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How does Organizational Culture Affect IS Effectiveness: A Culture-Information System Fit Framework

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Abstract—Previous research has examined the impact of organizational culture(OC) on the implementation of many information systems. However, there is a lack of overall picture on how OC affects the effectiveness of different information systems differently. Based on the Competing Value Framework, this paper proposes a comprehensive framework to explain how the fit between organizational culture and types of IS results in different types of IS effectiveness. This framework can be used by managers to create a proper organizational culture that is compatible with the use of specific information systems.

Keywords-organizational culture; information systems; fit

I. INTRODUCTION

Studying information systems (IS) effectiveness has been a central focus of researchers for many years. Among various antecedents of IS effectiveness, the role of organizational culture has been well recognized. Organizational culture (OC) is defined as underlying assumptions, values, beliefs and norms that organizational members share about corporate behaviour. Leinder and Kayworth[1] reviewed 83 journal papers and concluded that the impacts of culture on IT adoption, diffusion, use, and consequences are among the most frequently studied topics by researchers. However, we find that most previous research has focused on only one type of IS artifact, such as hospital information systems[2], ERP[3], intranet[4], EIS, DSS [5], and the results from one information system could not be readily applied to others.

This paper set out to build a comprehensive framework that match OCs with different ISs based on Competing Value Framework, an OC framework, and it is believed that this match produces greater IS effectiveness. IS effectiveness is defined as the extent to which IS helps organizations to attain their goals. The paper is arranged as follows. Firstly, the Competing Value Framework is reviewed. Secondly, several

important organizational effectiveness criteria are identified. Thirdly, a taxonomy and a classification of different types of ISs are provided in order to facilitate the mapping between OC and ISs. Finally, a framework is provided to address the IS effectiveness profile, which includes IS effectiveness criteria and their culture-IS fit predictors.

II. COMPETING VALUE FRAMEWORK

Competing value framework (CVF) was developed by Quinn and Rohrbaugh [6] to address the issue of organizational effectiveness. CVF divides OC along two dimensions: internal versus external orientation, and stability versus flexibility of an organization. Internal versus external orientation of an organization refers to the extent to which organizational improvements are driven by a focus on internal business process improvements and people caring, or by external stakeholder desires [7]. Stability versus flexibility orientation of an organization refers to the extent to which an organization is more stable in nature, or tends to encourage innovation, personal growth, continuous organizational improvement and change. Based on these two cultural dimensions, four types of OC are identified:

1. Group: organizations with a group culture tend to focus on the importance of cohesion and morale, with an emphasis on human resources and training. The value drivers of such organizations are commitment, communication and development.

2. Development: organizations are effective because they are organic, adaptable, and good at obtaining external resources. The value drivers of development culture are innovative outputs, transformation, and agility, and employees are bonded by entrepreneurship, flexibility and risk taking.

3. Hierarchy: there is a great emphasis on measurement, documentation and information management. People are given well-defined roles and are expected to follow rules that define what they

should do. The value drivers of this type of organization are efficiency, timeliness, consistency and uniformity.

4. Market: the market culture assumes that planning and goal-setting result in productivity and efficiency. Tasks are clarified, objectives are set, and action is taken. People are rewarded financially if they perform well, while if they don't perform well, they are asked to leave. The elements that bond this type of organization are goal-orientation, production and competition.

III. IS EFFECTIVENESS CRITERIA

At the organizational level, ISs are considered to benefit organizations by increasing operational efficiency, strategic benefits, organizational intelligence, and management control [8].

Operational benefits refer to the improved operational efficiency of specific business processes as a result of IT use, measures of which include increased output, reliability, repeatability and quality of the process, and reduced process costs and errors, etc. Strategic benefits refers to the amount of IT value that's actually appropriated by the firms. Factors that can affect IT business value appropriation include firms' bargaining power, customer/supplier lock-in through transaction specific investment, or high switching cost achieved through trust and brand image building or network externalities.

Increasing amount of information is now being captured by systems and database and used by firms to make intelligent decisions, and the use of IT also contributes to organizational intelligence (OI) [9], which refers to the capability of an organization to comprehend and apply knowledge relevant to its business purpose.

Management control refers to the extent to which managers can exert control over their organizations and employees. Management control can be achieved either by monitoring the operation of the entire company based on the information stored in IS, or through improved organizational communication, greater internal cohesion among from employees.

However, these benefits are not universal to all types of IT systems, the use of which may lead to different types of organizational advantages. "...a large number of IS effectiveness measures can be found in the IS literature. What is not clear in the literature is what measures are appropriate in a particular context"[10].

IV. A TAXONOMY OF INFORMATION SYSTEMS

Classifying ISs has been a central concern of IS researchers. Based on Anthony's classification of managerial activities and Simon's analysis of the nature of decision making, Gorry and Mortan [11] suggested two dimensions to classify IS: structured/unstructured ISs, and internal/external ISs (see table 1).

A. Degree of structuredness of information systems

Information systems differ in the extent to which they are structured. Structured ISs are process-oriented, with roles, procedures, and activities embedded in their systems. This type of system normally deals with routine, structured activities, and examples include enterprise resource planning (ERP) systems, HIS (hospital Information systems) and routine manufacturing systems. Conversely, unstructured systems provide platforms for ad hoc collaboration, non-routine work, and non-procedural work. Examples of such systems include DSS, GDSS, and knowledge management systems (KMS).

TABLE I. INFORMATION SYSTEMS CLASSIFICATIONS

Systems	Degree of structuredness	Degree of internal orientation
MIS (Management information systems)	High	High
TPS (transaction processing systems)	High	High
GDSS (group decision support systems)	Low	uncertain
ERP (enterprise resource planning)	High	High
EMS (electronic meeting systems)	Low	uncertain
EIS (enterprise information systems)	Low	Middle
IOS (inter-organizational systems)	High	Low-moderate
	Low	low
B2B EMs (business to business electronic marketplaces)	Low	low
KMS (knowledge management systems)	Low	moderate

B. Internal/external information systems

Internal ISs are used by employees to deal with organizational affairs. Systems with internal orientation include ERP systems that integrate internal departments, and decision support systems that support internal problem-solving. External ISs are used by firms to interact with customers, suppliers, outside trading partners, and other organizational network members. Inter-organizational systems (IOSs) and Enterprise Information Systems (EISs) are examples of such systems.

V. IS EFFECTIVENESS FRAMEWORK AND PROPOSITIONS: AN ORGANIZATIONAL CULTURE AND IS FIT PERSPECTIVE

An IS effectiveness framework is constructed by matching types of ISs, cultures, and IS effectiveness criteria, as illustrated in Figure 1, and explained in the following.

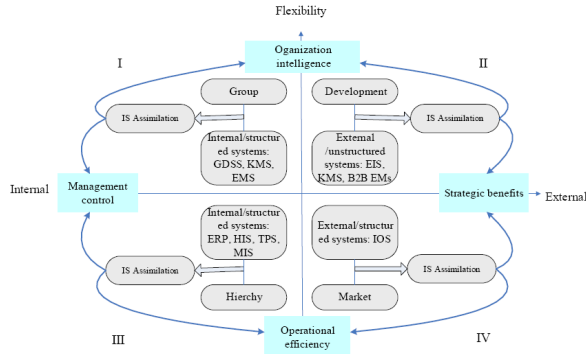


Figure 1. the fit between organizational culture and information systems

A. Quadrant I: The Group Culture

Internal/un-structured ISs fit the needs of organizations with a group culture which are characterised by group cohesion, participation, teamwork and sense of family. Inter-personal relationships, communication, human development, and caring are valued by this culture. Systems such as GSS, EMS and KMS can help to strengthen communication and inter-personal ties. For example, one type of important tool for knowledge-management, the intranet, can be used to provide training for employees and to facilitate information sharing.

The use of such internally-unstructured systems can lead to higher organizational intelligence and improved management control due to increased group cohesion. They provide central repositories for decision data, models and knowledge, and incorporate a user-extensible knowledge representation scheme that links information, knowledge and models. Additionally, the use of such systems increases group cohesion[12].

Proposition 1: Group culture fits internal and unstructured ISs. Their combination leads to greater management control and organizational intelligence.

B. Quadrant II: The Development Culture

Development cultures encourage innovation, growth and the acquisition of new resources. For this type of organization, environmental scanning and outside intelligence-gathering are important. External-oriented and unstructured systems, such as KMS with suppliers and customers, EIS, and electronic markets, are valued by this culture. For example, the relationship between KMS and the development culture has already been documented.

Systems such as EIS, KMS, B2B EMs and collaboration-oriented IOSs can enhance organizational intelligence. Since these systems are externally-oriented, and linked to their customers/suppliers, it is likely that their manipulation of the relationships with suppliers/customers and their knowledge-sharing practices will enable organizations to appropriate more

value from these systems than their trading partners. Consequently, a second proposition is advanced.

Proposition 2: Development culture fits external and unstructured information systems. Their combination leads to greater strategic benefits and organizational intelligence.

C. Quadrant III: The Hierarchy Culture

Organizations with a hierarchy culture that values process-control and stability will also value systems that are structured in nature, such as ERP, HIS, and transaction-processing systems. Kappos[3] analyzed the relationships between organizational culture and ERP strategic advantages by path-analysis, and concluded that internal cultures, rather than external ones, are positively related to ERP strategic advantages. A Lack of formal procedures and processes has also been criticized as one of the major barriers of ERP implementation in China.

The effective use of internal and structured systems benefits organizations through greater operational efficiency and management control. For example, Kennerley & Neely [13] found that at the corporate level, the impact on performance of ERP implementation was in improved efficiency, control, and rationalization of inventories.

Proposition 3: Hierarchy culture fits internal and structured ISs. This combination leads to greater organizational benefits and operational efficiency.

D. Quadrant IV: The Market Culture

Market culture value stresses an external focus and the need to maintain control. To remain viable, organizations must produce outputs valued by environmental sectors, especially customers/clients. The strategic focuses of this type of organization are customer focus, profitability, market superiority, and market share. ISs that are external and structured (or semi-structured) in nature, such as IOS, match this type of organizational value.

Such systems can benefit companies mainly by means of operational efficiency and by providing strategic advantages. Structured IOSs (such as EDI) can reduce transaction costs and errors, reduce inventory costs, and shorten time to market. Mukhopadhyay et al. [14] study showed that the implementation of EDI in the Chrysler Corporation yielded significant cost savings, including reduced inventory, lower write-offs, and reduced premium freight costs. These were achieved by means of frequent, reliable and error free shipments.

Strategic benefits of IOSs come from strategically manipulating inter-organizational relationships in the implementation and use of IT. For example, in the mid 1980s American Hospital Supply (the Baxter) installed sales terminals (ASAP) in the hospitals; this had the effect of making the ordering process more convenient,

and it successfully locked customers in, so gaining a competitive advantage[15].

Some marketplaces also provides strategic and operational benefits to participating companies by being early in e-markets, since buying companies are willing to do business with them due to the convenience of online transactions.

Proposition 4: Market culture fits external and semi-structured ISs. Their combination leads to greater strategic benefits and operational efficiency.

VI. CONCLUSIONS

The main contributions of this framework is that it proposes a comprehensive framework to address impact of OC on IS effectiveness. By the framework, the IS effectiveness criteria are not universal. Different types of IS-culture fit profiles lead to different IS effectiveness criteria.

The managerial implication of this framework is that when selecting a particular system, the managers should create a culture/atmosphere that fits the characteristics of the implemented IS. However, this paper is limited since the framework is based on the literature survey , and not validated empirically.

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