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# **DIRECTIONAL INTERACTION OF ORGANIZATIONAL CULTURE AND STRUCTURE THROUGH INFORMATION PROCESSING THEORY**

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A new theoretical model has been developed to explain the interaction of organizational culture and organizational structure, which, together, influence the effectiveness of the organization under a Stimulus-Organism-Response paradigm. It is found that through a loop of “People-Behaviour-Performance-Organizational Structure-People”, culture affects the organizational structure and through another “Goals-Organizational Structure-Output-Organizational Culture-Gaols” loop, the structure of an organization modifies the organizational culture. Furthermore, with the support of Information Processing Theory, it is able to explain the direction of the interaction of organizational culture and organizational structure. It is found that if the information-processing requirement of an organization dominated by a specific culture fits the information-processing capacity of a particular structure of the organization, the effectiveness of the organization increases. The model is applied in a case study of public healthcare institution. This paper presents both the model and its analysis in application.

Keywords: culture, information processing, organization, public healthcare, structure.

## **INTRODUCTION**

Past studies have established the relationship between organizational culture and organizational effectiveness and between organizational structure and organizational effectiveness. However, there has been little study, not to mention theoretical explanation, of the interaction between organizational culture and structure. This paper applies organizational theories to formulate a model of the inter-relationship between organizational culture and structure, and further, applies information processing theory to examine the directional relationship among Cameron and Quinn’s (1999) four styles of culture and four constructs of organizational structure.

## **MEANING OF ORGANIZATION**

The definition of organization among theorists varies. The more widely accepted definition is from Lawrence and Lorsh (1967:3) as a “system of interrelated behaviours of people who are performing a task that has been differentiated into several distinct subsystems, each sub-system performing a portion of the task, and the efforts of each being integrated to achieve effective performance of the system.”

Organizations have also been viewed as information processing systems in coping with uncertainties. Information processing refers to the gathering, interpreting, and

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synthesis of information in the context of organizational decision making (Tushman and Nadler 1978:614) while uncertainty is defined as the “difference between the amount of information required to perform the task and the amount of information already possessed by the organization.” (Galbraith 1973:5). There are studies supporting that information-processing capacities of effective organizations are able to meet their information-processing requirements in facing the uncertainty arising from the environment and technology (Akgün 2007; Egelhoff 1991; Galbraith 1973).

## **A MODEL ON INTERACTION OF ORGANIZATIONAL CULTURE AND STRUCTURE**

Culture, in general, is defined as “a set of attitudes, behaviours, and symbols shared by a large group of people and usually communicated from one generation to the next” where attitudes include “beliefs, values, general knowledge, opinions, superstitions, and stereotypes.” (Shirayev and Levy 2001)

Organizational culture is a subset of the general (societal/national) culture. Among the many definitions, a representative one is by Denison (1990:2) that organizational culture is the “underlying values, beliefs, and principles that serve as a foundation for an organization’s management system as well as the set of management practices and behaviours that both exemplify and reinforce those basic principles.” Where there are people, there are underlying values, beliefs and principles in the minds of the people and so, there is culture. People in a society form the societal culture. People in an organization form the organizational culture. Therefore, an organization in a society shares the societal culture.

The structure of an organization is analysed using Von Bertalanffy’s (1972) System Theory following the paradigm of the definitions above. According to Van De Ven’s (1976) application of System Theory, inputs of an organization are transformed into outputs, which are then discharged into the environment in the form of goods and services. Inputs are resources, which consist of manpower (people), raw material, money, plant and equipment etc. Outputs consist of goods and services. The entire process of turning inputs into outputs is carried out in a structured manner within an organization and is described as the “transformation process”. The transformation process defines the way in which factors interact. However, the process is affected by the level of complexity, degree of formalization, degree of centralization and level of integration – the construct of organizational structure.

Culture and structure of an organization interact due to the existence of people – one of the input resources. According to the duality of structure of Giddens’s (1984) Structuration Theory, people, on one hand, work within the system framework of defined structure of an organization in accordance with the rules and resources allocation for the production of goods and services. On the other hand, people transform the relationship, through their behaviour during formal and informal interactions, and reproduce the system. This is represented as a People-Behaviour-Performance-Organizational Structure (PE-B-P-OS) loop in Figure 1 which illustrates how culture affects structure of an organization.

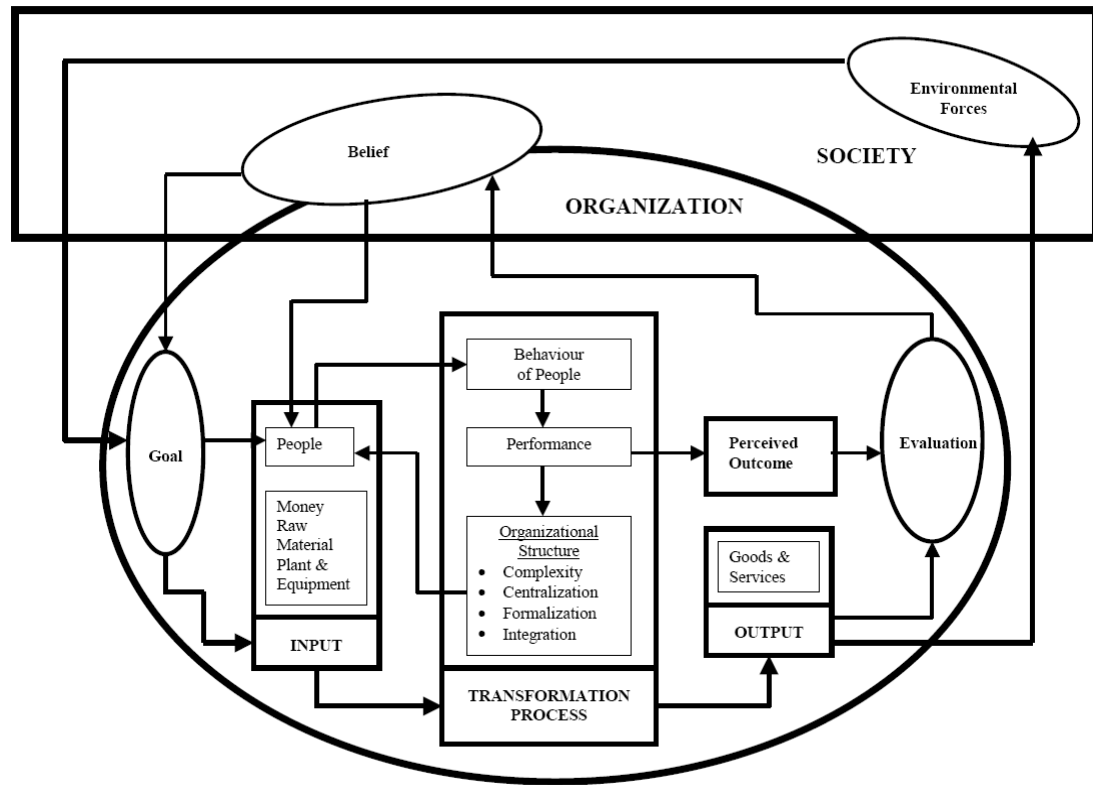


Figure 1: People-Behaviour-Performance-Organizational Structure (PE-B-P-OS) loop

Under Liu's (1996) G-B-P-O cycle, goals (G) direct people's behaviour (B). People's behaviour (B) determines their level of performance (P), which, through the organizational structure, contributes to the outcome (O) of the organization – from the output. Through comparing output with the perceived outcome in an evaluation process, people's beliefs are modified. Thus, the outputs affect the behaviour of people and so, the goals. This forms Liu's (1996) G-B-P-O cycle.

This theoretical model shows the interaction between organizational culture and organizational structure. Having established the model, the next step is to explore the directional relationship between organizational culture and structure.

## DIRECTIONAL RELATIONSHIP BETWEEN ORGANIZATIONAL CULTURE AND ORGANIZATIONAL STRUCTURE

The directional relationship between organizational culture and organizational structure can be explained by Galbraith's (1973) Information Processing Theory.

### Organizational culture affects organizational structure

As illustrated by Galbraith (1973:10), rules, programs and procedures are the simplest methods of coordinating interdependent functions as they eliminate the need for further communication among the subunits. The rules, programs and procedures provide employees with guidance to deal with anticipated situations and reduce the requirement to seek decision-making by upper levels in the hierarchy. The system works well when the job-related situations can be anticipated in advance. (Galbraith, 1973:10) When new situations arise where the pre-planned rules, programs and procedures are not able to provide guidelines for responses, they have to be referred to

upper levels of the hierarchy for decision-making and direction for new responses. Therefore, Galbraith (1973:12) considers the hierarchical communication system has only a finite capacity for handling information. Egelhoff (1991:343-344) echoes that rules and programs have a relatively low information-processing capacity and are used only to absorb a relatively small amount of uncertainty facing the organization. The hierarchical communication system is thus suitable for organizations under a routine and simple environment where the requirements for information processing are relatively low.

If the hierarchical communication system continues to be used in situations where there are lots of uncertainties and the norm of handling these situations is to refer all the exceptions upward in the hierarchy, the hierarchy becomes overloaded and delay in decisions and transmissions of responses downward results. Therefore, the organization becomes less effective. As the situation worsens, the organization must develop new processes to supplement rules and hierarchy (Galbraith, 1973:12) or change the organizational structure. The target of change is to reduce the volume of information processing in the system. This can be done through reducing the path of information flow between the points of action to the point of decision. This can be accomplished by delegating employees at lower levels with increased authority to make decisions (empowerment). This explains the direction of how organizational culture affects its structure.

### **Organizational structure affects its culture**

After the structure has been changed by introducing new processes and increasing the delegated authorities to employees at lower levels, in order to increase the probability of the employees behaving in an appropriate manner, either the skill mix of the employees has to be substituted or training of the employees has to be enhanced. Through training, and via employee's learning capabilities, the behaviour of employees changes under the Behaviour-Performance-Outcome (B-P-OC) path (Liu 1996). This explains the direction of how structure affects culture.

In summary, people work within the framework of structure on one hand and on the other hand, since the way they behave affects the output, the framework of structure is changed by the behaviour of people. This is Structuration Theory (Giddens 1984) and is represented in the People (PE) – Behaviour (B) – Performance (P) – Organizational Structure (OS), PE-B-P-OS, loop.

## **MATCHING THE CULTURE PROFILES AND STRUCTURES OF ORGANIZATIONS**

Matching the culture profiles and structures of organizations is believed to contribute to the effectiveness of organizations. According to Galbraith (1973), an organization has good structural fit when the information-processing capacities of an organization's structure fit the information-processing requirements of its environment and technology.

Empirical evidence (Aguila 1967, Galbraith 1977) confirms that organizational structure influences the information flow in organizations. Organizational structure acts to “constrain and channel information flows to follow the formal reporting and advisory channels expressed by a particular structure.” (Egelhoff 1982:438)

Through the application of Galbraith's (1973) theory of information processing in organizations, there is considered to be a good fit between structure and culture when

the information-processing requirements of a firm's culture are satisfied by the information-processing capacities of its structure. Alternatively, organizations have a good structural fit when information-processing capacities of the organization's structure fit the information-processing requirements of its cultural environment.

## **THE HYPOTHESIS**

It is hypothesized that a good fit between structure and culture profile of an organization has a positive relationship with the effectiveness of the organization.

In order to determine the fit between organizational culture and organizational structure, it is necessary to measure the information-processing requirements of an organization's culture and the information-processing capacities of the organization's structure.

## **THE DIMENSIONS OF ORGANIZATIONAL CULTURE**

Different researchers consider organizational culture consists of different elements. Out of the many studies, the Competing Value Model from Cameron and Quinn (1999) is considered the best of the time, as it is able to illustrate the relative weighting of each element.

According to Cameron and Quinn (1999), there are four styles of organizational culture – the hierarchy, adhocracy, market and clan. The questionnaire derived from the Competing Value Model is able to measure the relative intensities of the four styles of culture.

## **THE CONSTRUCTS OF ORGANIZATIONAL STRUCTURE**

There are many studies on the constructs of organizational structure. Based on the literature search, measurement tools are developed to measure the degree of complexity, formalization (or standardization), centralization and level of integration.

### **Degree of Complexity**

Hall (1996) analyses the degree of complexity in three elements – horizontal differentiation, vertical differentiation and spatial differentiation. The degree of complexity is thus measured by counting the number of occupational and professional specialties, the job titles within an organization, the number of levels from the Head of the Facilities Management Department/Section from the organization chart and the number of locations in which an organization has offices or plants. A summation of these numbers is used to represent the degree of complexity.

### **Degree of formalization or standardization**

Formalization is defined by Pugh *et al.*, (1968:75) as “the extent to which rules, procedures, instructions, and communications are written”. The degree of formalization concerns the extent to which standardized skill, knowledge, work processes and output are written. (Mintzberg, 1980; Sathe, 1978). That is, whether the team has the freedom to work in their own way. To measure the degree of formalization, an instrument developed by Hage and Aiken, the Formalization Inventory (Aiken and Hage 1966), has been adopted.

### **Degree of Centralization**

Centralization is defined as “the locus of authority to make decisions affecting the organization” (Pugh *et al.* 1968:79). A similar definition of centralization by Hage and Aiken (1967) is “how power is distributed among social positions”.

Dewar *et al.* (1980) verify that the indicators of centralization in Aiken and Hage's study are both reliable and valid. Aiken and Hage's scale of personal participation in decision-making and hierarchy of authority is considered valuable as a reference to measure the degree of centralization in this study. As this study considers the Facilities Management Department/Section as the unit of "organization", the scale of Aiken and Hage is not entirely suitable. However, based on Aiken and Hage scale, a self-administered questionnaire is developed to measure the level of centralization in this study. That is, an instrument modified from Aiken and Hage Scale of Personal Participation in Decision Making and Hierarchy Authority (Aiken and Hage, 1968) is used.

### **Level of Integration**

Integration is the means, or liaison devices, of linking members of an organization (Mintzberg, 1980). It is also "the process of achieving unity of effort among the various subsystems in the accomplishment of the organization's tasks" (Lawrence *et al.*, 1967:4). The degrees of integration, connectedness and coupling of organizations, albeit others, have important consequences to its effectiveness (Ranson *et al.*, 1980:2).

As there is no other valid reference on the measurement of the degree of integration, a survey approach is used in this study where a self-administered questionnaire, including modified questions from Hage *et al.* (1971), is prepared based on the literature search. A similar scale of measurement to that of Lawrence and Lorsch (1967:24) is adopted. Follow up interviews of selected samples are conducted to ensure the reliability and validity of the responses received.

## **ANALYSIS OF RELATIONSHIPS AMONG VARIABLES**

### **Hierarchy Culture**

According to Cameron and Quinn (1999), organizations dominated with a hierarchy culture are very controlled and structured places. Formal procedures govern what people do. The information-processing requirement is relatively low.

### **Market Culture**

Organizations with a market culture are very results oriented (Cameron and Quinn 1999). The glue that holds the organization together emphasises achievement and goal accomplishment. As Egelhoff (1991:344) indicates, goal-setting and planning allow more decisions to be made at lower levels in the organization as long as they are within the plan and so, relieves the information-processing load on the hierarchy structure, the information-processing requirement is, thus, higher than that of a hierarchy culture.

### **Adhocracy Culture**

Organizations with an adhocracy culture are innovative and risk taking (Cameron and Quinn 1999). Tasks units have much freedom to do the work and work is unique. As the nature of work is unique, innovative and risk-taking, the uncertainty is high and, thus, the information-processing requirement is also high.

### **Clan Culture**

The management style of organizations with a clan culture is characterized by teamwork, consensus and participation (Cameron and Quinn 1999). The success of organization is based on the development of human resources, teamwork, employee commitment, and concern for people. As the leadership in the organization is,

generally, considered to exemplify mentoring, facilitating, or nurturing, the information-processing requirement is high.

## **THE STUDY**

Organizations consist of many sub-systems. All organizations work within their boundaries. It has been indicated by Lawrence *et al.*, (1967: 4) that “the boundaries of organizations will not always coincide with their legal boundaries”. In this study the boundary of an organization is defined as the Facilities Management Unit (FMU) of a public healthcare institution in Hong Kong.

The study is carried out in three stages. In stage one, invitations were sent to over 400 staff working in the public healthcare institution for an online culture survey. The second stage is to invite all the staff working in the FMU to respond to a paper questionnaire on organizational structure. The last stage is to further study the structure of FMU through the organization chart.

In order to validate the questionnaire, a pilot study of a group of 8 people has been carried out. Returns on the pilot study were carefully reviewed and clarified with the respondents. The questionnaire on organizational structure has been further modified to cover comments from the pilot study.

## **DATA ANALYSIS**

### **Culture of the Institute**

As shown in Figure 2, there is significant difference between the current and preferred culture profiles. The current organizational culture profile of the public healthcare institution is dominated by hierarchy culture. The weakest culture is adhocracy where clan and market culture are of medium strength. The preferred profile shows a demand for strengthening the clan culture and adhocracy culture. The hierarchy and market culture are expected to weaken.

This is reflecting a dilemma of a public institution accountable to the society and a caring institution demanding teamwork in a dynamic environment. There are clearly stated policies, rules and guidelines, both internal and external in the institution to bind the way in which people work. The main concern of the institution is stability, control and continuity – the characteristics of hierarchy culture. However, as a caring institution, a close personal contact, both between staff and patient (or relatives) and among staff, is expected.

### **Culture of Facilities Management Unit of a public healthcare institute**

As shown in Figure 3, compared with the institution, the difference between the current and preferred culture profiles of the Facilities Management Unit is less significant. The two culture profiles overlap for clan and hierarchy culture and are dominating. The weaker market culture is preferred to be further weakened. However, the weakest adhocracy culture is expected to be strengthened.



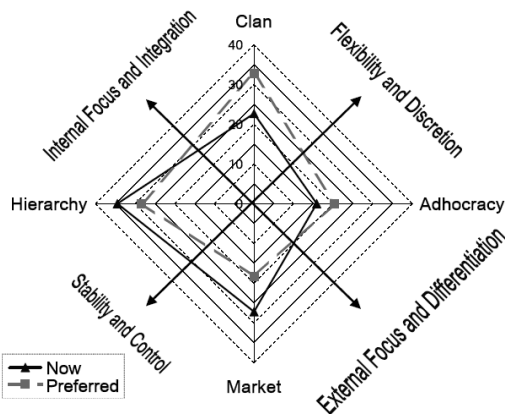


Figure 2: Culture Profile of the Institute

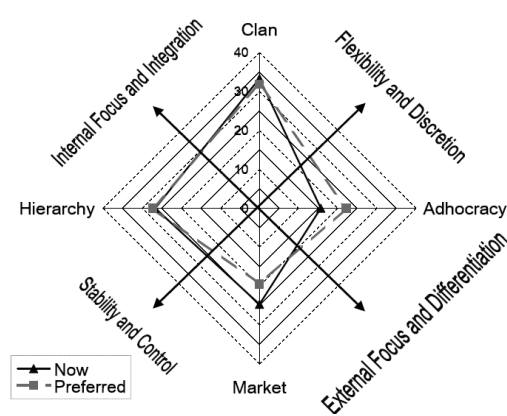


Figure 3: Culture Profile of the Facilities Management Unit

It is reflecting that employees prefer to have larger flexibilities, freedom, be innovative and willing to take risks. They value opportunities for new things. They consider the FMU as too result oriented or achievement oriented. People are too competitive, too aggressive, too hard-driving, high demands and achievement oriented.

### Structure measured

Preliminary analysis of returns show that the degree of formalization of the Facilities Management Unit is, generally, high as is the degree of centralization. The level of integration is medium. The degree of complexity is low as it is a small unit consisting of only 10 people. This reflects that, as a public institution, the organization is accountable to the public. Policies and procedures are clearly defined and staff are constantly checked for their compliance with the rules and regulations.

Owing to the highly formalized structure of the organization, the level of integration of members is only medium. It is noted that senior staff members prefer using formal ways of communication such as memos and emails while the junior staff prefer communicating by phone and face-to-face. The differences reflect that the senior staff are more aware and taking more responsibilities for accountability. For junior staff or the front line, they may have to deal with situations where formal communication may be ineffective. As formal communication, such as memos and emails, are uni-directional at one time, to communicate by phone and face-to-face can obtain immediate response and clarify ambiguities and so, is considered more effective.

It is noted from the frequency and time spent on meetings, one of the formal ways of communication, that the senior staff tend to have more and longer meetings than the junior staff. This is considered as a supplement to the impersonal way of formal communication by memos and emails.

### Relationship between Culture and Structure

As illustrated above, the information-processing requirement of a hierarchy culture is relatively low. The information-processing capacity of the structure of FMU is also low as the degree of centralization and formalization are both high. The medium level of integration and low degree of complexity enhance the low information-processing capacity of the structure. However, there is a demand for an increase in adhocracy and reduction in market culture, as shown in the preferred culture profile in Figure 3.

This is believed to be related to the adhocracy nature of projects in FMU where multi-stakeholders, such as Ward Managers, Finance Managers of the institution, the external design consultants, Government, patients, visitors and the public at large, are involved.

## SUMMARY AND DISCUSSION

The information-processing requirements of both FMU and the institution's culture are satisfied by the information-processing capacities of the structure of FMU. According to the culture-structure model, it is favourable to the effectiveness of the organization. To test the hypothesis, further study on the effectiveness of FMU is required and will be conducted through a customer satisfaction survey.

The culture-structure model is theoretically applicable to all organizations. Application of the model on organizations can, not only reveal the deficiencies of the organization but also identify ways of improving its effectiveness.

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