

# Virtual Organizations: the Business Design for the Twenty-First Century

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*Abstract-* The growing prominence of virtual organizations, such as Dell and Amazon.Com, has demonstrated the potential for virtual governance structures to achieve greater competitiveness than their more traditional counterparts. The designs of such organizations typically support three important characteristics: virtual customer interaction, virtual sourcing of complementary resources and assets from a network of alliance partners and suppliers, and the leveraging of virtual expertise for greater organizational effectiveness. The organizational adoption of a virtual organizational design has important economical and organizational implications for the firm. This study aims to investigate how economic (using transaction cost theory) and organizational factors (using institutional theory) could affect top management's attitudes towards adopting virtual organizational designs. A mailed questionnaire survey of potential adopters of virtual organizations will be conducted. Additional insights on economical and organizational factors of interest will be sought through semi-structured interviews with a representative sample of the respondents. Results from the study would provide researchers with a better understanding of how economical and organizational factors could affect management's decision to adopt new governance structures in general, and virtual organizations in particular. The findings could also point practitioners to the concerns of firms that intend to adopt virtual organizational designs, and suggest ways of addressing these concerns during implementation.

## I. INTRODUCTION

The information revolution and the opening up of the world economy have created great opportunities for traditional businesses to gain significant competitive advantages through the adoption of new organizational forms. The virtual organization is one such organizational form that is touted as the business model of the twenty-first century [23]. Henry Lucas [13] defines a virtual organization as one with minimal managerial hierarchy, a large span of control, flat organizational structures, and extensive geographically dispersed work enabled by advanced telecommunications, information and internet technologies. Advantages of virtual organizations include increased productivity, adaptability, flexibility, agility, and strategic competitiveness. To realize these benefits, organizations today are beginning to (re)design their governance structures (organizational designs) towards those of virtual firms ([13], [22], [21]). McGraw-Hill and Dell Computers, for example, have organization designs geared toward the dynamic and adaptive delivery of their

products and services that support their highly successful dynamic customization strategies [23].

Virtual organizations (VO) could be described by three interdependent characteristics: virtual customer interaction, virtual sourcing, and virtual expertise [23]. Virtual customer interaction refers to the ability of customers, whether individual or organizational, to interface (e.g. placing orders, requesting services, etc) with a virtual organization through the internet or other advanced communications and computing technologies. Virtual sourcing is the use of advanced technologies to facilitate business-to-business transactions, structured and managed by a dynamic portfolio of organizational relationships and alliances to gather and coordinate the required products for delivery to customers. Virtual expertise focuses on the use of advanced technologies for leveraging a wide range of expertise, both within and beyond organizational boundaries, as drivers for value creation and organizational effectiveness.

Despite its potential benefits and numerous successful cases like Dell Computers, IBM, Nike, Boeing, among others, VOs have not been as widely adopted as expected in Hong Kong. A study that investigates the possible reasons is particularly useful in Hong Kong for several reasons. First, companies could reap substantial benefits from operating cost savings such as storage space and office rentals, from increased competitiveness by swiftly responding to the demands of highly sophisticated customers, or from the greater access to a wide pool of expertise from Hong Kong, Macau and Mainland China, among others. Second, a large proportion of the companies in Hong Kong are SMEs involved in trade imports and exports between Mainland China and the rest of the world. They are the ones likely to benefit most from "virtualizing" their firms.

This study aims to investigate the impact of economical, intra-organizational, and extra-organizational factors on management's intention to adopt VOs. Potential significance of this study is to contribute to extant literature by a better understanding of how economical and organizational factors could affect the adoption of new governance structures. The study could also provide practical recommendations for practitioners to assess the

opportunity to assimilate such organizational designs, from both economical and organizational perspectives.

## II. LITERATURE REVIEW

This study seeks to understand the concerns of organizational decision makers towards virtual organizations more comprehensively from an economical perspective using transaction cost theory, and an organizational perspective using institutional theory.

Transaction cost theory is an economic approach to the study of modern organizations ([25], [26]). The primary focus of the theory is on achieving organizational efficiency by evaluating alternative governance structures with respect to their abilities to economize on the costs of transactions, rather than commodities. A transaction is said to occur when a good or service is transferred across a technologically separable interface. Transaction costs is minimized when a transfer occurs smoothly without needless loss or wastage, using the minimum of relevant resources. Thus, the transaction cost approach entails a comparison of the costs of planning, adapting, and monitoring task completion under alternative organization designs or governance structures. To perform such comparisons, three major dimensions of transactions need to be described: asset specificity, uncertainty, and frequency of occurrence.

Asset specificity is the extent to which large fixed investments are specialized to particular transactions. Unspecialized goods or services would pose no problems since such assets are easily available on the market [25]. There are three types of asset specificity: site specificity, physical asset specificity, and human asset specificity. Asset specificity is important to the study of transaction costs because once an investment has been made, the buyer and seller would be operating in a bilateral exchange relation for a substantial period of time; both buyers and sellers would be “locked into” the transaction. Thus, the higher the asset specificity, the higher the transaction cost.

Uncertainty and complexity in transactions arise mainly from environmental and behavioral disturbances. Highly uncertain transactions increases the need for more measures to write and enforce complete contracts between the transactional parties, and to monitor and measure the performance of tasks. Uncertainty also necessitates changes to resource allocations, schedules, and priorities during task execution. It increases the need for greater flexibility and speed in coordination and control, which would permit the organization to more effectively detect and respond to unforeseen problems and opportunities [29]. Thus, effective management of uncertainty requires a greater amount of information processing, which leads to higher transaction costs. Frequency of transactions has

implications for transaction costs, which could be lowered when governance structures specific to a particular situation are designed to facilitate frequent interactions between transacting parties. Under conditions of low frequency transactions, a general governance structure would be more appropriate.

Despite its popularity in the study of organizational design adoption, transaction cost theory focuses mainly on the economic aspects of organizations, and ignores important organizational aspects [7], such as the influence of institutional forces [20]. Whereas the emphasis of transaction cost theory is on economic efficiency, the focus of institutional theory is on legitimation of new organizational structures, regardless of any efficiency concerns ([20], [19]). Institutional theory ([5], [24]) argues that legitimation is achieved with isomorphism, the extent to which governance structures within organizational fields tend toward greater homogeneity over time. Legitimation is also attained when organizations adopt the idea that is widely perceived to be supported, endorsed, and encouraged by key institutions, such as government bodies, professional bodies, industry, or the business community.

Besides institutional forces, other organizational issues not addressed by transaction cost theory that could have significant impact on organizational design adoption are risk attitudes and trust [1], and the need for achieving strategic advantage through organizational innovation and adaptation [7]. MacCrimmon and Wehrung [14] and Yates and Stone [28] defined risk as the possibility of loss. People can have different preferences for it: risk-neutral, risk-averse, and risk-seeking. Risk is a separate concept from uncertainty. Whereas uncertainty is due to insufficient information, risk arises from differences in decision makers' confidence when assigning probabilities to decision alternatives [1]. Chiles and MacMackin [1] argued that transaction cost theory has so far adopted a simplifying behavioral assumption of risk neutrality among decision makers. Since the governance structure predicted by transaction cost theory tends to vary with the risk preference of management [1], it would be more appropriate to account for the whole spectrum of risk behavior exhibited by decision makers ranging from risk aversion through risk neutrality to risk seeking [15]. Chiles and McMackin [1] also argued for the study of trust with transaction cost theory, because trust is important and is extensively relied upon in business transactions despite the threat of risk ([27]: p.108). Trust has been defined as “increasing one's vulnerability to the risk of opportunistic behavior” [30].

In their critique of transaction cost theory, Ghoshal and Moran [7] argued that long-term organizational efficiency and strategic advantage gained from the

purposeful pursuit of innovative activities should also be considered in the selection of governance structures. Simply being efficient would not enable an organization to survive for long [18]. Instead, organizations need to innovate to be successful over time [18], even if they were to suffer inefficiencies in the execution of transactions in the short term [7]. Organizations need to have a sense of purpose to provide them with the ability to adapt and innovate, and the flexibility to select the appropriate governance structure to achieve long-term efficiency.

### III. RESEARCH MODEL

Transaction cost theory is relevant to the study of virtual organizations (VO) because it permits the assessment of whether organizations could achieve better performance with the adoption of VOs. However, the literature review also revealed that examining the adoption of governance structures from a solely economic

perspective is inadequate. When studying organizations, scholars have argued for the inclusion of institutional theory [20] and other organizational factors such as risk and trust attitudes of organizational executives [1] and purposive innovation behaviors [7] to complement transaction cost theory. Distilling from these works, a research model (Figure 1) is proposed in this research that accounts for the adoption of VOs from both economical and organizational perspectives. The economic consideration is reflected in the inclusion of transaction cost theory. The organizational considerations could be studied from two levels: an extra-organizational level and an intra-organizational level. The extra-organizational level is examined using institutional theory, specifically from the institutional isomorphism and institutional promotion aspects ([5], [11], [7]). The intra-organizational level will be investigated through factors such organizational decision makers' attitudes towards trust, risk, and purposive innovation.

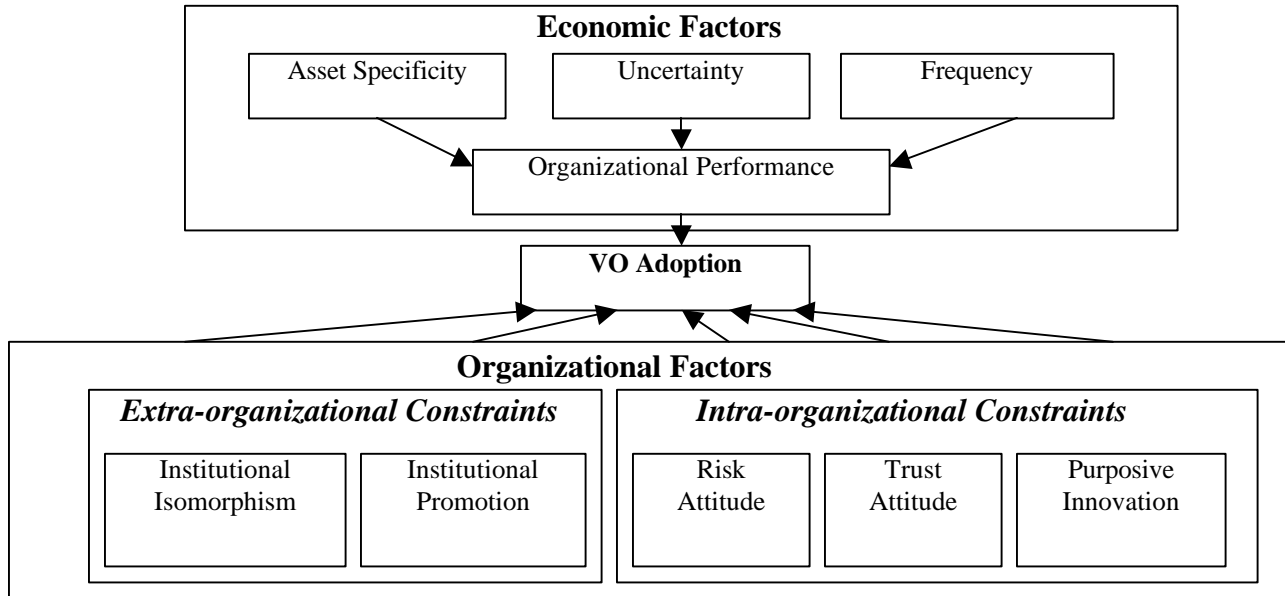


Fig. 1 The Research Model

#### A. Economic Factors and VO Adoption

The research model proposes that economical concerns about asset specificity, uncertainty and frequency of transactions could affect perceived organizational efficiency and performance, which could in turn influence decision makers' predisposition to adopt VOs. For asset specificity, a reduction in site, physical asset, and human asset specificities could enhance organizational efficiency. For instance, a reduction in site specificity could lower operating costs as a result of savings in storage and office space, rentals, site maintenance, etc, when sales could be carried out in a virtual environment rather than physical storefronts, when inventory storage space could be reduced

through just-in-time (JIT) sourcing of materials and products, outsourcing, or the acquisition of complementary resources through inter-company alliances, and when employees need not work in the traditional office. Physical asset specificity could be reduced when organizations could economically justify the costs of new technology investments for virtual work against the costs of maintaining current systems. A reduction in human asset specificity could enhance organizational performance because virtual organizations could have greater accessibility to better quality knowledge workers who are otherwise not willing or unable to work, professionals with particular specializations who work on a contract basis, suitably-qualified professionals from places where wages

are more competitive, among others. Further, virtual organizations' emphasis on capturing and leveraging on intellectual expertise and knowledge through the use of advanced technologies could also increase their organizational performance ([23], [10]). For example, Xerox and BP have utilized advanced database and satellite video conferencing technologies respectively to disseminate critical expertise to locations requiring time-sensitive responses, thereby greatly increasing their organizational effectiveness.

The effective management of uncertainty and complexity necessitates a greater amount of information processing by organizations. VO, through its use of decentralized structures, could increase the information processing capacity of an organization through "promoting the processing of information among those who are closest to the work being performed" ([17]: p.110). Thus, VOs could help to reduce uncertainty and thus should have a positive impact on organizational performance.

Depending on the necessity, a VO specially designed to facilitate the handling of transactions of high frequencies is likely to lead to greater organizational efficiency than the original organization design. When decision makers perceive higher organizational performance with a VO that can effectively process current and future transactional frequencies, they would be more likely to adopt the VO.

#### *B. Organizational Factors and VO Adoption*

Extra-organizational factors in the form of institutional forces ([5], [11], [7]) such as isomorphism and institutional promotion could influence the adoption of VOs. Isomorphism ([5], [20]) could be studied from the extent to which the organization's competitors have adopted VOs, and the extent to which these competitors have achieved success by adopting VOs. When firms perceive that their competitors became more successful from adopting VOs, they are also more likely to follow suit. Likewise, when firms perceive that institutions of significance are promoting VOs through their support, endorsements and encouragement, they are more likely to adopt VOs so as to gain greater legitimacy. For instance, besides the economic benefits, organizations may want to adopt VWEs so as to project itself as a socially responsible firm that is concerned about environmental pollution and is willing to provide employment opportunities for the physically disadvantaged. The gaining of societal and governmental approval for its decision could bring significant benefits, economic or otherwise, for the firm in the long term. The Provisional Hong Kong Science Park could be an example of an institution that encourages the trend towards virtual organizing. It promotes the formation of virtual corporations based on the concept of cluster

alliances of complementary organizations having specific goals. For instance, one cluster of organizations from the consumer electronics, personal computers, communications, power systems, and display management industries, among numerous others, has been formed in the Science Park for the research and development of highly portable systems.

Intra-organizational factors that could affect the adoption of VOs include risk attitudes, trust, and the pursuit of purposive innovation. Adoption of VOs requires investments in advanced information and communications technologies, and necessitates the restructuring of administrative arrangements resulting in changes to work styles, reward systems, and control and coordination systems. Insofar as a lower than expected return on investment could result from the new technologies, these changes could pose a certain amount of risk to organizations. Organizations having highly interdependent relationships with their alliance partners and resource suppliers could also expose themselves to significant risk from opportunistic behavior by these entities ([8], [12], [4]). Thus, it is likely that risk-seeking decision makers tend to have a better perception of VO adoption than less risk-seeking ones.

Related to the concept of risk is trust. Opportunistic behavior by partners and suppliers could arise from gaps in the negotiated contracts detailing their expected exchange relationships. Opportunistic behavior by workers could arise as a result of the difficulty of supervision and performance evaluation when VOs are adopted. Trust between organizational partners, and between management and workers, however, could reduce the extent of opportunistic behavior. Thus, greater trust between parties involved in both sets of relationships should be associated with greater tendency to adopt VOs.

To succeed in the long term, organizations need to engage in purposive innovation, even in the absence of short-term benefits [7]. Since the adoption of VO necessitates a new governance structure, it would constitute an innovation. Thus, if management perceives the adoption of VO as being useful for long-term organizational success, positive attitudes of these executives towards purposive innovation should be positively related to VO adoption.

#### *C. Economical and Organizational Factors*

Besides its impact on organizational performance, uncertainty in the environment could also affect the organizational pursuit of purposive innovations. Damanpour [3] observed that organizations of all types adopt innovations in response to environmental changes. Thus, it is likely that organizations operating under

situations of high uncertainty will tend to engage in more innovative activities.

#### IV. RESEARCH METHODOLOGY

A mailed survey is the data collection method. The mailed survey will be further supplemented with semi-structured interviews on a sample of representative respondents to provide additional insights into the more subtle and dynamic aspects of the research model, such as trust between organizational partners, changing attitudes of organizational members towards technological innovations, among others. To develop measures of the constructs in the survey questionnaire having desirable reliability and validity properties, a series of steps adapted from Churchill [2] and Moore and Benbasat [16] will be executed.

With the development of the validated questionnaire, a mailed field survey will be conducted. The survey is targeted at the Chief Executive Officers (CEOs) of firms that are potential adopters of VOs. The survey will be mailed to CEOs of about 2000 organizations randomly selected from the trade organization directory of the Hong Kong Industrial Technology Centre Corporation (HKITCC). A definition and description of VOs will be included in the initial portion of the questionnaire to ensure that all respondents have a consistent concept of what is involved in virtual organizations, and to minimize confusion. Besides the questionnaire, a cover letter stating the purpose of the study, and a self-addressed return envelope with postage will be sent in a parcel to each potential respondent. A hot line will be available to respondents to clarify any doubts. Follow-up calls will be made to those who do not respond after two weeks. Another round of calls will be made two weeks later to help increase the response rate. Attempts will be made to recover missing information from respondents by placing follow-up calls. Responses with too much missing information will be removed from the data analyses.

The data analyses will be carried out using structural equation modeling, a powerful second generation multivariate analysis technique that permits the estimation of multiple and interrelated dependence relationships, has the ability to represent unobserved concepts in these relationships, and account for measurement errors in the estimation process [9]. It is an important tool for studying causal models [6]. Structural equation modeling consists of two models: the structural model and the measurement model. The structural model is a set of dependence relationships linking the model constructs. The measurement model specifies the indicators for each construct, and assesses the reliability of each construct in estimating the dependence relationships. Assessing the measurement model involves examining the internal

consistency reliability, the convergent validity, and discriminant validity of the research instrument. The structural model is examined by assessing the explanatory power of the independent constructs, and the size and significance of the path coefficients. In addition, a number of control variables used in past studies on innovation adoption will be examined to see if they have a significant effect on the intention to adopt VOs, such as organization size, preexisting related knowledge of VOs, and sophistication of IT infrastructure.

#### V. CONCLUSION

The globalization of organizations brought about by the opening up of the world economy and facilitated by the advent of advanced telecommunications, information and internet technologies has seen the growing emergence of virtual organizations. Investigating the adoption of virtual organizations from both economical and organizational perspectives provide an important step towards a better understanding of the business model of the twenty-first century.

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