INTERNATIONAL CONFERENCE ON MULTI-NATIONAL CONSTRUCTION PROJECTS
"Securing high Performance through Cultural awareness and Dispute Avoidance"
SHANGHAI, CHINA
November 21-23, 2008

APPLICATION OF INFORMATION PROCESSING THEORY ON THE INTER-RELATIONSHIP OF ORGANIZATIONAL CULTURE AND ORGANIZATIONAL STRUCTURE

Yvonne I. H. Li[1], Richard F. Fellows[2] and Anita M. M. Liu[3]

1. Yvonne I. H. Li, PhD Candidate, Department of Construction and Real Estate, University of Hong Kong, Pokfulam Road, Hong Kong. (yvonneli@hkusua.hku.hk)
2. Richard F. Fellows, Professor, Department of Construction and Real Estate, University of Hong Kong, Pokfulam Road, Hong Kong. (fellows@hkucc.hku.hk)
3. Anita M. M. Liu, Professor, Department of Civil and Building Engineering, Loughborough University, Leicestershire LE11 3TU, United Kingdom. (a.m.m.liu@lboro.ac.uk)

ABSTRACT

A conceptual model of the inter-relationship between organizational culture and organizational structure has been formulated. However, it is still unable to explain the direction of interaction of organizational culture and organizational structure in real day-to-day operation. This paper explains this relationship through the application of Information-Processing Theory. It has been established that, on one hand, organizational structure modifies organizational culture and, on the other hand, organizational culture determines organizational structure. Based on the Information-Processing Theory, it is hypothesized that a good fit between organizational structure and organizational culture, has a positive relationship with the effectiveness of the organization. This model is illustrated by an empirical study of the Facilities Management Unit (FMU) of a public health care institution. The information-processing requirements of organizational culture and information-processing capacities of organizational structure of FMU are measured through a questionnaire adopted from the Competing Values Model and a self-administered questionnaire respectively. Preliminary results show that the information-processing requirement of the FMU is high as the organizational culture is dominated by clan. However, the information-processing capacity of the FMU is low as the organizational structure is highly formalized and centralized while the level of integration is only medium. The organizational culture of the FMU is not fitted by its organizational structure.

Keywords: effectiveness, health care, information processing, organizational culture, structure.

1. INTRODUCTION

People, one of the key resources, play important roles in an organization. According to Van De Ven's (1976) application of System Theory (Von Bertalanffy, 1972), manpower (people), raw material, money, plant and equipment etc. – the resources input into the organization, are transformed into outputs as goods and services. Studies have shown that transformation process is determined by the structure of an organization (Hall, 1996; Lawrence and Lorsh,

1967; Mintzberg, 1980; Sathe, 1978; Van De Ven, 1976), which affects the effectiveness of the organization. Organizational structure is "the arrangement and specification of formal relationships, rules, formal rules, operating policies, work procedures and similar devices adopted by management to guide employee behaviour (including that of executives) in certain ways." Peterson and Garrison (1971:139) The major function of organizational structure is to facilitate "the collection of information from external areas as well as permitting effective processing of information within and between subunits which make up the organization." (Tushman and Nadler, 1978:615)

2. MEANING OF TERMS

The term "organization" means 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." Lawrence & Lorsh (1967: 3) Organizations have also been interpreted as information processing systems in coping with uncertainties. Information processing refers to the gathering, interpreting, and 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)

There are also studies supporting that effectiveness of an organization is closely related to its culture (Cameron and Quinn, 1999; Deal and Kennedy, 1982; Denison, 1990; Hofstede, 1980; Peters and Waterman, 1982; Schein, 1985) where 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 behaviors that both exemplify and reinforce those basic principles." Denison (1990:2) The underlying values, beliefs and principles exist deep in the minds of people. Therefore, where there are people, there is culture. People in a society form the societal culture. People in an organization form the organizational culture. Organizational culture is embedded in the societal culture.

3. INTERACTION OF ORGANIZATIONAL CULTURE AND ITS STRUCTURE

Studies have shown the interaction between organizational culture, organizational structure and its effectiveness respectively (Li and Liu, 2007:35-36). Based on studies of Van De Ven's (1976) application of System Theory (Von Bertalanffy, 1972) and Gidden's (1984) duality of structure in Structuration Theory, a refined conceptual model from Li and Liu (2007:35-36) is established on the interaction between organizational culture and organizational structure. The interaction is formulated by a People-Behaviour-Performance-Organizational Structure loop, Liu's (1996) application of Stimulus-Outcome-Response Theory (Naylor, Pritchard and Ilgen, 1980) and her Goals-Behaviour-Performance-Outcome Cycle. The conceptual model is shown in Figure 1.

This conceptual model is able to illustrate the existence of inter-relationship between organizational culture and organizational structure. However, it is still unable to explain the direction of interaction of organizational culture and organizational structure in real day-to-day operation. To explain this, Information Processing Theory is applied.

4. DIRECTIONAL RELATIONSHIP OF ORGANIZATIONAL CULTURE AND ITS STRUCTURE

4.1 Organizational Structure modifies Organizational Culture

The flow of work and information among employees in the organization signal the instrumental and maintenance processes within and between organizational components. (Van De Ven, 1976:65) The simplest way to guide the flow is through rules, programs and procedures – the organizational structure, as their function is to eliminate the need for further communication among the subunits (Galbraith, 1973:10). These 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 and, therefore, reduce the information flow. The flow of work and information is facilitated by organizational structures and also bound by it.

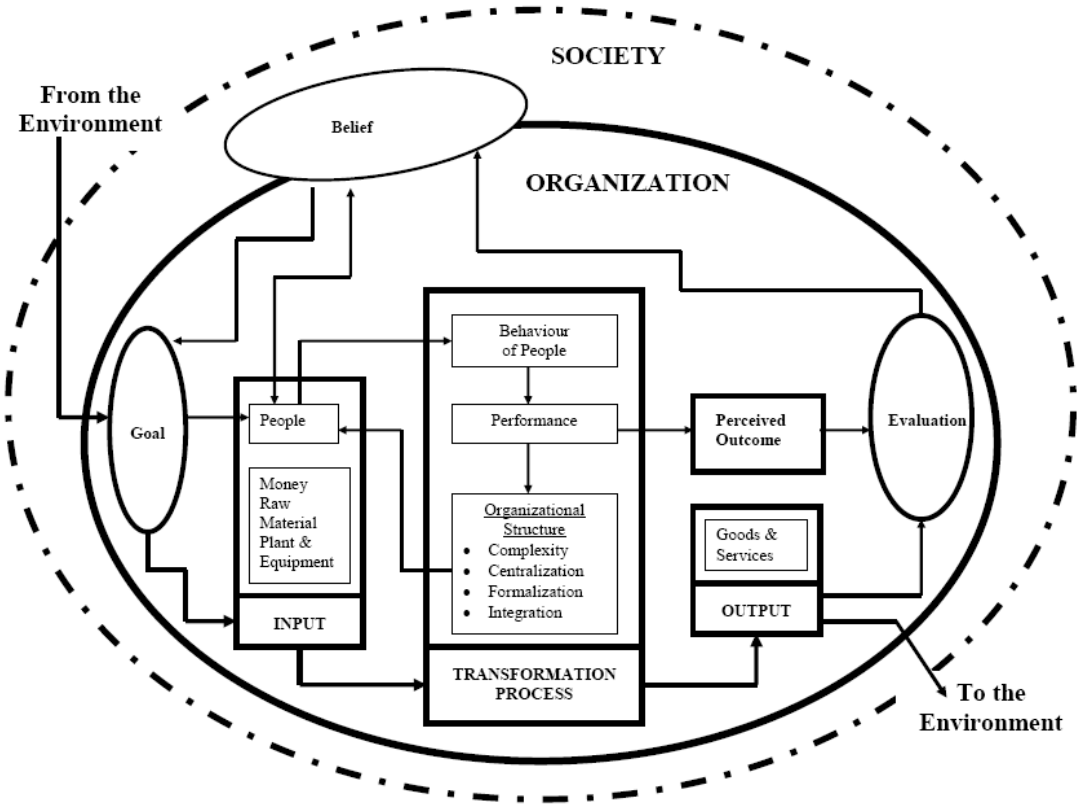

Figure 1: A conceptual model on the interaction of organizational culture and organizational structure (modified from Li and Liu, 2007)

Empirical evidence (Aguila 1967, Galbraith 1977) confirms that organizational structure influences the information flow in organizations as 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) Employees learn, through their day-to-day operation, to act within these rules, programs and procedures – the defined organizational structure. As this becomes a habit, their values, beliefs and principles of the organization are, thus, established as the (current) organizational culture. This signifies how organizational structure modifies the organizational culture.

4.2 Organizational Culture determines Organizational Structure

The system works well when the job-related environment is stable and can be anticipated in advance (Galbraith, 1973:10). However, when new situations arise, such as advancement in technologies and change in environment, uncertainties increase. When uncertainties increase to an extent that current values, beliefs and principles are no longer effective, according to Naylor Pritchard and Ilgen's (1980) Stimulus-Organism-Response paradigm,

based on an assumption that people's behaviour is rational (or at least non-random) for the most part, people will then choose to act in order to maximize the amount of positive outcome. Under these circumstances, the positive outcome will be to reduce uncertainties. To maximize this outcome, people intend to adjust their behaviour.

However, people's preferred ways of behaving is limited by the rules, programs and procedures in the hierarchical communication system of the organizational structure. There creates a gap between people's preferred way to behave – the preferred organizational culture, and the defined way of behaviour under the organizational structure – the current organizational culture. If the hierarchical communication system is not able to provide sufficient guidelines for responses to the increased uncertainties, the gap between the current organizational culture and the preferred organizational culture will enlarge. That is, if the information-processing capacity of the existing organizational structure is not high enough to accommodate the information-processing requirements, employees have to refer the uncertainties to upper levels of the hierarchy seeking for decision-making and direction. This increases the demand for flow of work and information from the upper level of the hierarchical communication system. The information-processing requirement is increased.

As the situation worsens, the hierarchy may become overloaded. This will result in delay in decisions and transmissions of responses downward. The organization will become less efficient. In fact, reduction in efficiency or productivity is a way of creating slack resources to allow the organizational structure to process more information (Galbraith, 1973). However, the less efficient organization will not be able to meet its pre-identified goals and the organization will become less effective.

To maintain effectiveness, the organization has to develop new strategies. The ultimate purpose of the new strategies is to "reduce the number of exceptional cases referred upward into the organization through hierarchical channels (Galbraith, 1973:15). According to Galbraith (1973:15), strategies will be taken to reduce the amount of information to be processed, that is the information-processing requirement of the organization, and/or to increase the information-processing capacities of the organizational structure to handle more information.

As illustrated by Galbraith (1973), to reduce the need for information processing, the possible strategies are:

1. creation of slack resources and
2. creation of self-contained tasks;

to increase the capacity to process information, the possible strategies are:

1. investment in a vertical information system and
2. creation of lateral relations

4.2.1 Creation of Slack Resources

According to Galbraith (1973:15), one way of reducing the need for information processing is simply reducing the required level of performance by consuming more resources. The additional resources are called slack resources. The reduced performance levels reduce the amount of information to be processed which will prevent overloading the hierarchical channels. However, this strategy does not improve the effectiveness of the organization and does not lead to a positive outcome.

4.2.2 Creation of Self-Contained Groups

Through creation of self-contained groups or decentralization, there will be a reduction of division of labour and the point of decision is moved closer to the source of information (Galbraith, 1973:26-27). As such, the need for flow of information, or the information-processing requirements, will be reduced. Therefore, with the increase in the degree of decentralization, the information-processing requirement of the organizational will decrease or

the information-processing capacity of the organizational structure will comparatively be increased.

4.2.3 Investment in Vertical Information System

The purpose of investment in a vertical information system is to reduce the frequency (or timing) of information flow, increase the scope of data base available, increase the degree of formalization of the flow of information and increase the capacity of the decision mechanism (Galbraith, 1973:31). Therefore, with the increase in the degree of formalization, the information-processing capacity of the organizational structure will increase.

4.2.4 Creation Lateral Relations

The creation of lateral relations is to reduce the number of decisions being referred upwards and, therefore, increase the information-processing capacities of the organization (Galbraith, 1973:46). This strategy is similar to the creation of self-contained groups that decisions are made at points where information originated, and discretion at lower levels of the organization is increased. The difference is that some of the lateral relations are through "informal organization" or cliques (Galbraith, 1973:47). As these informal structures exist in most organizations and many tasks are accomplished through these informal processes, instead of the formal structure, this strategy is to formalize and improve these informal structures by designing them into the formal organization (Galbraith, 1973:47). That is, to increase the level of integration of the organization. Therefore, with the increase in the level of integration, the information-processing capacity of the organizational structure will increase.

These new strategies will change the degree of decentralization, degree of formalization and the level of integration of the organizational structure. Therefore, increase in organizational culture gap leads to an increase in information-processing requirements and lead to changes in organizational structure. This explains the direction how organizational culture determines its structure.

4.3 Organizational Structure-Culture-Structure Loop

After the organizational structure has been changed by introducing new processes and increasing the discretion and delegated authorities to employees at lower levels, in order to increase the probability of the employees behaving in the 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 employee's learning capabilities, the behaviour of employees changes under the Behaviour-Performance-Outcome (B-P-OC) path (Liu 1996). This explains again the direction how organizational structure modifies its culture. An Organizational Structure – Organizational Culture – Organizational Structure loop has thus been formulated.

4.4 Contribution to Effectiveness

It has clearly been illustrated by Information Processing Theory of the directional relationship of organizational culture and organizational structure. It is still necessary to explain how it contributes to the effectiveness of the organization. This is further explained by theories of Galbraith (1973) and Egelhoff (1982).

According to Galbraith (1973), an organization has good structural fit when the information-processing capacity of its structure fits the information-processing requirements of its environment and technology. Egelhoff (1982:435) interprets that the relationship is good "fit" if the organization's structure is well suited to exploiting the resources of its environment. The relationship is not a good "fit" if organizations "fail to structure properly to implement their strategies, or to fit the environmental conditions implied by the strategies, [and so] find themselves at a relative disadvantage in exploiting their environments." (Egelhoff 1982:435)

Under the Organizational Structure – Organizational Culture – Organizational Structure loop, matching the organizational culture and its structures profiles of an organization is considered

as the same as fitting the information-processing requirements of organizational culture and information-processing capacities of organizational structure, and therefore, contributing to the effectiveness. As the gap between preferred and current organizational culture increases due to the increase in uncertainties, the demand for communication, that is flow of work and information, to deal with the gap, will increase. The information-processing requirement in the organization is, thus, increased. If the information-processing requirement derived from the gap is not matched by the information-processing capacities of the organizational structure, the organization is considered ineffective.

5. THE HYPOTHESIS

Therefore, it is clear that if the information-processing capacities are meeting the information-processing requirements of an organization in facing uncertainties from the environment, the organization is considered as effective. It is hypothesized that a good fit between organizational structure and culture profile of an organization has a positive relationship with the effectiveness of the organization.

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

6. INFORMATION-PROCESSING REQUIREMENTS OF ORGANIZATIONAL CULTURE

Different researchers consider organizational culture to consist of different elements (Cameron and Quinn, 1999; Cooke and Rousseau, 1988; Deal and Kennedy, 1982; Denison, 1990; Peters and Waterman, 1982). In order to measure cultural strength of organizations, it is necessary to identify a model which allows the measurement of the relative strength of the dimensions of organizational culture. Out of the many studies, the Competing Values Model from Cameron and Quinn (1999) is considered the best of the time, in terms of comprehensiveness and application. Furthermore, only the Competing Values Model is able to measure the relative intensities of current and the preferred organizational culture styles.

One way of detecting the information-processing requirement is to identify the gap between preferred and current organizational culture. As illustrated in section 4 above, the gap increases due to the increase in uncertainties, the demand for communication, that is flow of work and information, to deal with the gap, will therefore be increased. The information-processing requirement in the organization is, thus, increased.

Another way of detecting the information-processing requirement is to identify the degree of "culture incongruence". That is, the variation of organizational culture profile in various parts of the organization (Cameron and Quinn, 1999:64). The culture incongruence indicates that some aspects of the organization are not clear about and focused on the same values and sharing the same assumptions (ibid). It leads to differences in perspectives, goals and strategies within the organization and results in complaints of the ambiguity, lack of integration and absence of fit (ibid). The larger the culture incongruence, the larger is the complications, disconnects, (ibid), and therefore, the larger is the demand for clarifications and instructions and, the higher is the information-processing requirement of the organization and the more is the obstacles towards effectiveness (ibid).

According to Cameron and Quinn, there are four styles of organizational culture – hierarchy, adhocracy, market and clan. The questionnaire derived from the Competing Values Model from Cameron and Quinn (1999) is used to measure the relative intensities of the four styles of organizational cultures. The population is members of the Facilities Management Unit (FMU) of a public health care institution.

7. INFORMATION-PROCESSING CAPACITY OF ORGANIZATIONAL STRUCTURE

7.1 Constructs of organizational structure

There are many studies on the constructs of organizational structure (Hall, 1996; Lawrence and Lorsh, 1967; Mintzberg, 1980; Pugh et al., 1969; Sathe, 1978; Van De Ven, 1976) Based on the literature search, measurement tools are developed to measure the degree of complexity, formalization (or standardization), centralization and level of integration – the generic constructs of organizational structure.

7.1.1 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, from the organization chart, the number of occupational and professional specialties, the job titles within an organization and the number of levels from the Head of the FMU. The number of locations in which an organization has offices or plants is also counted. A summation of these numbers is used to represent the degree of complexity.

7.1.2 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 skills, knowledge, work processes and output are written. (Mintzberg, 1980; Sathe, 1978). That is, whether the team has the freedom to do 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), is adopted.

7.13 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. The original scale of Aiken and Hage's (1968) instrument has not been fully adopted since their scale is applicable only to survey the organization as a whole. As this study considers the FMU as the unit of "organization", their scale is not entirely suitable to this study. However, based on Aiken and Hage's scale, a self-administered questionnaire is developed to measure the level of centralization in this study.

7.1.4 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 for 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) study is adopted. Follow up interviews of selected samples are conducted to ensure the reliability and validity of the responses received.

8. ANALYSIS OF RELATIONSHIP AMONG VARIABLES

Scholars in the past decades (Cameron and Quinn, 1999; Deal and Kennedy, 1982; Denison, 1990; Hofstede, 1980; Peters and Waterman, 1982) studied and formulated various models

on the measurement of organizational culture. Out of the many models, the Competing Values Model from Cameron and Quinn (1999) is considered the most appropriate instrument on measurement of organizational culture in this research as it is able to measure the relative intensities of the context of organizational culture. According to Cameron and Quinn (1999), there are four contexts of organizational culture, namely hierarchy culture, market culture, adhocracy culture and clan culture.

8.1 Hierarchy Culture

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

8.2 Market Culture

Organizations with market culture are very results oriented (Cameron and Quinn, 1999). The glue that that holds the organization together emphasizes 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 hierarchy culture.

8.3 Adhocracy Culture

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

8.4 Clan Culture

The management style of organizations with clan culture is characterized by teamwork, consensus and participation (Cameron and Quinn, 1999). The success of an 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.

9. THE FACILITIES MANAGEMENT UNIT

All organizations work within boundaries. As indicated by Lawrence and Lorsh, (1967:4) “the boundaries of organizations will not always coincide with their legal boundaries”. Similar to Tushman and Nadler’s (1978:615) study, the basic unit of analysis in this study is the subunit (a department) of public health care institutions in Hong Kong – the Facilities Management Units (FMU). FMUs are responsible for the planning, organizing and liaising with the policy makers, users, and monitoring the performance of consultants and contractors for the implementation of construction projects within the compound of the institution.

10. DATA COLLECTION

The study is carried out in stages. In stage one, a pilot study has been conducted where a group of 8 people working in a public health care institution were invited to answer paper questionnaires on organizational culture and organizational structure. Returns on the pilot study were carefully reviewed and clarified with the respondents. The questionnaire on organizational structure has been further modified to cover comment from the pilot study. In stage two, invitations were sent to over 400 staff working in a public health care institution having an intranet email account for an online organizational culture survey. The third stage is to invite all the staff working in the FMU, altogether 10 people, of that institution to respond

to a paper questionnaire on organizational structure. The last stage is to further study the organizational structure of FMU through the organization chart. A summary of the population and samples drawn is shown in Table 1.

	Population	Sample	Return	%
Institution	6,319	400 (6.3% of population)	53	13.3
FMU A	10	10	10	100

Table 1: Summary of Population and sample drawn

All respondents were requested to answer a questionnaire developed by Cameron and Quinn (1999) indicating the current and preferred status of the organization. Staff working in the FMU were further requested to answer a self-administered questionnaire on organizational structure.

11. DATA ANALYSIS

11.1 Organizational Culture of the Institution

As shown in Figure 2, the current organizational culture profile of the public health care institution is dominated by hierarchy. The less dominating organizational culture types are market and clan. The weakest organizational culture is adhocracy. The preferred organizational culture profile shows a very different pattern where clan culture dominates and then followed by hierarchy and adhocracy. The weakest preferred organizational culture is market.

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

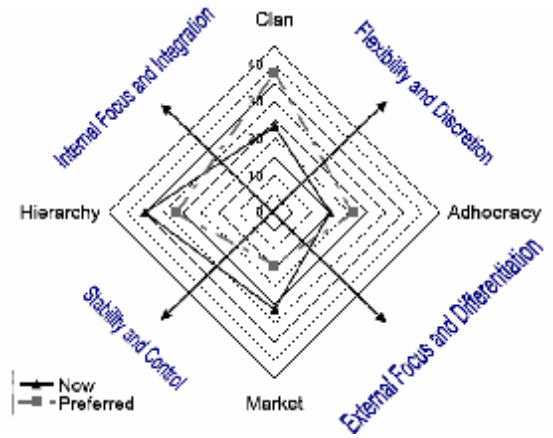

Figure 2: Organizational Culture Profile of the Institution

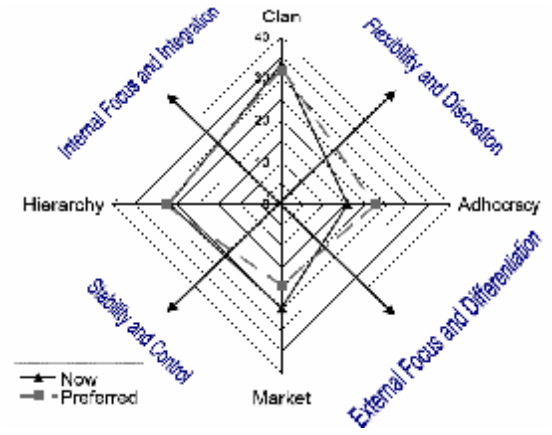

Figure 3: Organizational Culture Profile of the Facilities Management Unit

It is a dilemma of a public health care institution which is accountable to the society on one hand and a caring institution demanding teamwork in a dynamic environment on the other hand. 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 as shown in the preferred organizational culture profile.

11.2 Organizational Culture of Facilities Management Unit

As shown in Figure 3, unlike the general organizational culture profile of the institution, the current organizational culture profile of the Facilities Management Unit (FMU) is dominated by clan. The less dominating organizational cultures are hierarchy and market. The weakest organizational culture is adhocracy, which is similar to the organizational culture profile of the institution. The preferred dominating organizational cultures are clan and hierarchy, which are having almost the same relative intensities as the current organizational culture profile. The less dominating preferred organizational culture is adhocracy and the weakest preferred organizational culture is market.

It is worth noting that the relative intensities of the dominating organizational cultures, that is, clan and hierarchy culture, for both the current and preferred organizational culture profile of FMU are almost the same. It seems that employees of FMU agreed with and share the dominating clan and hierarchy culture of the organization.

11.3 Organizational Structure of Facilities Management Unit

Preliminary analysis of returns shows that the degree of formalization of FMU 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. A summary of the results is shown in Table 2. This reflects that, as a public institution, the organization is accountable to the public. Policies and procedures are clearly defined and staff is constantly checked for their compliance with the rules and regulations.

Context of Organizational Structure	Profile of FMU
Degree of Formalization	High
Degree of Centralization	High
Level of Integration	Medium
Level of Complexity	Low

Table 2: Summary of Organizational Structure Profile of the Facilities Management Unit (FMU)

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 take 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 memo 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 email.

12. SUMMARY AND DISCUSSION

12.1 Choice of FMU as the Unit of Study

Preliminary result of the study shows that the organizational culture profile of FMU differs from that of the institution. This supports the choice of FMU as the unit of study instead of the health care institution as a whole, since the organizational culture profile of the latter has been generalized by the various departments of the institution. Furthermore, as FMU is responsible for the planning, organizing, monitoring and implementing all alteration, addition and maintenance works within the compound of the institution, its nature of business is similar to a property management organization rather than a health care institution where it belongs. The tasks of FMU are basically construction projects which involve the close cooperation of working partners – the construction related professionals and contractors.

12.2 Information-Processing Requirement of the FMU

As shown in a summary of the organizational culture of the institution and FMU in Table 3, the current organizational culture profile of the institution is dominated by hierarchy. However, the preferred organizational culture profile of the institution is dominated by clan. Both the current and preferred organizational culture profiles of FMU are also dominated by clan.

The nature of works of FMU demands heavily on teamwork and is very customer oriented. It is both preferably and practically requiring staff's commitment and participation for the success of the Unit. Furthermore, majority of the staff are working in the same office, it is thus considered reasonable that both their current and preferred organizational culture is dominated by clan culture.

Organizational Culture Profile		The Institution	The FMU
Current	Dominated by	Hierarchy Culture	Clan Culture
	Weakest	Adhocracy Culture	Adhocracy Culture
Preferred	Dominated by	Clan Culture	Clan Culture
	Weakest	Market Culture	Market Culture

Table 3: Summary of Organizational Culture Profiles of the Institution and the Facilities Management Unit (FMU)

Organization dominated by clan culture is like an extended family. The leaders are acting as mentors and perhaps even parent figures (Cameron and Quinn, 1999:82). As the organization attaches great importance to cohesion, the information-processing requirement of the FMU is high.

12.3 Information-Processing Capacities of the FMU

The organizational structure of FMU is highly formalized and highly centralized. Their level of integration is medium and the level of complexity is low. As a department of the public health care institution, FMU has to be accountable to the public and subject to be audited on the expenditure. The FMU has to work in accordance with the established rules and procedures. This is particularly critical to the senior management. The organizational structure is therefore highly formalized and highly centralized. These are the typical characteristics of hierarchy organizational culture and the information-processing capacity is comparatively very low.

The relatively high intensity in clan culture emphasizing teamwork seems to contradict with the high intensity in hierarchy culture which emphasizes stability and control. However, clan culture is considered as a balance in organizations dominated with hierarchy culture. Owing

to the stringent control of formal procedures and high level of division of labour, in order to efficiently deliver the tasks, it is necessary to work closely as a team where informal contacts are supplementing the formal communications and thus the intensity of clan culture is also high.

Majority of FMU's clients are clinical professional of the institution. Facing with the two groups of stakeholders of totally different background and both are experts in their field, one of the major roles of FMU is to translate messages from the groups for delivery of messages between the two groups of professionals. Therefore, much time is spent on communication or integration. However, owing to the domination of hierarchy culture in the FMU, much of the communication is through the formal structure. The medium level of integration is considered matching the nature of business and organizational culture of FMU.

12.4 Fitting of Information-Processing Requirement and Information-Processing Capacity

The information-processing requirement of the FMU is high but the information-processing capacity is very low. The information-processing requirement of the FMU is not fitting the information-processing capacity.

13. CONCLUSION

As illustrated above, the information-processing requirement of the clan organizational culture is high. The information-processing capacity of the organizational structure of FMU is low as the degree of centralization and formalization are both high. The medium level of integration further even lower the information-processing capacity of the organizational structure.

Based on the preliminary analysis of the organizational culture profile of FMU and its organizational structure, the organizational culture profile of FMU is basically not matching its organizational structure. Both the current and preferred organizational culture profiles of FMU are dominated by clan while the level of integration of the organizational structure is only medium, the information-processing requirement is not fitted by the information-processing capacity of the organizational structure which may affect the effectiveness of the FMU.

To further assess the effectiveness of FMU, a customer satisfaction survey will be conducted. Similar study will continue to be conducted on the FMU of another public health care institution. The results of the two institutions will then be compared and so as their effectiveness.

The theoretical model is applicable to all organizations. In order to fully testing the model, further studies on the relationship among the sixteen variables, that is, combination of the four organizational culture styles defined by Cameron and Quinn (1999) and the four constructs of organizational structure, have to be carried out.

14. REFERENCES

Aguilar, Francis Joseph (1967) *Scanning the Business Environment*. New York: MacMillan.

Aiken, M. and Hage, J. (1966) Organizational Alienation: A Comparative Analysis. *American Sociological Review*, 31, 497-507.

Aiken, M. and Hage, J. (1968) Organizational Interdependence and Intra-Organizational Structure. *American Sociological Review*, Vol. 33, No. 6. (Dec., 1968), 912-930.

Akgün, Ali E., Byrne, John and Keskin, Halit (2007) Organizational intelligence: a structuration view. *Journal of Organizational Change Management*, Vol. 20 No. 3, 2007, 272-289.

Burns, T. and Stalker, G. M. (1961). *The management of innovation*. London: Tavistock.

Cameron, K. and Quinn, R. E. (1999) *Diagnosing and changing organizational culture: Based on the competing values framework*. Reading, Mass.: Addison-Wesley.

Cooke, R. A. and Rousseau, D. M. (1988) Behavioural norms and expectations - a quantitative approach to the assessment of organizational culture. *Group and Organizational Studies*, 13(3), 245-273.

Deal, T. and Kennedy, A. (1982) *Corporate cultures- the rites and rituals of corporate life*. Reading, Mass.: Addison-Wesley Pub. Co.

Denison, D. R. (1990) *Corporate culture and organizational effectiveness*. New York: John Wiley and Sons.

Dewar, Robert D., Whetten, David A. and Boje, David (1980) An Examination of the Reliability and Validity of the Aiken and Hage Scales of Centralization, Formalization, and Task Routineness. *Administrative Science Quarterly*, Vol. 25, No. 1. (Mar., 1980), 120-128.

Egelhoff, William G. (1982) Strategy and Structure in Multinational Corporations: An Information- Processing Approach. *Administrative Science Quarterly*, Vol. 27, No. 3. (Sep., 1982), 435-458.

Egelhoff, William G. (1991) Information-Processing Theory and the Multinational Enterprise. *Journal of International Business Studies*, Vol. 22, No. 3. (3rd Qtr, 1991), 341-368.

Galbraith, Jay R. (1973) *Designing complex organizations*. Reading, MA: Addison-Wesley.

Galbraith, Jay R. (1977) *Organization Design*. Reading, MA: Addison-Wesley.

Giddens, A. (1984) *The constitution of society: Outline of the theory of structuration*. Berkeley: University of California Press.

Hage, J. and Aiken, M. (1967) Relationship of centralization to other structural properties. *Administrative Science Quarterly*, Vol. 12, No. 1. (Jun.) 72-92

Hage, J. Aiken, M. and Marrett, C. B. (1971) Organization Structure and Communications. *American Sociological Review*, Vol. 36, No. 5. (Oct., 1971), 860-871.

Hall, R. H. (1996) *Organizations: Structures, processes, and outcomes* 6th ed. Englewood Cliffs, N.J.: Prentice Hall.

Hofstede, G. H. (1980). *Culture's consequences: International differences in worked-related values.* Beverly Hills, Calif.: Sage Publications.

Lawrence, P. R. and Lorsh, J. W. (1967) Differentiation and integration in complex organization. *Administrative Science Quarterly*, 12(1), 1-47.

Li, Y. I. H. and Liu, A. M. M. (2007) Impact of culture on organizational structure and effectiveness. *Collection of thesis for the Academic Forum for Management Science and Engineering*, Tianjin, October 2007, 33-42.

Liu, A. M. M. (1996) *A framework for the evaluation of project outcomes*. Ph.D. thesis (unpublished), Department of Surveying, Faculty of Architecture, University of Hong Kong.

Mintzberg, H. (1980) Structure in 5'S: A synthesis of the research on organization design. *Management Science*, 26(3), 322-341.

Naylor, J. C., Pritchard, R. D. and Ilgen, D. R. (1980) *A theory of behaviour in organizations*. New York: Academic Press, Inc.

Peterson, R. B. and Garrison, J. S. (1971) Culture as an interventing variable in the technology organization structure relationship. *Academy of Management Journal (pre-1986), 14*(000001), 139-142.

Peters, T. J. and Waterman, R. H. (1982) *In search of excellence: Lessons from America's best-run companies*. New York: Harper and Row.

Pugh, D. S., Hickson, D. J., Hinings, C. R. and Turner, C. (1968) Dimensions of organization structure. *Administrative Science Quarterly*, 13, 65-105.

Pugh, D. S., Hickson, D. J., Hinings, C. R. and Turner, C. (1969) The context of organization structures. *Administrative Science Quarterly*, 14(1), 91-114.

Ranson, S., Hinings, B. and Greenwood, R. (1980) The structuring of organizational structures. *Administrative Science Quarterly*, 25(1), 1-17.

Sathe, V. (1978) Institutional versus questionnaire measures of organizational structure. *Academy of Management Journal (pre-1986)*, 21(2), 227-238.

Schein, E. H. (1985). *Organisational culture and leadership*. San Francisco: Jossey-Bass Publishers.

Tushman, Michael L. and Nadler, David A. (1978) Information Processing as an Integrating Concept in Organizational Design. *The Academy of Management Review*, Vol. 3, No. 3. (Jul., 1978), 613-624.

Van de Ven, Andrew H. (1976) A framework for organization assessment. *The Academy of Management Review*, 1(1), 64-78.

Von Bertalanffy, Ludwig (1972) The History and Status of General Systems Theory. *The Academy of Management Journal*, Vol. 15, No. 4, General Systems Theory. (Dec., 1972), 407-426.