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The Contribution of ICTs in the Metamorphosis of Organisational Forms: A Structural Approach

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Abstract

Despite a number of studies, there is no consensus on how new organisational forms (NOFs) emerge. This paper is intended to address this gap. The aim is to develop a theoretical understanding that identifies the ICT-related variables which might influence an organisation's transformation into a new form. Data were gathered from 212 top level managers of large Australian organisations and analysed using Structural Equation Modelling technique. The findings indicate that the evolution of attributes of NOFs is influenced by several factors, including management Support, IT support for innovativeness and proactiveness. The paper contributes towards a better understanding of the potentials of ICTs in NOFs. Researchers can use the model and instrument in future research endeavours. Managers can chart the transformation of their organisations using the common variables identified in this paper and benchmark their organisations against both historical data and industry best practices.

Keywords

ICT, new organisational forms, business strategy, IT strategy, SEM

Introduction

Organisational form refers to the combination of strategy, structure, internal control, and coordination systems that provides an organisation with its operating logic, resource allocation rules, and corporate governance mechanism (Creed & Miles 1996). Since the evolution of conventional organisational forms such as hierarchical and bureaucratic, they have been continuously transforming into newer forms. New organisational forms (NOFs) have acquired a variety of labels including network organisation (Ghoshal & Bartlett 1990), virtual organisation (Davidow & Malone 1992), and post-bureaucratic (Heckscher 1994). Previous research has therefore focused on identifying the contexts, processes and variables that are associated with the emergence of these organisational forms. In terms of context, Beugre, et al. (2006) believes that the volatility of the external environment influences how organisations restructure themselves to cope with changes or to anticipate them. More recently, contingency approach (soft determinism) proposes that a set of factors have determined new forms of organisations. Globalization, deregulation, convergence of industries and rapid technological advancements, particularly in Information Technology (IT) and telecommunication are the contexts through which NOFs are emerging (Fulk & Desanctis 1999). In terms of process, the progression toward new organisational forms has been gradual in most firms, dramatic in some, and non existent in others. A number of variables have also been associated both with the shape of and the underlying process that have resulted in NOFs.

This paper falls in the tradition of the research that has been looking into the variables that contribute to NOFs. Since the publication of the seminal article 'Management in the 1980s' (Leavitt & Whisler 1958), the relationship between Information and Communications Technology (ICT) and organisations has been one of the most challenging issues for management scholars and researchers. What makes the ICT- organisation relationship so thought-provoking is that not only does it touch the complex combinations of knowledge and the ICT synergies, but also its implications on a range of variables including cost, quality, accuracy, risk, efficiency and productivity (Sauer & Willcocks 2004). Most, if not all (for example see: Winter & Taylor 1999), of the previous research argued for a positive link between changes in ICTs and changes in some individual dimensions of the organisation.

Despite a long tradition of research that has been looking into the relationship between ICTs and organisations, the findings remain inconclusive. In addition, there is limited research that has looked into the shape and form of the organisation that has been formed as a result of many years of ICTs assimilation. Further, although the impact of ICT at a very generic level is known, there is much less research that relates the specific attributes of ICTs (upstream factors) to attributes of NOFs (downstream factors). This paper contributes towards addressing the above gap in research. The purposes of the study are (1) to identify the features of new organisational forms

(2) to develop an underlying model that relates these features to attributes of ICT and (3) to develop and test an instrument that aids in operationalising the model and (4) to discuss the theoretical and practical utility of the model and instrument.

Theoretical Background and Model

Previous research on the effects of ICTs on the various dimensions of an organisation has covered a number of variables. While some focus on the effect of ICTs on the organisation size, scope and product, others specifically look at the effect of ICTs on vertical and horizontal control mechanisms. Following the advent of the Internet, the effect of ICTs on the quality of an organisation's connection has received some research attention.

Reviewing the literature indicates that most of the previous research treats IT as a major determining force in influencing the different dimensions of organisations and the resulting forms (Child & Mcgrath 2001; Fulk & Desanctis 1999). Contemporary research however argues that in addition to the accumulation of IT assets and the maturity of organisational IT capabilities, the overall alignment of IT with the business strategy and the quality of managerial support and commitment to IT are equally important. Successful IT strategic alignment means developing and sustaining a mutually relationship between IT strategy and business strategy - a relationship that benefits both parties. Particularly, the strategic fit and functional integration of an organisation's business and IT strategies and functions determine its ability to deploy IT effectively and the effect IT might in turn have on the organisational form. This implies that changes in organisational form might be associated with the nature of the business strategy an organisation pursues, and the corresponding IT strategy to support the business goal (Chan, Sabherwal & Thatcher (2006); Kearns, Grover & Sabherwal (2006). Strong managerial support and commitment to IT are essential to organisations if they desire to maintain a coherent and business-aligned IT (NOIE 2005; Tallon, Kraemer & Gurbaxani 2000). As ICT needs a huge amount of organizational capital there has always been a concern about the effectiveness of ICT investment. Successful ICT investment can not be achieved without commitment to change in organization. Since top management has a broader view over different internal and external organizational issues, their role in taking most advantages of ICT capabilities is irrefutable. In their process-oriented model, Tallon et al. (2000) incorporated management practices as the key determinant of IT capabilities.

This paper therefore examines the effects of five factors, business strategy (BS), IT strategy (ITS), ICT capabilities (ICTC), and management support (MS) on the metamorphosis of NOF. Figure 1 presents the initial theoretical model and the main hypotheses (H1 to H4) followed by a brief description of each of the main constructs.

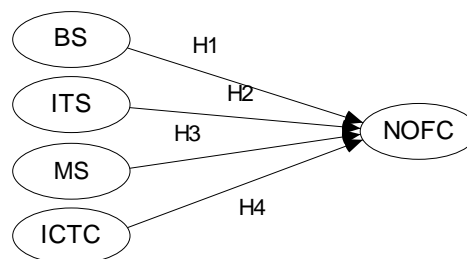


Figure 1: Initial Research Model

New Organisational Forms (NOFs)

The dependent variable in this research is NOF which refers to the combination of strategy, structure, internal control, and coordination systems that provides an organisation with its operating logic, resource allocation rules, and corporate governance mechanisms. Therefore various dimensions of organisational structure including openness, degree of centralization, formalization, and specialization were used to conceptualize the NOF construct. (Dewett & Jones 2001)

Organisations have moved toward new organisational forms by restructuring and reengineering programs designed to reduce overhead, delay, divest underperforming businesses and redesign core business processes.

In such forms coordination is accomplished by individuals and teams with cross-functional, computer-mediated jobs. Decentralization is commonly described in the literature on NOFs using such labels as "empowerment" (Fulk & Desanctis 1999; Malone 1997). Miles & Snow (1995, p13) claim that the new 'spherical' organisational form is based on "leadership as a shared responsibility among colleagues, not as superior-subordinate relationship." ICTs are seen to provide organisational employees with global data that will permit them to make local decisions consistent with overall organisational goals (Fulk & Desanctis 1999).

Strategy

The relationship between strategy and organisational dimensions has received a great deal of attention in the organisational literature. The notion that strategy is hierarchically related to structure is widespread (Harris 2000; Mintzberg 1990). Mintzberg (1990) argued for what he called the design school of strategic management promoting the notion that strategy begets structure. Henderson & Venkatraman (1999) regard strategic alignment as being supported by two basic assumptions; firstly that there exists a direct relationship between an organisation's strategy (both business and IT) and the organisations' administrative structure; and secondly, that this relationship is inherently dynamic. The Strategic Alignment Model (Henderson & Venkatraman 1999) provides a clear and concise structure to evaluate the strategic fit and functional integration of an organisation's business and IT strategies on its structure. Thus we argue that there is an underlying relationship between the strategy (whether business or IT strategy) an organisation pursues and resulting structure.

Venkatraman's (1989) identified six different but interrelated typologies of a business strategy based on the "resource deployment patterns" that organisations employ to achieve their objectives. These are *aggressiveness, analysis, defensiveness, futurity, riskiness, and proactiveness*. In aggressive posture, organisations compete with close rivals for the pursuit of market share. Analysis posture reflects the formal, analytical decision-making processes and the organizing mechanisms adopted by a particular organisation. Defensiveness reflects the entire spectrum of a business unit's domain of operations that must be defended to realize competitive edge in the marketplace. In futurity posture focuses on the extent to which long-term considerations are reflected in the key actions of an organisation. Dimension of innovativeness captures innovativeness underlying business unit operations on some of the major spheres. Proactiveness is a reflection of the pre-emptive postures of organisation in actions such as capacity expansions, new product introduction, acquisition of businesses.

Many studies focus on the role of innovation processes, in organisation evolution (Lewin, Long & Carroll 1999; Van de Ven, Angle & Poole 1989). Schumpeter's theory (1950) posits that new organisational forms result from innovative processes that lead to "creative destruction of industries". Therefore for the purpose of this paper we chose two dimensions: proactiveness and innovativeness as they have been among the important factors influencing the evolution of NOFs.

The above discussion can lead us to the following hypothesis

Hypothesis 1(H1): The type of business strategy an organisation pursues has a direct and positive influence on the resulting organisational form.

Corresponding to each of the business strategy typologies, Chans (1997) identified five typologies of IT strategy. These IT strategy typologies focus on the capabilities provided by IT to support different business strategies. The same as business strategy we focused on two dimensions as follows:

- IT Proactiveness refers to IT deployments used by the business unit to expedite the introduction of product/service.
- IT Innovativeness refers to IT deployments used by the business unit to facilitate creativity and exploration.

Hypothesis 2 (H2): The type of IT strategy that an organisation pursues in support of its business strategy has a direct and positive influence on the resulting organisational form.

ICT Capabilities

ICT capabilities (ICTC) refers to ICT capabilities and functionalities which can influence the organisational dimensions including the amount of investment in ICT, the variety in ICT usage, and the sourcing structure for ICT. Traditionally organisational forms have been mainly designed for coordination and control purposes in the presence of time and distance barriers. According to Dutton (1999) technological innovations have led to changes in organisational forms offering new capabilities for overcoming such constraints. For example, telephone, telegraph, and mail systems have enabled organisations to have better organisational and inter-organisational communication systems. Also, new ICTs have provided modern capabilities influencing organisational processes (Huber 1990). Although several factors are thought to contribute to the evolution of NOFs, a major force lies in the capabilities provided by ICTs. Over recent years, several different arguments have been offered to highlight the potential of ICTs to enable and shape organisational form (Rajan & Wulf 2006). The combination of hardware, applications, infrastructure forms the capabilities of ICTs. As each of these dimensions develops, the concept, design and capabilities of ICTs would dramatically change. ICT resources cover a wide range of services such as e-mail, voice mail, teleconferencing, videoconferences, desktop, video- conferencing, computer aided design (CAD), discussion lists, information databases, groupware, intranet, e-procurement, e-logistics, e-government. A number of researches have focused on the impact of these

capabilities on organisational dimensions in general and on dimensions of NOFs in particular. For instance Marschak (2004) believes that these capabilities have overcome the traditional communication difficulties and affected the role of middle managers and organisational hierarchy. In another study Panayides (2004) pointed out how advanced ICT capabilities could decrease the size of organisation. Therefore, what is clearly deduced from this perspective is the influencing power of ICT infrastructures and capabilities on organisational dimensions.

Hypothesis 3 (H3): The evolution of the attributes of NOFs is positively related to capabilities provided by ICT.

Management Support

Management Support (MS) refers to the extent of management support for ICT promotion in organisations. Brynjolfsson and Hitt (2000) emphasized on the importance of management on the success of ICT investments. They believed that any relationship between ICTs and organisational change is due to the temperament of management rather than their economic capabilities. As ICT needs a huge amount of organisational capital there has always been a concern about the effectiveness of ICT investment. Successful ICT investment can not be achieved without commitment to change in general and IT project in particular. Since top management has a broader view over different internal and external organisational issues, their role in taking most advantages of ICT capabilities is irrefutable. In their process-oriented model, Tallon et al. (2000) incorporated management practices as the key determinant of IT capabilities. They showed how top executives with more focused goals for IT could bring more IT capabilities into action. Top management make a variety of organisation decision including planning, design, resource allocation, and implementation activities (Thong, Yap & Raman 1996). This in turn would somehow affect ICT structure and capabilities. In another study, Luftman (1998) identified senior executive support for IT as one of the key factors in a successful IT investment. Management support was operationalized based on Luftman (1998), Tallon, et al (2000) , by assessing top management attitudes regarding ICTs capabilities and the extend top management support technological innovation.

Hypothesis 4 (H4): The evolution of attributes of NOFs is positively related to the support top management provides to ICT.

Research Methods

This study is deductive in nature which is followed by gathering data and using some descriptive statistics to conceptualize the research theoretical model being proposed. The main research objective is to develop a theoretical model explaining how and to what extent ICT can contribute the evolution of new organisational forms. The survey strategy was employed because it enables researchers to work with a large amount of data in a highly economical way.

Instrument Development

The research works with five basic constructs- NOF, Business Strategy, IT Strategy, IT Capabilities and Management Support. To operationalise business strategy (innovativeness and proactiveness) we used Venkatraman's (1989) instrument. Venkatraman's instrument contains a total of seven items for the proactiveness, and innovativeness. IT strategy is operationalised using Chan, et al's (1997) instrument, Chan's instrument operates in parallel to Venkatraman's instrument i.e. for each individual variable, there is a parallel variable in Chan's instrument. For instance *proactiveness* is one of the dimensions used to measure business strategy. Its parallel variable would be: *IT supports for proactiveness*. Table 1 presents the reliability of these two constructs in the mentioned instruments.

Table 1: The Reliability of Business and IT constructs

(Venkatraman 1989)			(Chan et al. 1997)		
Dimension	No of items	Internal Consistency (Cronbach Alpha)	Dimension	No of items	Internal Consistency
Innovativeness	2	0.61	IS support for Innovativeness	3	0.82
Proactiveness	5	0.64	IS support for Proactiveness	4	0.87

Three items for ICT dynamics from NOIE (2005) and five items from NOIE (2005) and Thong, Yap & Raman (1996) were taken from the previous studies.

Data Collection

The research is aimed at a broad sample of private and public sector organisations in Australia from seven selected industry groups of the Australian and New Zealand Standard Industrial Classification (ANZSIC). The

sectors covered are government administration and defence, manufacturing, electricity, gas and water supply, construction, communication services, finance and insurance, health and community services. These groups have obtained the highest mean overall business value from ICT among 17 groups in the ANZSIC classification (NOIE 2005). All Chief Executive Officers (CEOs) were contacted and asked to complete a web-based questionnaire on the basis of a five point Likert scale. The use of email and websites allowed us to reach a broad audience (Apigian, Ragu-Nathan & Ragu-Nathan 2006). Hence an online questionnaire was located on a web server, and a web link to this server was provided in invitation emails. We utilized all 2480 email addresses rented from the Impact List Company. Of the 2480 emails sent to top Australian managers, 212 were completed and returned, and 380 were returned as incorrect or otherwise invalid and undeliverable addresses. Hence the overall response rate for this study was 10.1 %. While a higher response rate is desirable in any research endeavour, this response rate is reasonable, given the comprehensiveness and length of the instrument. Table 2 contains a summary of research data.

Table 2: Summary of data collected

	Frequency	Percentage %		Frequency	Percentage %
Job Title					
Chief Executive Officer	110	%52.7	Annual revenue		
Chief Information Officer	48	%23	Less than 10 Million (Aus\$)	6	%2.8
Other	51	%24.4	Between 10 M and 100 M	78	%37.0
Total	209		Between 100 M and 500 M	61	%28.9
Type of Industry			More than 500 M	55	%26.1
Communications services	22	%10.4	Not Known	11	%5.2
Electricity, Gas, and Water Supply	6	%2.8	Total	211	100.0 %
Construction	23	%10.9			
Government			Number of Employees		
Administration	27	%12.8	Less than 999	124	5%8.8
Finance and Insurance	29	%13.7	1000 to 9999		
Health and Community Services	28	%13.3	10000 to 99999	67	%31.8
Manufacturing	55	%26.1	Not Known	5	%2.4
None	21	%10.0	Total	211	%100
Total	211	%100			

Instrument Validation

An exploratory factor analysis (EFA) was employed to identify the underlying constructs for the twenty items, five items and three items used to assess NOFs, management support and ICT capabilities respectively. No EFA was conducted for the remaining constructs- the dimensions of business strategy and IT strategy as they were adopted from the previous validated instruments. Using principle component extraction technique and varimax rotation method three factors were identified for NOFs. In doing EFA minimum factor loading 0.50 was employed. Those items with factor loadings greater than 0.50 on two or more factors were dropped from the final instrument. After three iterations the final factor structure containing eleven items was obtained for NOFs. Cronbach's alpha coefficients for all factors were above the acceptable level. Table 3 presents three categories of attributes of NOFs; one factor with five items for management support and ICT capabilities factor with three items identified from the data. The first factor of NOFs with four items is related to the nature of decision making in organisation so we labelled it as the *decentralized attributes* (DECAT). The second factor of NOFs was labelled as *participatory attributes* (PARAT) as it sought the degree of participation among organisation employees. And the final factor represents the degree of autonomy in organisation so we labelled it as *attributes of autonomy* (AUTAT).

Table 3: Factor analysis for NOFs, Management support and ICT capabilities; PCA extraction method; varimax rotation method

Items	Factor loadings					Items	Factor loadings				
	1	2	3	4	5		1	2	3	4	5
N10	0.66					M1				0.80	
N5	0.61					M2				0.81	
N7	0.56					M3				0.82	
N2	0.52					M4				0.81	
N1		0.50				M5				0.86	
N9		0.61				ICT1					0.72
N3		0.61				ICT2					0.85
N4		0.57				ICT3					0.81
N14			0.66								
N6			0.64								
N8			0.63								

Data Analysis

To test the research model, we used Structural Equation Modelling (SEM). Both measurement (construct validity) and structural (hypothesis testing) models were estimated using AMOS 6.0 (Byrne 2001). Firstly we describe our analysis on the measurement model and later on the structural model will be described.

The Measurement Model

We first employed CFA to validate the measures (Byrne 2001). The measurement model was assessed for nine latent constructs (Figure 2). Due to sensitivity to sample size (Harwick & Barki 1994), along with chi square index we used other measures for goodness of fit such as comparative fit index (CFI) and goodness of fit index (GFI). The indices for the measurement model indicate a poor fit. CFI (0.81) and GFI (0.71) were below acceptable levels. Amos output indicated that items N14 of AUTAT had large residuals and weak correlation with other items. These results suggested that goodness of fit could be improved by re-specifying the measurement model by removing this item. Amos provides suggested covariance between error terms and factors. Following suggestions by Segars and Grover (1993), each of these re-specifications was done on the model one by one. Figure 3 represents the final measurement model.

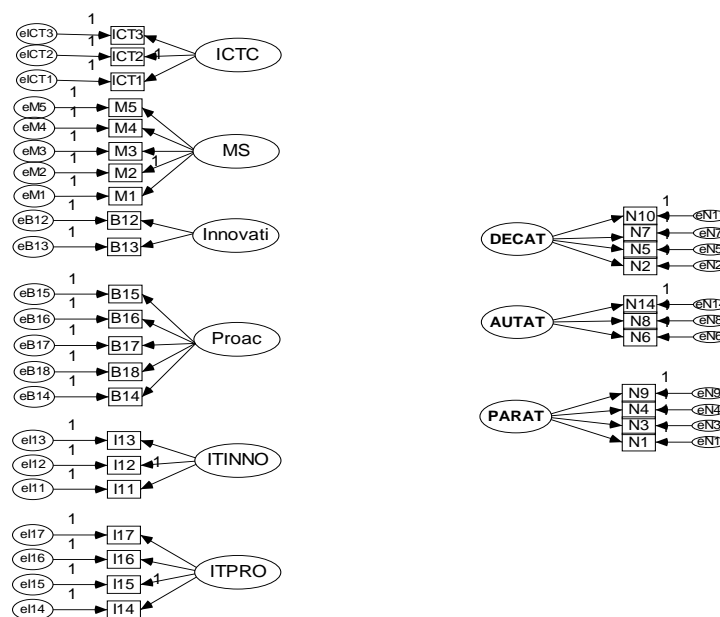


Figure 2: The Measurement Model

The model (Figure 3) fit for CFA was reasonable, with a $\chi^2 = 556$ of $556/448 = 1.23$; GFI = 0.86; $\chi^2/df = 1.24$; a root mean square error (RMSE) of 0.04, and a comparative fit index (CFI) of 0.93. All loadings are of a reasonable magnitude and are significant (Table 4). Following the results of the measurement model, we re-specified our hypothesis as summarized in table 5.

Table 4: Assessment of the Measurement Model

Construct /indicators	Loading	Composite reliability	Average variance Extracted(AVE)	Construct /indicators	Loading	Composite reliability	Average variance Extracted(AVE)
AGGS		0.86	0.84	INNO		0.75	0.80
B1	.71***			B12	.75**		
B4	.72***			B13	.80***		
B3	.83***			PROAC		0.51	0.60
B4	.84***			B14	.44***		
B5	.90***			B15	.79***		
MS		0.89	0.70	B16	.63***		
M1	.71***			B17	.16**		
M2	.72***			B18	.22***		
M3	.81***			DECAT		0.92	0.87
M4	.79***			N2	.26**		
M5	.87***			N5	.54**		
ICTC		0.79	0.71	N10	.63***		
ICT1	.59***			PARAT		0.86	0.81
ICT2	.92***			N1	.42***		
ICT3	.77***			N3	.25**		
ITPRO		0.77	0.60	N4	.40***		
I14	.59***			AUTAT		0.70	0.63
I15	.72***			N6	.45***		
I16	.76***			N8	.67***		
I17	.66***			N14	.26**		
ITINN		0.65	0.59				
I11	.63***						
I12	.69***						
I13	.54***						

** Significant at $p < 0.05$; *** Significant at $p < 0.01$

Table 5: Research Hypotheses

No.	Description
H1a	The pursuit of an innovative business strategy leads to decentralized organisational form
H1b	The pursuit of an innovative business strategy leads to autonomous organisational form
H1c	The pursuit of an innovative business strategy leads to participatory organisational form
H1d	The pursuit of proactive business strategy leads to decentralized organisational form
H1e	The pursuit of proactive business strategy leads to autonomous organisational form
H1f	The pursuit of proactive business strategy leads to participatory organisational form
H2a	An IT strategy that supports innovative business strategy leads to decentralized organisational form
H2b	An IT strategy that supports innovative business strategy leads to autonomous organisational form
H2c	An IT strategy that supports innovative business strategy leads to participatory organisational form
H2d	The pursuit of proactive IT strategy leads to decentralized organisational form
H2e	The pursuit of proactive IT strategy leads to autonomous organisational form
H2f	The pursuit of proactive IT strategy leads to participatory organisational form
H3a	ICT capabilities are positively related to the evolution of attributes of decentralization in NOFs.
H3b	ICT capabilities are positively related to the evolution of participatory attributes in NOFs.
H3c	ICT capabilities are positively related to the evolution of attributes of autonomy in NOFs.
H4a	Management support is positively related to the evolution attributes of decentralization in NOFs.
H4b	Management support is positively related to the evolution of participatory attributes in NOFs.
H4c	Management support is positively related to the evolution of attributes of autonomy in NOFs.

Structural Model

Following confirmation of the measurement model, we proceeded to examine the structural model. Figure 3 presents the results of the structural model. It is worth noting that paths could have been hypothesized between each pair of constructs in the model (e.g., between proactiveness and management support). However, our aim was to develop a parsimonious yet powerful model. Some paths could have introduced unnecessary multicollinearity, and were therefore removed from the final model. As shown in Figure 3, the overall fit index CFI (0.93) and the $\chi^2 = 556$ with degrees of freedom ratio (1.23) show that the proposed model fits the data

acceptably and goodness of fit index GFI (0.86) is only slightly below the recommended 0.90 threshold. Also the variances explained (R^2) by the other endogenous latent variables (PARAT= 0.88, AUTAT= 0.83, DECAT= 0.39) are reasonable ($R^2 \geq 0.39$). So we can conclude that the overall model fit is acceptable and the path estimates can be employed for hypothesis testing. All the paths shown in Figure 3 are significant. Thirty nine percent of the variance in centralizated attributes, 83 percent of the variance in autonomous attributes, and 88 percent of the variance in participatory attributes are accounted for by the model. The percentages of variance explained are greater than or equal to 10 percent, implying a satisfactory and substantive model (Byrne 2001). The hypotheses can be evaluated based on the size and significance of the standardized path coefficients. Four standardized path coefficients were significant at the 1 percent level of significance, and three coefficients were significant at the 5 percent level of significance. This indicates that seven relationships hypothesized were supported by the SEM analysis. The rest of relationships hypothesized were not supported.

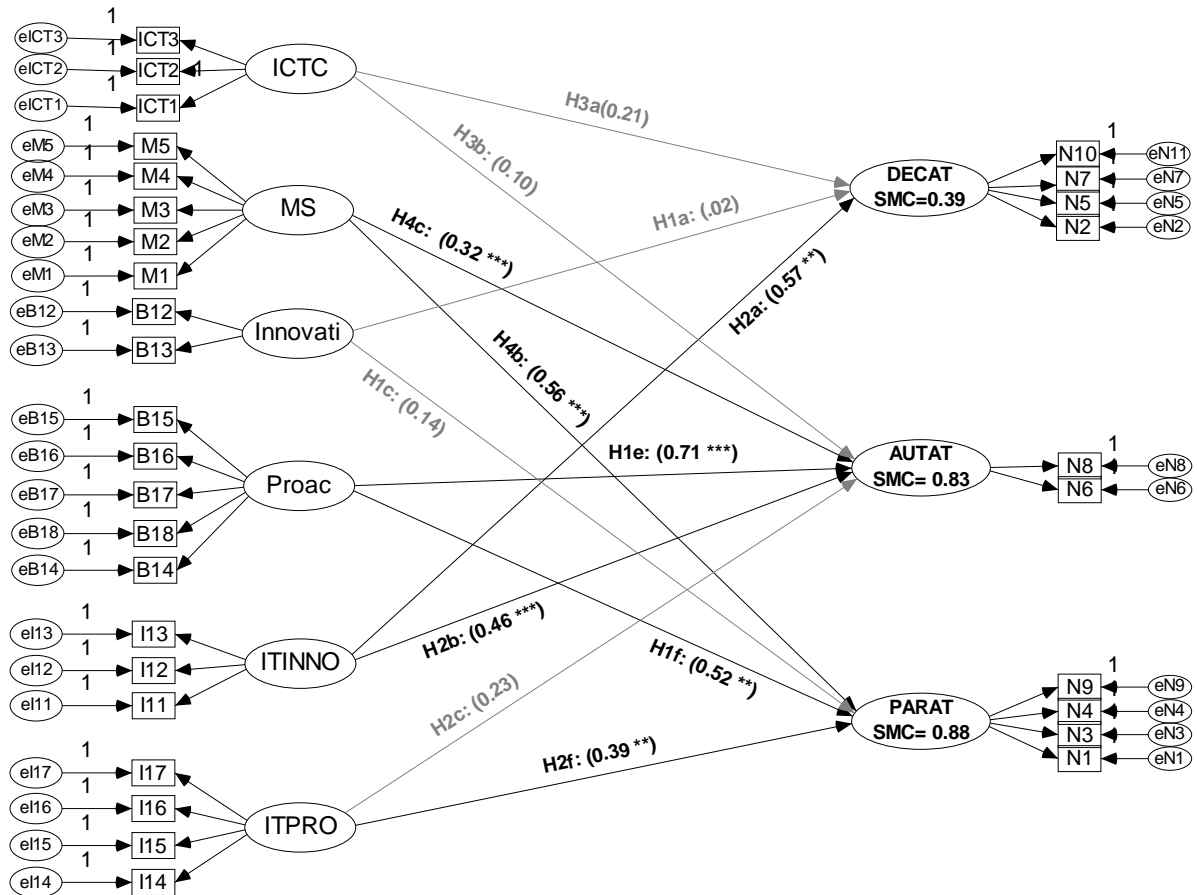


Figure 3: The structural and Measurement Model

Note: RMSEA= 0.34; CFI = 0.93; χ^2 /df: 556/448 = 1.24; GFI = 0.86;

** Significant at $\rho < 0.05$; *** $\rho < 0.01$; SMC: Square Multiple Correlation (R^2).

The structural model results provided modest support for the theoretical model. We did not find significant relationship from ICTC, and innovativeness. Management support affects the evolution of NOFs both in participatory and autonomous attributes, thus providing support for Hb4, H4c. This indicates the importance of top management attitudes toward organisational changes. Also proactiveness affected the evolution of attributes of autonomy and participatory attributes of NOFs, thus supporting H1e, H1f respectively. While we could not find any significant relationship from business innovativeness to any attributes, both dimensions of IT strategy had significant relationships with categories of attributes. In terms proactiveness and innovativeness the structural model indicates that IT strategy has more influence on the evolution of attributes of NOFs (H2a,H2b,H2f). This is in accordance with Schumpeter's theory in which technological innovation have an impact on forming new organisations. ICT capabilities and infrastructures did not have any significant linkage with the attributes of NOFs (H3a,H3b,H3c). This is might be due to the fact that we emphasized on just three domains of ICT capabilities. The rest of linkages were not significant.

Summary, Conclusion and Limitations

Various internal and external variables have contributed to the evolution of new organisational forms. As an influencing variable ICT has been one of the important variables in the transformation process toward new forms of organisation. These approaches are discussed around three main areas of context, process and variables. Cumulative results from the previous studies that examined the relationship between ICT and NOFs, were plagued with ambiguities and inconsistencies. At the same time, understanding the clear-cut impacts of ICT on organisation requires a mechanism in which various domains of ICT, in terms of internal and external are considered. We tried to develop a model to address this gap. It is a working model of ICT- NOF and does not claim to be comprehensive. The business strategy, IT strategy, ICT capabilities and management support provide meaningful indicators of ICT impacts in the evolution of NOFs. Therefore both researchers and practitioners can take benefit of the research instrument and model. Researchers can use the model and instrument in future research endeavours. Managers can chart the transformation of their organisations using the common variables identified in this paper and benchmark their organisations against both historical data and industry best practices.

The paper has some limitations that can be addressed in future research. For example, for the purpose of this paper we just borrowed two dimensions from Venkatraman's instrument. Future study can focus on the other dimensions. The effect of environmental conditions on the pervasiveness of ICT impacts is another area that can be explored in future research. Particularly this current study, although constitutes a cross sectional survey, was limited to Australian organisations. Therefore, the effects of macroeconomic conditions were not investigated. Another area that can be addressed in future research is an appreciation of the information intensity of the industry. Some specific industries such as insurance, banking, and finance are more information intensive than other section. Hence, the speed and the effectiveness of ICT impact can vary depending on the type of the industry. As this study was conducted as a cross sectional survey of several industries, such effects were not monitored. Longitudinal investigation may further augment the empirical validity and generalizability of the proposed model and research instrument.

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