowers the efficiency of decision making. Another instance of over-control can also be observed in daily operations when business operators are asked to maintain vast amounts of data in their systems, and the time they spend doing so greatly exceeds their efforts in those daily operations. Over-control may also bring other disadvantages to enterprises, such as lowering employees' commitment to work and reducing their willingness to seek ways to improve their work processes (Jørgensen and Messner, 2009) as well as the risk of transforming organizations into bureaucratic forms of management, all of which have often been criticized as not being appropriate for organizations that require flexibility (Burns and Stalker, 1966; Mintzberg, 1979).

Similarly, over-flexibility in integrated information system configurations may also occur when no clear business rules are implied in a system or there is no clear data type definition regarding the input data. These situations may be costly and detrimental to enterprises because employees must spend extra time configuring business rules or cleansing the data they need. Moreover, being over-flexible may also lead to a lack of discipline and misuse of business resources and may therefore result in wasted time, lower productivity, and higher costs for product delivery. With undue flexibility, it is also possible that the expected outcomes will not be achieved (Jørgensen and Messner, 2009).

Control and flexibility are the two important aspects to be evaluated in any integrated information

system. They are equally important but usually contrary to each other, which causes conflicts when both are considered at the same time. Balancing control and flexibility in integrated information systems becomes a key issue for enterprises that hope to get the most out of their systems (Duncan, 1976; Tushman, 1997).

1.2 Research Motivation and Objective

The shortcomings of integrated information system over-control and over-flexibility can be observed not only in enterprises but also in our daily lives when we receive services from these enterprises. For example, a well-known internet service provider in Taiwan requires its workers to maintain a series of operational data after installing each modem in a household, and it is observed that workers spend much more time maintaining data than conducting their primary business operations. As a control mechanism, maintaining data increases the information transparency of the service provider as a whole, but this process greatly reduces workers' service capacities and efficiency. In a case study of Restaurant Division in the UK (Ahrens and Chapman, 2004), branch managers enjoyed a certain degree of flexibility and discretion in choosing and applying the tools provided by the restaurant's information system. Nevertheless, there is the concern that over-flexible system configurations could allow restaurant managers to manipulate the numbers in the financial reports from each restaurant branch to falsely overstate its margin.

From the cases above, we obtain a basic understanding that there are constant trade-offs between control and flexibility with integrated information systems. Enterprises must determine the causes of any conflicts and how to address those conflicts while designing or applying integrated information systems, especially under conditions of over-control or over-flexibility.

Moreover, a majority of studies only focus on control and/or flexibility, which limits their discussions to single dimensions such as business strategy, system design, operation management, and organization, leaving the others to exclusively stand at one end of the control/flexibility spectrum. To that end, the goal of this research is to investigate the conflicts between control and flexibility from multiple perspectives. By conducting empirical case studies on enterprises that had experienced information system over-control and over-flexibility, the objective was to answer the questions below:

- What system over-control and system over-flexibility problems could enterprises encounter?
- Why do enterprises encounter system over-control and system over-flexibility problems?
- How can enterprises resolve system over-control and system over-flexibility problems?

2. Literature Review

This section addresses the literature related to control and flexibility in enterprise systems and management practice to establish a research framework for this paper. First, by understanding the advantages, disadvantages, and conflicts between coercive and enabling (Adler and Borys, 1996) settings of integrated information systems, we acquire a fundamental understanding of the interests that enterprises should evaluate regarding these systems. Second, to obtain a more systematic point of view regarding the conflicts between the two contrary information system configurations, a typology should be established to categorize the different types of conflicts. Finally, possible solutions to many of the conflicts that are proposed in existing studies are investigated to build assumptions about the actual approaches that enterprises apply to resolve these conflicts.

2.1 Integrated System Control and Flexibility

Adler and Borys (1996) proposed the concepts of coercive and enabling, which are the two types of formalization that are often believed to be in conflict with each other; however, some contingency studies have discovered that these two formalizations do not appear to be opposites and could be applied at the same time in many businesses (Brown and Eisenhardt, 1997). There is also evidence that implementing both formulizations could yield better enterprise performance (Chenhall, 1986; Adler, 1999) and that, in terms of integrated systems, an organization can achieve the objectives of both efficiency and flexibility with the simultaneous use of both mechanisms in its enterprise system (Simons, 1990). This research draws on these concepts to develop a fundamental framework and applies the terms control and flexibility to represent the two, often contrary, enterprise system settings and business objectives. Furthermore, to picture the circumstances of misuse, this research introduces the terms over-control and over-flexibility, which are the key issues the study attempts to address and resolve.

2.2 Control versus Over-Control

The idea of control can be traced back to Frederick Winslow Taylor's work "Principles of Science Management", which applies scientific approaches to formalizing procedures, specializing employees' tasks, and standardizing outputs. By utilizing control mechanisms in management practices, enterprises have acquired numerous advantages, such as bringing order to activities (Jørgensen and Messnerk, 2009), enhancing efficiency, and ensuring output quality (Lee, 2003). Additionally, by further enforcing control through integrated information systems, enterprises can also improve data reporting quality and inter-organizational collaboration (Nicolaou, 2010; Chen and Li, 2013), reduce dependency on employees (Shaw, 1999), and gain competitive advantage (Roberts & Wood, 1997). Organizations can enjoy the abovementioned benefits if their integrated systems are designed to fit their primary tasks (Adler, Goldoftas, and Levine, 1999): for instance, when an

organization's tasks are simple and its goal is efficiency, the organization will benefit from adopting a mechanistic form of control (Burns and Stalker, 1961). Strong control has also proved to be essential in organizations with strict budget or schedule constraints and those that require high-quality results (Harris, Collins, and Hevner, 2009).

However, when too much control—that is, over-control—is enforced by integrated systems, enterprises may lose the flexibility to nimbly reallocate resources and smoothly adjust processes; hence, they may also lose the capability of flexible responses to business changes (Kurke, 1988). The centralized nature of bureaucratic control has often reduced personal discretion by specializing employees' tasks to certain scopes, and this type of mistrust lowers employees' commitment to finding alternative solutions to resolving new business problems and improving current business operations (Jørgensen and Messner, 2009). In terms of local operations, a case study on a UK restaurant chain presented the concern of local restaurant managers that the meal portions and accounting methods that had been defined by the central office and the information system might not comply with local operations and customer services (Ahrens and Chapman, 2004). Other backfire effects can also be identified in numerous studies that have found that over-control in enterprise systems caused by restrictive information and inter-department links could delay decision making, slow the responses to customers' needs (Goodhue et al., 1992), increase the complexity of issue sourcing (Singletary, 2003), and reduce the ability to manage unanticipated situations (Shang and Liao, 2006). To that end, bureaucratic forms of management and control have often been criticized as not being appropriate for organizations that require flexibility (Burns and Stalker, 1961; Mintzberg, 1979), and these organizations therefore encounter a dilemma between efficiency and flexibility.

2.3 Flexibility versus Over-Flexibility

Flexibility is the ability to respond to new situations with little time or effort (Upton, 1995); it provides more freedom and options for employees to complete their tasks (Noori and Radford, 1995). Enterprises pursue flexibility for purposes of fulfilling new business requirements and constantly changing customer demands and thereby ensure their agility and advantage over competitors (Leana and Barry, 2000; Chen et al., 2009; Kumar and Stylianou, 2014). In terms of information system flexibility, Easton and Rothschild (1988) described it as the ability of a system to take different forms. With adequate information system flexibility, enterprises could extend their systems' periods of use and gain more IT investment efficiency (Chang and King, 2005; Moitra and Ganesh, 2005; Gebauer and Schober, 2006). In today's constantly changing business environment, the tendency toward enterprise system flexibility rather than control is addressed in multiple studies across different industries (Adler et al., 1999; Ahrens and Chapman, 2004; Zhang, 2006). With manufacturing, for instance, the combination of flexibility and traditional control in enterprise systems will bring the industry greater product variety, faster response times, and increased

productivity (Chase and Garvin, 1989; Pine, 1993; Hayes and Pisano, 1994; Goldhar and Lei, 1995), which can be found in practice as well at New United Motor Manufacturing Inc. (NUMMI) by Adler et al. (1999). In other areas such as the service industry, businesses can also benefit from flexible enterprise systems in the form of innovation capability in providing services, which is especially important in today's changing environment (Ahrens and Chapman, 2004; Zhang, 2006)

Although the majority of contemporary research focuses on the benefits of flexibility, there is another voice that claims that too much flexibility, which is referred to as over-flexibility in this research, may be detrimental to organizations with regard to budget and outcome control, business objective alignment, employee behavior management, and investment efficiency (Minic, Petrovic, and Ilic, 2013). Jørgensen and Messner (2009) state that enterprises may risk not reaching expected business outcomes when too much flexibility is allowed, and this flexibility also comes at the price of additional investment and complexity in enterprise systems (Gebauer and Schober, 2006). At that point, given the input and compromise required for flexibility, it is difficult to verify whether this flexibility can generate practical benefits for enterprises (Chen et al., 2009). On an individual level, over-empowerment among employees may lead to feelings of confusion, especially at lower levels of a given hierarchy (Leana and Barry, 2000). Although contemporary studies address in only a limited fashion to the issues that arise from over-flexibility, Ahrens and Chapman (2004) addressed the concern of a head office manager who indicated that an over-flexible enterprise system configuration could allow for malicious employee behavior such as tampering with data in the system.

2.4 Conflicts between Integrated Information System Control and Flexibility

To conceptualize the abovementioned conflicts between integrated information system control and flexibility, this research establishes a typology framework to categorize different types of conflicts from either the organizational or the operational perspective, within which the different system configurations would make positive or negative impacts. Why? A review of a number of studies in the literature also found that the configuration of integrated information systems plays an important role in organizational and operational success or failure (Upton, 1995; Lei et al., 1996; Palanisamy and Sushil, 2004; Zhang, 2006). In other words, integrated system configurations can bring about advantages and disadvantages from both the organizational and the operational perspectives.

Table 2-1: Pros and Cons of Integrated System Configurations

	Integrated System	
Organizational Perspective	Control	Over-Control
	● Access to more and better information for decision making ● Gain competitive advantages in price and quality ● Reduce dependence on employees ● Improve data-reporting quality with transparent information	● Limited response to business environment changes ● Lose the agility to reallocate resources and adjust processes ● Increase the complexity of issue sourcing and delay decision making because of tight inter-department links
	Flexibility	Over-Flexibility
	● Respond to new situations with little time or effort ● Increase competitive advantage with greater product variety and faster responses ● Gain investment efficiency and extend the use of enterprise systems	● Poor budget and outcome measurement ● Decreased business objective alignment because of excessive decentralizing ● Risk of not reaching expected business outcomes ● Added complexity of and investment in enterprise systems
Operational Perspective	Control	Over-Control
	● Bring order to activities with formalized rules and processes ● Enhance operation efficiency with specialized tasks ● Ensure work quality with standardization	● Inconveniencing local operations ● Inability to manage unanticipated situations ● Low employee commitment to problem solving ● Poor responses to customer needs
	Flexibility	Over-Flexibility
	● Offer more freedom and options for employees to complete their tasks ● Fulfill constantly changing customer demands ● Acquire innovation capability in processes and services	● Low work quality because of poorly defined procedure ● Feelings of confusion among lower-level employees ● Malicious employee behaviors are allowed for self-benefit

2.5 Balancing Control and Flexibility

To address the solutions to the different types of conflicts between enterprise system over-control and over-flexibility, this research draws on three approaches that have been proposed in contingency theories (Ouchi, 1977, 1979, 1980; Adler and Borys, 1996; Adler et al., 1999): organizational, operational, and system.

The **organizational approach** adopts the control theory proposed by Ouchi (1977, 1979, & 1980) and aggregated by Harris et al. (2009) into three types of control, output, behavior, and clan. **Output control** entails measuring results by setting explicit specifications for outcomes, and it can be performed when actual results can be verified based on definable and measurable expectations of outcomes. **Behavior control** is individual surveillance that involves comprehensive regulations and procedures to regulate employees' behavior, and it can be conducted when a cause-and-effect relationship between certain behaviors and expected goals is well understood. Whereas output and behavior control are known as bureaucratic forms of control, **clan control** is, rather, an enabling approach that allow employees to find their own way under the assumption that they share the same goals as the organization and will work for the organization's best interest.

The **Operational approach** applies the four operational mechanisms presented by Alder et al. (1999) to balance control and flexibility in individuals tasks, specifically meta-routine, job enrichment, switching, and partitioning. **Meta-routines** formalize the creative process by turning non-routine tasks into more routine tasks to gain more control over unstructured work under certain levels of flexibility; it is assumed that control can be enforced using the integrated information system. **Job enrichment** gives employees the right to take part in improvement tasks and propose solutions for optimizing their work in addition to their primary production tasks, which allows them to become more innovative and flexible. **Switching** allows employees to switch between improvement tasks and production tasks, which gives them the time to focus on each task by distinguishing between the two roles. **Partitioning** further differentiates the improvement role and the production role by separating them into respective units. It permits each unit to concentrate on its task while both units support each other and function in parallel.

The **System approach** highlights Adler and Borys' (1996) four system design elements for supporting system usability: repair, internal transparency, global transparency, and flexibility. **Repair** permits employees to fix system-related problems such as applying procedures to operations and breakdowns on their own rather than relying on engineers each time an issue arises. This ensures the smoothness of operations without interruptions from system configurations or fails by involving employees in problem resolutions, thereby reducing the downtime spent waiting for help. **Internal**

transparency gives employees access to overall information about the local system regarding its management control processes, operation status, and functioning logic. Employees can therefore understand what should be done for the department's best interest and what is required to be in line with customers' expectations, and they can at the same time intelligently fix errors. **Global transparency**, as opposed to internal transparency, gives employees a broader understanding of how the system works as a whole; a wide range of the information that is provided can assist with inter-department collaboration and communication and make it possible for employees to keep track of how their work fits into the entire organization. **Flexibility** allows employees personal discretion on how they use systems and whether those systems should be used. Employees can choose whether to apply the system's suggestions and also to modify the system to fit their specific needs.

Table 2-2: Approaches to Balancing Control and Flexibility

Organizational Approach	Operational Approach	System Approach
● **Output Control** Measuring results by setting explicit specifications for outcomes ● **Behavior Control** Individual surveillance that holds to the complete regulations and procedures that are intended to regulate employees' behavior ● **Clan Control** A somewhat enabling approach that allows employees to find their own way	● **Meta-routine** Formalizing the creative process by turning non-routine tasks into more routine tasks ● **Job Enrichment** Giving employees the right to take part in improvement tasks in addition to conducting their primary tasks ● **Switching** Allowing employees to switch between improvement tasks and production tasks ● **Partitioning** Further distinguishing the improvement and production roles by separating them into respective units	● **Repair** Permitting employees to fix system-related problems on their own rather than relying on engineers ● **Internal Transparency** Giving employees access to overall information about the local system ● **Global Transparency** Giving employees a broader understanding of how their system works as a whole ● **Flexibility** Allowing employees personal discretion regarding how they use a system and whether that system should be used

3. Research Method

To answer the questions of “what”, “why”, and “how” regarding the issues that arise from over-control and over-flexibility of integration systems, multiple case studies among five companies were carried out to shed light on the research questions within this work. Those companies were selected based on three criteria: First, the company has at least three years of experience with integration systems and is aware of the system’s influence on the organization. Second, the company has experienced or is currently experiencing integration system over-control or over-flexibility. Third, the interview counterpart in the company is able to recognize the issue and delve deeply into multiple dimensions for discussion.

Table 3-1: Target Case Study Company

Company Code	**Industry**	**Scope of Interviewed Case**	**Integration Technology**	**Interview Time**
Telecom Co A	Telecommunication	Customer hotline center, network management, and network maintenance	Self-developed ERP, CRM, and workflow integration system	Network Manager 4 hrs
Telecom Co B	Telecommunication	Business services and a payment gateway	Self-developed payment integration platform	System Analyst 2 hrs
Software Co	Software	Software development and inter-region process integration	Navision ERP and Salesforce CRM	Project Manager 2 hrs Business Analyst 2 hrs
Electricity Co	Power Utility	Procurement, cashier, and accounting	SAP ERP	Consultant 2 hrs
Manufacturing Co	High-tech Device Manufacturing	Workflow of several manufacturing processes	Self-developed workflow integration system	Production Line Manager 1 hr

Table 3-2: The Four Steps of the Research Process

	Objective	Approach	Deliverables
Literature Review	Develop a basic understanding of the multiple dimensions of conflicts	Contextual analysis of the existing literature	Aggregation of the possible issues and solutions to the conflicts
Multiple Case Study	Validate the findings from the previous step in real-world circumstances	Conduct interviews with key enterprise representatives based on the questionnaire	Findings from real-world conflicts, actual causes, and practical solutions
Cross-case Analysis	Align the academic and practical perspectives	Conduct an in-depth compare and contrast on the findings from the previous steps	Discussion on the differences and similarities in the findings
Conclusion building	Establish a final conclusion	Summarize the discussion in the form of highlights	Final practical guidelines for resolving the conflicts

Before interviews with key representatives, a contextual analysis was first conducted in the literature review section. This review aggregated the “what” dimension of the conflicts that have been mentioned in the existing literature in addition to organizing the pros and cons of two enterprise aspects under different system configurations. Furthermore, the “how” dimension was also investigated using the possible solutions presented in numerous studies to understand approaches to resolving different aspects of conflict. The findings from the contextual analysis provided this research with a number of assumptions and directions of thought to be raised during the interviews; therefore, a semi-structured questionnaire (Appendix 1) with open-ended questions was designed based on the literature that was reviewed.

4. Cases Description

4-1. Telecom Co A

Table 4-1: Descriptions of Telecom Co A - Case No. 1

Company	**Case Description**	**Case Type**
Telecom Co A	Bureaucratic Delay on Customer Service	Over-control
Problem		
Poor response to customer needs Inconvenient employee operation	● The customer service had long been criticized as inefficient for its lengthy processing time on feedback and handling of network issues reported by customers. ● All network information had to wait for confirmation between the hotline center manager and 2nd line personnel and then announced by the hotline center manager on an internal dashboard.	
Cause		
Poor information transparency Lack of empowerment Low trust to 1st line personnel	● When its first generation integration system was implemented, the 1st line customer hotline center personnel's authority was limited to only reporting customer complaints to 2nd line network management personnel. ● The lack of empowerment and trust therefore limited their access to information regarding customer network status and the progress of outstanding issues.	
Solution		
Allow employees to improve the system by themselves (Limited effect) External expert's support for extended information integration	● A new supporting system implemented by the network management department now allows 2nd line personnel to directly update network error and handling progress to 1st line personnel. However, limitations still exist due to the extra human effort. ● A 2nd generation integration system will be built by an external consultant to further enhance automatic information streaming that allows 1st line personnel to conduct case-by-case services for customers.	

In Telecom Co A, customer service had long been criticized as inefficient for its lengthy processing time on feedback and handling network issues reported by customers. When its first generation integration system was implemented, the authority of the 1st line customer hotline center personnel was limited to only reporting customer complaints to 2nd line network management personnel. The lack of trust and empowerment therefore limited their access to information regarding customer network status and the progress of outstanding issues. This information was delayed as a result of the

necessary confirmation between the hotline center manager and 2nd line personnel; it was then announced by the hotline center manager on an internal dashboard.

As the number of customers had grown dramatically over time and the telecommunications market had become more competitive in recent years, the company began to sense the need for improving the customer service process. A new support system implemented by the network management department now allows 2nd line personnel to directly update network errors and the progress of outstanding issues to 1st line personnel; however, limitations still exist due to the employees' scant knowledge of the system structure, and extra effort is required to update data for each request. In response to these issues, a second generation integration system will be built by an external consultant; its purpose is to improve information integration and automatic streaming. This will allow 1st line personnel more customer and real-time information to conduct case-by-case services for customers.

Table 4-2: Descriptions of Telecom Co A - Case No. 2

Company	**Case Description**	**Case Type**
Telecom Co A	Limited Response to Emerging 4G Service	Over-control
Problem		
Limited response to environment change Low employee commitment to problem solving	● As the company started to provide its new 4G service, the network status monitoring index hard-coded into the system was no longer appropriate to monitor its new network configuration. ● Network management personnel had been performing the same routine for a long time, and they were unwilling to make changes.	
Cause		
Employees resist change Poor responsibility design Insufficient workforce and knowledge	● The flawed employee performance assessment encouraged network management personnel to focus on their routine job and discouraged them from engaging in improvements to the network. ● An insufficient workforce in the network management department and limited knowledge of the system also made improvements difficult.	
Solution		
Separate improvement role into new department (unsuccessful)	● Established a new department to direct improvement tasks; however, low trust in the professional knowledge of the newly established department from network management personnel still impeded the progress of the task.	
External expert's support for reviewing and redesigning the system	● A 2nd generation integration system, which was mentioned in the previous cases, will be direct by an external consultant to review and replace the dated system.	

When Telecom Co A started to provide its new 4G service, its hard-coded network status monitoring index was no longer suitable for monitoring its new network configuration; however, network management personnel had been performing the same routine for a long time, and they were therefore unwilling to solve the problem. The reason for this was that the company's flawed employee performance assessment encouraged network management personnel to focus on their routine job and discouraged them from performing tasks to improve the network. Moreover, an insufficient workforce in the network management department and employees' limited knowledge of the system also make system improvements difficult.

To improve the system, the company established a new department to direct improvement efforts; however, the network management personnel's minimal trust in the new department's professional knowledge still impeded the progress of the task. Finally, an opportunity to conduct a large-scale system renewal due to the coming 4G service era shed light on the problem. A 2nd generation integration system, which was mentioned in the previous cases, will be direct by an external consultant for the purpose of reviewing and replacing the dated system.

Table 4-3: Descriptions of Telecom Co A - Case No. 3

Company	**Case Description**	**Case Type**
Telecom Co A	Poor Management of Device Installation	Over-Flexibility
Problem		
Low work quality Poor budget and outcome measurement Self-interested, malicious employee behavior	● Installation personnel should have but did not update the information in the system to keep track of the devices installed in each base station, and therefore the power consumption data from the monthly operational expense report did not comply with the data reported by installation personnel. ● There is a concern that installation personnel might overstate the number of installed devices to benefit themselves.	
Cause		
Poor system design Poor operation control	● The design of the data input process was too complicated and time consuming, which discouraged installation personnel from maintaining information in the system. ● To keep their work simple, each device installation department kept their own records on excel files instead of maintaining them in the system.	
Solution		
Simplify process Reeducate employee	● Review the problem and adjust the system to simplify the data input process ● Enforce data reporting quality by reeducating installation personnel	

In Telecom Co A, after the installation and maintenance of network devices, installation personnel should update the information in the system to keep track of the devices installed in each base station; however, the base station's power consumption data from the monthly operational expense reports constantly failed to comply with the data reported by installation personnel. From the point of view of the system, the design of the data input process was too complicated and time consuming, which discouraged installation personnel from maintaining the information in the system. With regard to employee operation, to make the work easier, each device installation department kept its own records on excel files instead of maintaining the data in the system.

There was also a concern by a manager that the lack of enforcement would allow installation personnel to form secret agreements with land owners of base stations; they would then overstate the number of devices installed in a base station to entice the land owners with access to free electrical power that should have been consumed by the overstated devices. The problem was eventually reviewed and the system was adjusted to simply a data input process. Moreover, installation personnel were re-educated to enforce data reporting operations.

4-2. Telecom Co B

Table 4-4: Descriptions of Telecom Co B - Case No. 4

Company	**Case Description**	**Case Type**
Telecom Co B	Unpredictable Result of Payment Processing	Over-Flexibility
Problem		
Poor budget and outcome measurement	● Each payment was assigned to the acquiring agency with the lowest commission charge at the time of payment. From the user's point of view, the transaction results were essentially random and out of their understanding and control	
Risk of not reaching expected business outcome	● Extra adjustments on business service platforms were required to comply with the floating commission rate logic of the payment system	
Cause		
Ignore real operation practices and requirements of users	● The design of the payment system focused on top management's need for maximizing company profit, and the design ignored actual operation practices and the needs of end users.	
Poor communication and education regarding benefits	● Benefits of the design were not well communicated or adequately explained to end users, and users had to experience a series of troubles before they were able to benefit from the system.	
Solution		
Unsolved (lesson learned)	● The system design had already run out of time and budget, and the problem was still unsolved	

Telecom Co B designed a payment processing system that integrated credit card, stored value card, telecom billing, and 3rd party payment into a single payment gateway. Users of the system included internal and external business services such as e-commerce platforms. For the purpose of maximizing profit, each payment would be assigned to the acquiring agency with the lowest commission charge at the time payment was processed. From the user's point of view, the transaction results were practically random and beyond their understanding and control. Moreover, extra adjustments on business service platforms were required to comply with the floating commission rate logic of the payment system.

"The system is like a black box to users, they don't trust it since they have no idea or control over how their bucks are handled." – System Analyst

The design of the payment system focused on top management's need for maximizing profit but ignored actual operation practices and requirements from users. In addition, the benefits of the design were not well communicated or explained to users; users had to experience a series of difficulties before they were able to benefit from the system. In the end, the system design had run out of time and budget, and the problem was still unsolved.

Table 4-5: Descriptions of Telecom Co B - Case No. 5

Company	**Case Description**	**Case Type**
Telecom Co B	Increased Confusion from Users	Over-Flexibility
Problem		
Feeling of confusion among users	● Key information needed by users was distributed across different reports, and users often had to go through several reports to understand a single fact. Similar information was also revealed in different reports in different views, and users were confused regarding which report would serve as the standard.	
Added complexity and investment in system	● The reports provided by the system had to be redesigned with extra investment and effort.	
Cause		
Information overload	● Users of the system actually did not need that much information, and they did not have time to go through all the reports.	
Lack of understanding of user requirements	● The design of the reports was not well tailored based on user requirements, and thus, the information provided lacked focus.	
Solution		
Redesign with extra resources	● Most of the reports were abandoned, and the remaining ones were redesigned with extra investment to meet user requirements.	

A continuation of the previous case of Telecom Co B, for all transactions that went through the payment processing system, multiple reports were created to reveal different views of transaction results. The intention of the report's design was to provide as much flexibility for users to review the information as necessary; however, key information was distributed across different reports, and users often had to go through several reports to understand a single fact. Similar information was also revealed in different reports in different views, and users were confused regarding which report served as a standard.

"Imagine it's like your smartphone. It provide you with so many communication apps such as SMS, WhatsApp, Line, and WeChat. Users actually only need one or two, and they hate the idea that they have to use them all to communicate with different people using different apps." – System Analyst

The design of the reports was not well-tailored for user requirements, and therefore, the information provided lacked focus. Users of the system actually did not need that much information, and they did not have time to go through all the reports. A great deal of resources had been invested in designing the reports, but over time, most of the reports were abandoned, and the remaining ones were redesigned with extra effort to meet user requirements.

4-3. Software Co

Table 4-6: Descriptions of Software Co - Case No. 6

Company	**Case Description**	**Case Type**
Software Co	Difficulties with inter-regional Process Migration	Over-Flexibility
Problem		
Added complexity and investment in system	● From a high level view, the migration should be straightforward because the company uses the same integration system in every business region; however, it was actually difficult to implement because the migrated processes shared many differences with local processes.	
Cause		
Over-customized processes for respective business regions	● The ERP and CRM system of the company had different instances in different business regions, which allowed customization for different regions based on respective business cultures. ● Many processes that were supposed to be unified regardless of region still shared a great degree of differences by region.	
Solution		
Extra investment and effort	● The intention from top management to keep the original design of the migrated processes lead to extra effort and investments of time in adjusting the local system to fit the migrated processes.	

Due to the inter-regional integration of Software Co, a part of the business processes from EMEA (Europe, the Middle East, and Africa) was migrated to APAC (Asia-Pacific). From a high level view, the migration should be straightforward because the company used the same integration system in every business region; however, it was actually difficult to implement because the migrated processes had many differences with local processes.

The ERP and CRM system of the company had different instances in different business regions, which allowed different regions a certain degree of flexibility in customization based on respective business cultures. However, many processes such as product registration, which was supposed to be unified across regions, still exhibited a number of differences by region. The company had to make a decision on which process to comply with. Finally, the intention of top management to keep the original design of the migrated processes lead to extra effort and investment in adjusting the local system to fit the migrated processes.

"This is an unprecedented project in the APAC region, and it could be a lesson learned on the degree of customization that should be allowed in different regions" – Project Manager

Table 4-7: Descriptions of Software Co - Case No. 7

Company	**Case Description**	**Case Type**
Software Co	Reduced Software Development Efficiency	Over-Control
Problem		
Inconvenience in local operation	● In cases of urgent requests, the authorization process became an obstruction to work efficiency. ● In multiple cases, the process had to be delayed for almost a week when approving personnel were absent for days.	
Cause		
Require multiple levels of approval	● All access to the software development environment required multiple levels of approval.	
Solution		
Flexibility on how a system should be used Allow employees to find their own way	● To make urgent cases free from obstruction, a request could instead use email to obtain an agent manager's verbal approval, and the official process through the system could wait to be fulfilled afterward.	

In Software Co, all access to the software development environment required multiple levels of approval. In cases of urgent requests, the process became an obstruction of work efficiency. There were multiple cases in which the process had to be delayed for almost a week when approving personnel were absent for days. To make urgent cases free from obstruction, a request could instead

be sent by email for an agent manager's verbal approval, and the official process through the system could wait to be fulfilled afterward.

"This might not be justifiable from the company's point of view; however, a certain level of alternatives are needed to complete work on time." – Business Analyst

4-4. Electricity Co

Table 4-8: Descriptions of Electricity Co - Case No. 8

Company	**Case Description**	**Case Type**
Electricity Co	Increased Complexity on Internal Invoicing Process	Over-Control
Problem		
Inconvenience in local operation	● As a government owned enterprise, its processes were already bureaucratic, and the SAP implementation made the situation even worse. The internal invoicing process had to go through even more steps, requiring even more forms in the system.	
Cause		
Two standards are enforced at the same time	● To comply with government auditing standards and with SAP best practices at the same time, more actions were needed from base-level employees to complete a single invoice.	
Solution		
External expert's support for reviewing and adjusting system Remain in control but optimize and automate the process	● Request for an Application Maintenance Service from external consultant ● Remained in control but combine similar parts of the two standards into fewer steps ● Automate the data input of common data in the two standards to reduce the data input effort from base-level employees	

After the implementation of SAP in Electricity Co, the company experienced overall business process reengineering to comply with the so called "best practice" of SAP. As a government-owned enterprise, its processes were already bureaucratic, and the SAP implementation made the situation even worse. To comply with the government auditing standard and to comply with SAP's best practice at the same time, the internal invoicing process had to go through even more steps and add more forms into the system.

To respond to the problem, the company requested Application Maintenance Service from an external consultant to review the problem and then combined similar parts of the two standards into fewer steps. The data input of common data in the two standards was also automatized to reduce the burden of base-level employees.

Table 4-9: Descriptions of Electricity Co - Case No. 9

Company	**Case Description**	**Case Type**
Electricity Co	Inconsistent data Reporting on Orders	Over-Flexibility
Problem		
Feeling of confusion among lower level employees Inconsistent data reporting	● Some auto generated fields in new established order forms were modifiable to fulfill the purpose of reopening or revising certain orders; however, there were cases employees would revise those fields intentionally or unintentionally for unknown reasons that lead to inconsistency in data reporting.	
Cause		
Poor employee training Poor system design	● Employees did not understand the intention of system design due to insufficient education, which lead to low quality of the data input ● The logic for revising the order in the system was not well designed, which confused users from time to time	
Solution		
Enforce certain rules through the information system and re-educate employees	● Because the problem was cash flow related, the company decided to adjust the system to make those fields not revisable and then re-educate employees on the new policy. The order revising and reopening process will now need the approval of the department manager.	

In the procurement department of Electricity Co, when a new order form was established, several fields such as order number would be automatically generated and filled by default to ensure the continuity and correctness of data. Those fields were modifiable to fulfill the purpose of reopening or revising certain orders; however, there were cases where employees would revise those fields intentionally or unintentionally for unknown reasons that lead to inconsistency in order data reporting.

On the system side, the logic behind the order revision in the system was not well designed, which confused users from time to time. On the operation side, employees did not understand the intention of the system design due to insufficient education, which lead to low quality of data input. Because the problem was cash flow related, the company decided to adjust the system to make those fields not revisable and then re-educated employees on the new policy. The order revising and reopening process will now need the approval of the department manager.

4-5. Manufacturing Co

Table 4-10: Descriptions of Manufacturing Co - Case No. 10

Company	Case Description	Case Type
Manufacturing Co	Inadequate agility in resource allocation and process adjustment	Over-control
Problem		
Lose agility in reallocating resources	● Due to insufficient system capabilities or suspicious system defects, there were cases where the system spent more than half an hour to return a scheduling result.	
Unable to manage unanticipated situations	● Managers knew how to arrange the next step based on their experience, but they tended to wait until the system returned an answer.	
Cause		
High-risk process	● The unit price of its material and product is unimaginably high, and the company was unwilling to take any risk on man-made error. Therefore, all scheduling had to be subject to the system, and managers had low discretion in scheduling.	
Low trust in and low dependency on employees	● If managers revise the process by themselves, even with good intentions, they have to be totally responsible for the negative consequences.	
Solution		
Play it safe	● Remain in control and wait for the next upgrade to the system.	

Manufacturing Co applied an integrated production scheduling system to support the production line manager in scheduling work for the purpose of maximizing the capability of each production line. Due to insufficient system capability or suspicious system defects, there were cases where the system had to spend more than half an hour to produce a result. Managers knew how to arrange the next step from experience, but they tended to wait until the system produced an answer.

To examine the reasons for this, it was stated that the unit price of a high-tech product and its material was unimaginably high, and the company was unwilling to take on any risk from man-made error. Therefore, all scheduling must subject to the control made by the system, and managers had low discretion in scheduling. If managers revised the process by themselves, even with good intentions, they had to be totally responsible for the negative consequences. In the end, the company still decided to remain in control and waited for the next adjustment and upgrade of the system.

5. Findings from Cross-case Analysis

5.1 Cross-case Analysis of Over-control Cases

Table 5-1: Summary and Comparison of System Over-control Cases

	System Over-control Case No.	1	2	7	8	10
Problem	Limited response to business environment changes		V			
	Lose the agility to reallocate resources and adjust processes			V		V
	Inconveniencing local operations	V		V	V	
	Inability to manage unanticipated situations					V
	Low employee commitment to problem solving		V			
	Poor responses to customer needs	V				
Cause	Poor information transparency	V				
	Lack of empowerment and trust to employee	V				V
	Poor responsibility design		V			
	Insufficient workforce and system knowledge	V	V		V	
	Require multiple levels of approval			V		
	Two standards are enforced at the same time				V	
	High-risk or cash flow related process				V	V
Solution	Clan Control			V		
	Job Enrichment	◎				
	Partitioning		◎			
	Repair	◎				
	Transparency	V				
	Flexibility			V		
	External expert's support	V	V		V	
	Remain control				V	V
	Empower and trust employee	V		V		
	Employee responsibility redesign		●			

V: Found in case ◎: Found in case but with limited effect ●: Not found but should be consider

To examine the similarities and differences of the system over-control cases in previous chapter, a summary and comparison of the five over-control cases is organized into Table 5-1. This table provides a foundation of our following analyses and interpretations.

Table 5-2: Cross-case Analysis of Over-control Cases

Over-control Problems Found in Cases	**Solutions from Previous Research**	**Solutions applied in this study**	**Explanation**
Inconveniences employees in the completion of tasks	Allow employees to take part in system improvement tasks (Job Enrichment, Partitioning, Repair)	Request for support from external experts to review problem and redesign system	A gap arises due to insufficient workforce at the enterprise and limited system knowledge of the employees
Poor response to internal or external environment due to limited information transparency	Give employees access to more information (Internal and global transparency)	Trust and empower employee with information access	Trust and empowerment are key mindsets for information transparency
Low employee commitment to problem solving when work is specified by system	Not applicable	Adjust responsibility design and the way the company evaluates employee performance	The problem is not directly attributed to system control but results from responsibility design
Lack of work efficiency due to extremely controlled processes	Not applicable	Remain in control but try to improve system automation of processes	High-risk or cash flow related process control cannot be compromised and should remain in control

System over-control has constantly been criticized for preventing employees from working in an efficient manner, and this phenomenon has also been confirmed by most of the over-control cases in this paper. To respond to the problem, Telecom Co A adopted several approaches mentioned in the previous studies, such as Repair and Partitioning, that allowed employees to take part in system improving tasks, but eventually those approaches still failed to resolve the problem. Request for an external expert's support, such as service from a consulting firm, was a common solution adopted by Telecom Co A and Electricity Co. The gap between previous research and empirical findings arises due to an insufficient workforce in the organization or because employees usually lack professional knowledge of integration systems, and thus, this paper suggests that the support of an external expert would be an ideal measure under those circumstances.

Lack of transparency in the information system is another common over-control issue that usually limits employees' response to the internal or external environment. It was proposed by Adler and Bory (1996) that better information sharing internally and globally within a system configuration would be a feasible approach. Alternatively, from the case of customer service delay at Telecom Co A, we realized that its non-transparent information sharing design was subject to the minimal trust placed by high level management in 1st line personnel, who actually have the potential to perform better if they have the necessary information. Management should believe in the employee's ability to create more value with proper information. To conclude, our finding suggests that the mindset of high level management plays a rather important role in the information transparency of a system.

Over-control was also believed to be a source that lead to low employee commitment to problem solving and process improvement; however, our finding in the software development case of Software Co showed that even the process was under strict system control; employees still had intentions to find their own way and work around restrictions. In contrast, in the 4G service case of Telecom Co A, employees were also under system restrictions, but they were unwilling to solve the problem. Therefore, the problem in the Telecom Co A case should be blamed on responsibility design and the merit system of the company. Therefore, we propose that low employee commitment cannot be directly attributed to system over-control but results from responsibility design and the merit system of employees.

Finally, although system over-control has many downsides that may reduce employees' work efficiency, it is necessary and inevitable in certain kinds of processes. In the cases of Electricity Co and Manufacturing Co, we found that even their over-control had a noticeable influence on process efficiency, and they tended to remain in control because their processes were high risk and cash flow based and had low tolerance to faults. Conducting system automation on that kind of process would be a possible alternative to alleviate the inefficiency issue.

5.2 Cross-case Analysis of Over-flexibility Cases

Table 5-3: Summary and Comparison of System Over-flexibility Cases

	System Over-flexibility Case No.	3	4	5	6	9
Problem	Poor budget and outcome measurement	V	V			V
	Decreased business objective alignment				V	
	Risk of not reaching expected business outcomes		V			
	Added complexity of and investment in enterprise systems			V	V	
	Low work quality because of poorly defined procedure	V				
	Feelings of confusion among lower-level employees	V		V		V
	Malicious employee behaviors are allowed for self-benefit	V				
Cause	Poor system design	V	V	V		V
	Poor employee communication and education	V	V			V
	Ignore real operation practices and requirements of users		V	V		
	Over-customized system processes of respective business units				V	
Solution	Behavior Control (Employee education)	V	●			V
	System redesign with extra investment and effort	V		V	◎	V
	Precisely examine user requirements in each level		●	●		
	Review flexibility policy of system				●	

V: Found in case ◎: Found in case but with limited effect ●: Not found but should be consider

To examine the similarities and differences of the system over-flexibility cases in previous chapter, a summary and comparison of the five over-flexibility cases is organized into Table 5-3. This table provides a foundation of our following analyses and interpretations.

Table 5-4: Cross-case Analysis of Over-flexibility Cases

Over-flexibility Problems Found in Cases	**Solutions from Previous Research**	**Solutions applied in this study**	**Explanation**
Feeling of confusion from end users on using system	Regulate employee behavior with regard to using the system (Behavior Control)	Review and redesign the target system process and then educate employees on their operation and the system design	To fully resolve these problems, both solutions are required to be enforced simultaneously
Malicious self-interested employee behavior is allowed			
Unable to reach expected outcome that adds complexity and requires investment in system	Not Applicable	Precisely examine user requirements in each level and use extra caution with regard to how and how much flexibility should be granted at the very beginning of the system design	When problem is deeply rooted or the scope of the problem is too large, it is hard to resolve afterward
Decreased business objective alignment because of decentralized system design			

To address employee-related system over-flexibility problems, such as feelings of confusion and malicious behavior, previous research suggests Behavior Control as an approach to regulate employees' behavior in terms of using a system. As for our finding in the over-flexibility cases of Telecom Co A and Electricity Co, besides exerting control on employee operations through employee education, system review and redesigns were also essential because the system design did play an important role in the way users interact with the system. In the case of Telecom Co B, it was also found that employee education meant not only regulating employee behavior but also conveying the intentions and values of the system design to let employees appreciate it. To summarize, both system redesigns and employee education should be carried out collaboratively to fully resolve the problems.

Telecom Co B was unable to reach its expected outcome from the payment system, and extra investment was needed to address the complex over-flexibility issues of the system, which lead to the failure of system implementation. In addition, the unduly decentralized integration system process design across regions impeded Software Co from reaching its objective of inter-region process

integration. From these cases, we found that the system over-flexibility problems were already deep rooted, and as a result, the problems were difficult or almost impossible to be eradicated afterward. In response to the problems, this paper suggests that precise reviews of user requirements for each level and extra caution regarding the level of flexibility endowed should be emphasized at the very beginning of the system design to prevent subsequent over-flexibility issues.

6. Conclusion

6.1 Summary

Enterprise integration systems have been adopted by enterprises globally for their potential to strengthen business competitiveness; however, the systems were prove to be stumbling blocks for enterprises as the system becomes over-controlled or over-flexible. To obtain deeper insight into the problems, causes, and solutions of system over-control and over-flexibility, a literature review, empirical case study, and cross-case analysis have been conducted in this paper. First, in our literature review, several relevant problems that were mentioned in previous studies have been assembled to establish a comprehensive understanding of the problems, and the solutions presented in previous research had also been gathered to serve as possible guidelines for resolving the problems. Second, we conducted five enterprise interviews in our case study; each case was organized in a table and was separated into three dimensions for review. Finally, in cross-case analysis, solutions from previous studies were compared with empirical findings to conduct in-depth analysis.

To answer the three research questions, first, most of the problems in previous studies had been identified in our empirical cases. In terms of over-control, most significantly, inconveniencing employees' operations, low employee commitments, and poor response to internal or external environment. In terms of over-flexibility, notably, confusions and malicious behaviors from employees, extra complexity and investment in systems, and decreased business objective alignment. Second, a wide range of causes to over-control and over-flexibility beside the causes from system itself are found in this study, for instance, low trust and empowerment on employees, poor responsibility design and operation control, and lack of understanding to user's requirements. Third, several novel approaches to resolve the problems in different contexts were proposed, such as requesting for external resources, adjusting responsibility design, and the actions to take at early system design stage.

6.2 Contribution

Table 6-1: Contribution of Difference Dimensions

Type	Dimension	Findings
Over-control	System design	Enterprises should remain system control on low fault-tolerant processes even if control has a negative impact
	People	Empowerment is a key mindset for transparent information sharing, and to a certain extent, enterprises will need external expert support
	Policy	Responsibility design should be reviewed to allow employees to work around the over-control issue
Over-flexibility	System design	User requirements at each level should be well-tailored at the very beginning to prevent an uncorrectable over-flexibility problem
	People	Employee education is important to make flexible design be appreciated
	Policy	Flexibility policy of a system should also be reviewed at the very beginning to avoid unpredictable over-flexibility issues

In regard to system over-control, our findings can be discussed in dimensions of system design, people, and policy. In the system design dimension, enterprises should remain system control on low fault-tolerant processes even if control has a negative impact. In the people dimension, empowerment is a key mindset for transparent information sharing, and to a certain extent, enterprises will need external expert support. In the policy dimension, responsibility design should be reviewed to allow employees to work around the over-control issue. In regard to system over-flexibility, our findings can also be discussed in the three dimensions. In the system design dimension, user requirements at each level should be well-tailored at the very beginning to prevent an uncorrectable over-flexibility problem. In the people dimension, employee education is important to make flexible design be appreciated. In the policy dimension, the flexibility policy of a system should also be reviewed at the very beginning to avoid unpredictable over-flexibility issues.

6.3 Limitation and Future Research

The case studies in this paper were conducted across only four industries; therefore, it cannot be confirmed that the solutions we proposed are applicable to all industries. Moreover, our solutions are subject to the limitations of certain contexts, and therefore, they may not be one-size-fits-all solutions. Future research could be conducted in other industries and context settings to verify the applicability of our findings. Moreover, from different points of view, people might agree or not agree that a system is over-control or over-flexible. Future research can also refer to different stakeholders' opinions to construct more thorough solutions.

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Appendix 1

Questionnaire

Integrated system misuse		● In your company or department, what processes are integrated within the enterprise system? ● What do you think about your company's integrated system? Does it control too much or is it too flexible?
Over-Control	**General**	● Do you find any over-control cases caused by the coercive integrated information system setting in your company? ● If you do, what do you find? Please describe it in detail.
	Organization	● Does the system affect your company as a whole? ● Does it lower your company's responsiveness to external or internal changes? ● Does it raise the complexity for issue sourcing when issues arise? ● Does it delay your business processes, such as decision making? ● If any of the above applies, how do they affect your organization? ● Why do these situations happen? ● How do you resolve these problems? Do your solutions help? Is there any trade-off? ● Do you think the system should be more flexible and give employees more freedom to fix problems? Is there any trade-off?
	Operation	● Does the system affect employees' daily operations? ● Does it lower employees' commitment to improving operations? ● Does it impede local operations, for instance within specific business units? ● Does it impede addressing unexpected situations such as unexpected customer requests? ● If any of the above occurs, how do these events affect operations? ● Why do these things happen? ● How do you resolve these problems? Do your solutions help? Is there any trade-off? ● Do you think the system should be more flexible to give

		employees more freedom to fix problems? Is there any trade-off?
Over-Flexibility	**General**	● Do you find any cases of over-flexibility that are caused by enabling integrated information system setting in your company? ● If you do, what do you find? Please describe it in detail.
	Organization	● Does your system affect your company as a whole? ● Does it impede your company's outcome or budget measurement? ● Does it decrease business units' alignment with your company's business objective? ● Does it require additional investment or cause additional complexity within your company's integrated system? ● If any of the above applies, how do these problems affect your organization? ● Why do these situations happen? ● How do you resolve these problems? Do your solutions help? Is there any trade-off? ● Do you think the system should enforce more control to keep track of business outcomes or employee behavior? Is there any trade-off?
	Operation	● Does your system affect employees' daily operations? ● Does it lower employees' work quality, for instance, because of missing standard procedure? ● Does it cause confusion among the employees? ● Does it benefit the employees rather than the organization? ● If any of the above applies, how does it affect your organization? ● Why do these situations happen? ● How do you resolve these problems? Do your solutions help? Is there any trade-off? ● Do you think the system should enforce more control to clearly define employee roles and tasks? Is there any trade-off?