# ES Adoption in Chinese SMEs: Institutional Effects on Users and Providers

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**Abstract**

*The main literature on Enterprise Systems (ES) is dominated by research on large Western firms. The survey based research method, which is commonly employed with focal concerns about user perspectives and critical success factors (CSFs), shows a great emphasis on the analysis of before-after effects. In contrast, this research examines ES engagement in Chinese SMEs through case studies. It argues that ES adoption and implementation is a complex process that operates within a broader institutional context, and the significance of institutional influence needs to be identified and explored. Both King et al.'s (1994) institutional framework and DiMaggio & Powell's (1983) institutional isomorphism have informed the institutional analysis of this paper. The findings signify that the Chinese government potentially plays an important role in influencing ES engagement, however its effectiveness is limited. The importance of normative and mimetic power is also highlighted.*

**Keywords**: Enterprise systems; SMEs; case study; China; institutional theory.

## 1.0    Introduction

This research explores the process of adoption and implementation of Enterprise Systems (ES) in Chinese Small and Medium sized Enterprises (SMEs) from two perspectives – the user company and the ES vendor – both operating within a broad institutional framework. As defined by Davenport (1998), ES is a software system that imposes its own logic on a variety of aspects of an organization such as operations, culture and strategy, which leads to a higher degree of integration and competitiveness.  The aim of this case based research is to understand to what extent the process of ES engagement is influenced by institutions. Thus, institutional analysis is the focus here.

King et al. (1994) define an institution as "any standing social entity that exerts influence and regulation over other social entities" (p.141). In this research, institutions are considered as the combination of government and social context. Such a stance leads to the employment of two mature models - King et al.'s (1994) institutional framework and DiMaggio & Powell's (1983) institutional isomorphism – to address policy and non-policy perspectives respectively. The institutional analysis

is conducted in two inter-connected layers: 1). The policy context for the development of ES and SMEs is demonstrated through the example policies issued by the Chinese government (Section 3.0); and 2). The impact of the policy context is evaluated from the perspectives of both the user company and ES vendor through the study of ES adoption and implementation, and the impact of social context (e.g. market competition, providers' strategies) on the user company in particular is additionally examined in the process (Section 5.0).

The interest in, and relevance of, this research stands from two sources – literature and practice. From the literature perspective, while the ES literature focuses on studies of large Western firms (Esteves and Bohorquez 2007; Nandhakumar et al. 2005), the generalisability of this body of knowledge to other countries can be questioned. Furthermore, the position for SMEs may present separate challenges due to their different experience of ES adoption and implementation (Brown & Lockett 2004; Stevenson et al. 2005), and the situation may be further complicated by the context of developing countries (e.g. governmental influence, shortage of professionals, etc.) including China (Huang & Gamble 2011; Weerakkody et al. 2009). The research gaps indicate that there is scarce research on SMEs in China; and ES research is generally dominated by survey based and firm-centred studies with a focus on before-after effects (Parker et al. 2015). Therefore, the institutional context relating to ES and SMEs in China needs to be explored to reveal its uniqueness; case-based, process oriented research needs to be conducted to enrich understanding about ES adoption and implementation, by embracing other perspectives (e.g. ES vendors and government).

In terms of the practical significance of this research, the China context has been specifically investigated. The decision to do this is mainly influenced by the substantial development of the ES market. China has achieved unprecedented development in recent years. At the time of writing, it is the second largest economy in the world. Since more than 98% of firms in China are SMEs, it is increasingly important to examine SME-related issues. Meanwhile, it needs to be indicated that China has well recognised the significant role of information and communications technology (ICT) for increasing productivity. In 2014, the ICT sector (including IT, IS products and services, internet, cloud computing, etc.) to GDP ratio was 26.1%

(Ministry of Industry and Information Technology, MIIT 2015). This has shown the huge commitment of the Chinese government in regard to developing ICT. Considering the importance of ES in the sector, it is critical to study ES in the context of Chinese SMEs.

As demonstrated, a majority of the adoption research is firm centric with a focus on internal factors. In contrast, institutional influence is under researched and thus provides a rationale for this work. To investigate this further in the specific context of Chinese SMEs, This research set out to shed light on two questions:

o   To what extent is ES engagement in Chinese SMEs shaped by institutional influence including policy, competitors and technology providers?

o   How is that influence specifically manifested in the users and ES providers?

Four cases have been completed but, for this paper, one case is selected to demonstrate the research method and some key findings from the institutional perspective. In this research, a case is comprised of a user company and an ES vendor both operating in the same context of government policies. The paper is divided into 6 parts. After briefly introducing the research, the literature review (2.0) is presented to elaborate the state of ES research and highlight relevant research gaps, and is followed by an examination of the policy environment at both national and city levels (3.0). Then, the research methodology is discussed (4.0). One case is selected and the analysis and findings are presented (5.0). A discussion and some key findings form the conclusion (6.0).

## 2.0    Literature Review

The ES adoption and implementation literature is very large and beyond the scope of a single paper. The selected literature reviewed here is presented in three parts. First there is an overview of the mainstream literature, which is typically based on large firms in developed countries, and is important and influential research. Second, ES research in a China context is discussed, particularly that relating to Chinese SMEs. Third, institutional theory is introduced, before the review concludes with a brief discussion.

## 2.1 ES Research on Large Firms in Non-China Context

The ES research can be broadly categorised as ES adoption, ES implementation, and critical successful factors (CSFs) (Esteves & Pastor 2001; Esteves & Bohorquez 2007). Research on ES adoption is still underdeveloped, focusing on studies in motivators (Alves & Matos 2012), selection criteria (Baki & Çakar 2005), and decision-making (Karsak & Özogul 2009). There are many research studies on ES implementation, comprising several sub-streams like: implementation method (Mandal & Gunasekaran 2003), organisational fit (Hong & Kim 2002), and implementation impact (Gefen & Ragowsky 2005).

The study of CSFs remains the largest strand of research, addressing both adoption and implementation (Law et al. 2010; Markus et al. 2000; Ram et al. 2013; Razmi et al. 2009), but in virtually all cases the analytical focus is the concern of the user company (Esteves and Bohorquez 2007). CSF related research generally embraces technological, managerial, and organizational concerns. Typical of this strand is the early work of Holland & Light (1999) but there are many examples:

o A questionnaire research study conducted in a group of Swedish and Finnish firms points out the critical role of IT competence, and suggests better collaborations between internal and external expertise to improve ERP system and information quality (Ifinedo 2011);

o By analysing survey data gathered from 5300 Irish manufacturing companies, the firms considered as young, large, skill and export intensive, and fast growing are more likely to achieve a successful ICT adoption (Haller & Siedschlag 2011).

Few research studies like Kamal et al. (2013) and Berchet & Habchi (2005) employ a process thinking approach, however the nature of discussion is either implicit or firm centric. Brown & Lockett's (2004) study is a rare example explicitly discussing the vendor-SME relationship in the context of ES engagement.

This rich Western based research on ES adoption and implementation is largely characterised by three perspectives introduced below.

**User firm centred:** The ES research in general has shown strong emphases on the perception of the user company. For instance, for ES selection criteria, user

companies determine the weight of selection criteria, and consequently the findings (Baki & Çakar 2005; Gu et al. 2012; Molnár et al. 2013). However, the user company is unlikely to be the only influential party involved in the adoption and process of ES implementation. Others such as the ES vendor, ES consultants, government, etc. are also pivotal to the process (Brown & Lockett 2004).

**Dominance of survey based methods:** The research into ES is heavily survey driven. Statistical data is commonly used as the basis for the analysis and the contribution (Haller & Siedschlag 2011; Ifinedo 2011). Although the analysis of statistical data is capable of identifying problems, concerns, and even critical influential factors for ES projects, the statistical findings may have limited explanatory power. Surveys are especially open to challenge when based on single respondents, using factors identified as significant in prior research. Arguably, ES are complex IS and organizational systems and are context-dependent, and ES adoption and implementation may be better investigated through case studies.

**Event thinking:** Treating ES as a 'product' that is selected and implemented as an event is commonplace e.g. the notion of organizational life 'before and after' ES implementation (Alves & Matos 2012). In reality, implementation of ES is a complex process (Currie 2004), and can be months and often years (Panorama 2013).

## 2.2 ES research on Chinese SMEs

ES research in the China context is heavily influenced by the dominant research phenomena created by Western literature in terms of research approach and strategy. The survey-based research method is still popularly employed with an event-thinking approach (Xu & Ma 2008), and most investigations in the China context are driven by firm-centred discussions (Marble & Lu 2007).

Despite the similarities, Chinese firms in general have also shown their unique experience of ES engagement (Ge & Voß 2009). ES implementation in this context is predominantly influenced by hierarchical power, and Chinese firms generally have passive attitudes towards ES innovation (Srivastava & Gips 2009).

The ES research specifically targeting Chinese SMEs is scarce. Within the niche research area, most research tends to generalise findings from studies of mixed firm

sizes (Lun & Quaddus 2011). In the China context (including Chinese SMEs) three characteristics emerge from the extant research that provide a point of comparison and reference to Western experience.

**Limited resources:** All SMEs are commonly recognised as resource constrained, including Chinese SMEs, possibly to a greater extent. Poor IT infrastructure, financial resources, inadequate staff competence and numbers, etc. have been identified as pivotal (Liang & Xue 2004; Xia et al. 2009).

**External influences:** The Government in China is more active than most Western governments in influencing ES adoption by issuing relevant policies or initiating national projects (Ge & Voß 2009). This is framed as the provision of a supportive environment (along with financial, education, training and infrastructure development, consultants etc.) to Chinese firms (Tan et al. 2007; Chen et al. 2008). Hence studying the influence of government and other external stakeholders (e.g. competitors, ES providers) is critical.

**Cultural study oriented:** ES research in the China context has shown a significant emphasis on cultural study. The study of Chinese culture is frequently considered as an effective way to guide the ES customization, and minimise issues of organizational fit (Avison & Malaurent 2007). Although understanding Chinese culture will reveal some behavioural tendencies regarding ES innovation, the cultural study arguably has limited explanatory power to the process of ES adoption and implementation.

## 2.3 Introducing Institutional theory

Institutional theory is a complex and broad approach largely exploring non-economic factors in organisational behaviour. Originating from organisational studies it primarily investigates the influential role of environments, legitimacy, isomorphism, culture and all other forms of social forces that exercise their power over organisations to change the way they behave. King et al. (1994) and DiMaggio & Powell's (1983) are two of the most influential sources exploring institutional influence and intervention and provide the analytical framework for this work. King et al. focus on policy perspectives and point out that research on innovation in information technology has inadequate understanding about governmental intervention in innovation, however institutional intervention has considerable

influence on shaping innovation in information technology. Six institutional interventional actions (knowledge building, knowledge deployment, subsidy, mobilisation, standard setting, and innovation directives) are proposed to explain how the interventional actions may play regulatory or influential roles to create supply-push or demand-pull forces influencing the innovation.

DiMaggio & Powell's (1983) emphasis is on the study of social context. They assert that "bureaucratization and other forms of organisational change occur as the result of processes that make organisations more similar without necessarily making them more efficient" (ibid, p.147) and the term "isomorphism" is explained as the similarities of the organisational structure and practice, which appear in different organisations within the same social environment (ibid). There are different isomorphic influences: coercive isomorphism, mimetic isomorphism, and normative isomorphism, which respectively represent the compulsory hierarchical pressures, power of uncertainty, and influence of professionalization (ibid).

## 2.4 Discussion

A clear characteristic of the extant research on ES adoption and implementation is the primacy of the firm centred user view, and other stakeholder perspectives are less evidenced (Parker et al. 2015). Studies of government policies are scarce. Methodologically, the survey dominates and often the variables (e.g. CSFs) are sourced from previous studies. Such an approach not only limits the exploration of CSFs, but also provides scarce explanations for the identified CSFs.

Knowledge about the context of Chinese SMEs is even scarcer. Although the unique characteristics presented by Chinese firms (including SMEs) have been recognised, the significance of the context is inadequately explained in terms of implementation strategy and process, process of change management, interactions of stakeholders, etc. (Ge & Voß 2009; Liang & Xue, 2004). A black-box effect has gradually been created. This is regrettable and limits the potential contribution to both theory and practice.

King et al. (1994) imply that innovation is the consequence of a long-term complex interplay of various social entities, and institutions endow an innovation with profound meanings. The research conducted by Brown & Thompson (2011) sets an example of employing King et al.'s (1994) institutional model to explain the influence

of policies on ICT innovation. Non-political institutional influence is also considered important since research such as Huang & Gamble's (2011) highlighted the significance of social norms (e.g. respect for authority) to individual participation and satisfaction in China. As indicated, in this paper, six institutional intervention actions illustrated in King et al.'s (1994) institutional model are employed to provide explanations of political influence and intervention, while the institutional isomorphism powers are used to study non-political aspects.

## 3.0    Policy Environment

The policy context in China is an essential construct of the Chinese institutional environment, and it also adds to the uniqueness of ES research in the China context. Studying the policy context reveals the governmental settings, and most importantly it assists later sections (particularly Table 3 in Section 5.0) to understand to what extent the development of ES in the example case is influenced by the issued policies.

Compared to governments in developed nations, China is a transitional economy and the Chinese government arguably exerts stronger hierarchical influence, and in some cases control, over economic development. Such influence is manifested in the issued laws and policies, including those targeting SMEs and ICT based innovation, which is the focus of this research. Thus, before carrying out analysis of the selected case, it is important to appreciate this further. The policy environment can be generally studied at two levels: national level and local level (ShenZhen City), and government at different levels has different focuses. Considering the length of this paper, only a few example of policies are demonstrated.

### 3.1 National level

The national government plays an important role in influencing the development of ICT and SMEs, including the potential impact of the former on the latter. This can be achieved by issuing laws and policies. For instance, the National People's Congress Standing Committee (NPCSC) approved the 'Law of the People's Republic of China on Science and Technology Progress' in 1993 to promote the development of information technology. It encourages hi-tech research and the construction of hi-tech industrial parks. The government is required to provide the necessary technical and

financial support for ICT development and establish research bases and training facilities to create a better infrastructure environment for IT researchers and workers (Ministry of Science and Technology, MoST 1993).

'The National Mid-and-Long-term Plan for Science and Technology Development' (2006-2020, aka. Document No.44) contains some of the most important administrative guidance for ICT development in recent years. The document advocates the establishment of advanced R&D, reliable networks, and effective ICT services in order to improve the development of ICT. The importance of developing information systems is highlighted, and the service sector (including transport and logistics, ICT, public heath, retail sales, mass media, etc.) is particularly encouraged to take advantage of information systems that offer integrated solution plans (General Office of the State Council of the People's Republic of China, GOSC 2005).

Regarding the ICT development in SMEs, the MoST worked closely with the National Development and Reform Commission and other relevant sectors, and they jointly issued 'Opinions and Notifications about Consolidating the Governmental Service and Motivating the Informatisation in SMEs' in March 2008 (MIIT 2008) to mainly encourage the construction of governmental ICT service systems. In addition to guaranteeing a necessary level of governmental financial support, it suggests many approaches to propel the progress of informatisation in SMEs: establish information platforms for ICT consultancy, improve governmental ICT service, provide training service, etc.

## 3.2 Local level

The local government is influenced by the central government, however it also has certain autonomous power to interpret and localise the policies from central government. The degree of autonomy may be greater in special economic zones like ShenZhen city. Policies issued at local level may relate to both ICT and ES, and they have shown concerns about areas like funding support, construction of hi-tech industrial parks, information platform construction, certifications, etc. For example: in 'Policies to Develop the Industry of Information Technology' (ShenZhen City Council 2011, aka. Document No.210), starting from 2011 and in the following five years, the City Council will provide 100 Million RMB each year to support hi-tech

projects, and guarantees the local IT industry could receive a total of 500 Million RMB special funding each year.

Also, 'Double-soft Certification' (refers to software companies and software product certifications) involves the identification and evaluation of intellectual property, software product testing and registration, etc. To a certain extent, it has guaranteed the quality of the product and service for potential user companies. Once a company has obtained a double-soft certificate, it would also benefit from preferential tax policies (Double-soft Certification 2012).

Moreover, regarding ES development in local SMEs, Shenzhen City Council issued an 'Implementation Plan for the Convenient Service (aka. 'Blue Tunnel Project') for SMEs in ShenZhen' in 2005 (ShenZhen City Council 2005) to improve the quality of governmental services, intensify the application of ES, and enhance the ES competence of local SMEs.

### 3.3 Discussion

Broadly, the central government serves at the national level constructing policy intents, and the local government (ShenZhen) that serves at the city level is responsible for policy implementation. Overall, the Chinese government at different levels clearly intends to create a supportive policy environment to indirectly influence and stimulate ES development in SMEs. In respect of the differences, the central government arguably aims to establish a comprehensive policy mechanism for ICT development across the nation, whilst local government interprets national policy in the context of local needs. The interpretive power of local government has generated gaps between policy intent at a national level and policy implementation at the city level. In some cases, the effects of policy implementation may deviate from the original policy intent. The complex institutional environment encourages this research to further explore the behavioural reactions of the SMEs regarding ES adoption and implementation.

## 4.0 Methodology

The discussions in the literature point to the need for a research design based on a process approach with multiple stakeholders. Thus, case study methodology was adopted.

Comparing with other types of qualitative research, case study research embraces multifarious variables and its flexible nature enables case study research to be operated in situations with soft boundaries to collect detailed information. This is ideal to carry out exploratory studies where theoretical support is limited, as is the situation for Chinese SMEs adopting and implementing ES.

Case study research can be generally divided into single case study research and multiple case study research. Two critical concerns of single-case study research are commonly discussed in the literature: bias of researchers and lack of generalisation (Easterby-Smith, et al. 2008). Hence, multiple case study was employed to manage the concerns and generate more compelling findings (Yin 2009).

In brief, and using the above principles, the empirical design was based on the selection of four SMEs (defined by the Chinese firm classification regulations), all in Shenzhen, Guangdong Province, China. For each company the relevant software provider firm was identified and included in the study. There were two such providers. For all the firms involved, semi-structured interviews were employed with interviews audio recorded where possible. Multiple interviews with the most relevant personnel were carried out as appropriate. Firm documentation where relevant was collected.

The strict government hierarchy in China significantly constrained the effectiveness of interviews with governmental officials in practice. Only limited government personnel were interviewed. The government perspective was mostly studied through secondary data such as document analysis. However, since the government plays an overarching role to influence ES development in local business via its policies, document analysis is very efficient to explore the policy environment. Individualised semi-structured interviews are designed for user companies, ES providers, and government with different focuses, and they are illustrated in Table 1 below:

| Key stakeholders | Focus of semi-structured interviews |
|---|---|
| User company | o Internal chronicle of key events with explanations (user perspective)<br>o Externalities and corresponding reactions (e.g. competitors, customers, ES providers, government, etc.) |
| ES vendor | o General market strategy<br>o Reaction to governmental influence<br>o Chronicle of key events with explanations (vendor perspective) |
| Government | o Governmental settings (national and local levels)<br>o Key legislation (national level)<br>o Relevant policies and regulations (national and local levels) |

**Table 1: Focus of semi-structured interviews**

The study is retrospective and covered implementations from 2009 to 2011. Fieldwork took place in two stages between 2011 and 2013. This is a relatively long time frame but had advantages in that companies could be revisited for the effectiveness of the government policies to be judged. As previously mentioned, four cases have been studied along with their respective software providers. In this paper the focus is on the user company – Track-Tech and its interactions with its software provider – CH Solution (CHS). Since the four cases are selected from the same city, the influences of local government are applicable to all of them. The overview of the four cases is shown in Table 2 with the selected example 'Trach-Tech' in bold.

| | Turnover | No. of Employees | Location | Software Provider | Selected Modules | Multiple Interviews with |
|---|---|---|---|---|---|---|
| **Case Example User Company: Track-Tech** | **CNY 12 million (USD 2 million)** | **15** | **ShenZhen City, Guang Dong Province** | **ES Vendor: CHS** | **Production management Procurement management; Stock management; Sales management; Financial management.** | **1.Vice general manager 2.Software consultant (CHS)** |
| Other Cases User Companies: Battery-Shell, Plasbox, and TradeIT | CNY 40-200 million (USD 6.5-32 million) | 57-420 | ShenZhen City, Guang Dong Province | ES Vendor: GZsoft or CHS | 5-9 modules | 2-5 interviewees |

**Table 2. Overview of the four user companies**

## 5.0 Analysis: Track-Tech and CHS Example Case

To reiterate, each case is constructed under the same policy environment, and both perspectives of user company and ES vendor are incorporated to offer a better view for the process of ES adoption and implementation. The section is organised into three elements: (1) profiles of company and ES vendor (2) overall timing and schema of the ES adoption and implementation process, and (3) governmental and non-governmental influence and intervention.

### 5.1. Profiles of Track-Tech and CHS

Track-Tech is a private hi-tech company founded in 2006 in ShenZhen, and it mainly produces and distributes GPS related components that include GPS chips, GPS receivers, GPS antenna, etc. By 2012, it had 15 employees and a turnover of CNY 12 million (USD 2 million). Fierce market competition and emerging internal problems (e.g. poor information sharing and information flow, information loss, etc.) challenged the company's 'traditional' approach to management, and forced the vice-general manager (V-GM) to reform the business. As a result, a decision was made in February 2011 to adopt an Enterprise Resource Planning (ERP) system.

The selected ES Vendor – CH Solution (CHS) was initially founded in Taiwan in 1990. Based on the experience of technology, service and management accumulated in Taiwan, CHS learned to acclimatise to the managerial mode and the ES market in mainland China, and quickly became one of the leading ES providers on the market.

### 5.2. Adoption and Implementation Process

The essence of the analysis was to capture retrospectively the adoption and implementation of the ES through time – effectively a process perspective – reflecting the events as seen by the user and the vendor. The overall timing and sequencing of events is provided in Figure 1 with an indication of continuous institutional influence. Central to this process were milestone events and these are shown. The project lasted for approximately two months, and it was finished in April 2011.

Track-Tech served big customers such as ZTE Corporation and Foxconn Technology Group, however fulfilling the needs of customers and surviving market competition was increasingly difficult for the company. Track-Tech even started to develop

business in other areas to support its development in the GPS industry. Unfortunately the outcomes were not satisfactory.

As a hi-tech company, how to effectively manage the information was the key to Track-Tech. However the traditional management could not assist the company to secure any sensitive information or improve the information flow. The company experienced the problems of information loss during the change in personnel, and the ineffective information flow led to poor order management. What is more, Track-Tech had no efficient method to control the material usage in the outsourced manufacturers, which created much pressure on the procurement department.
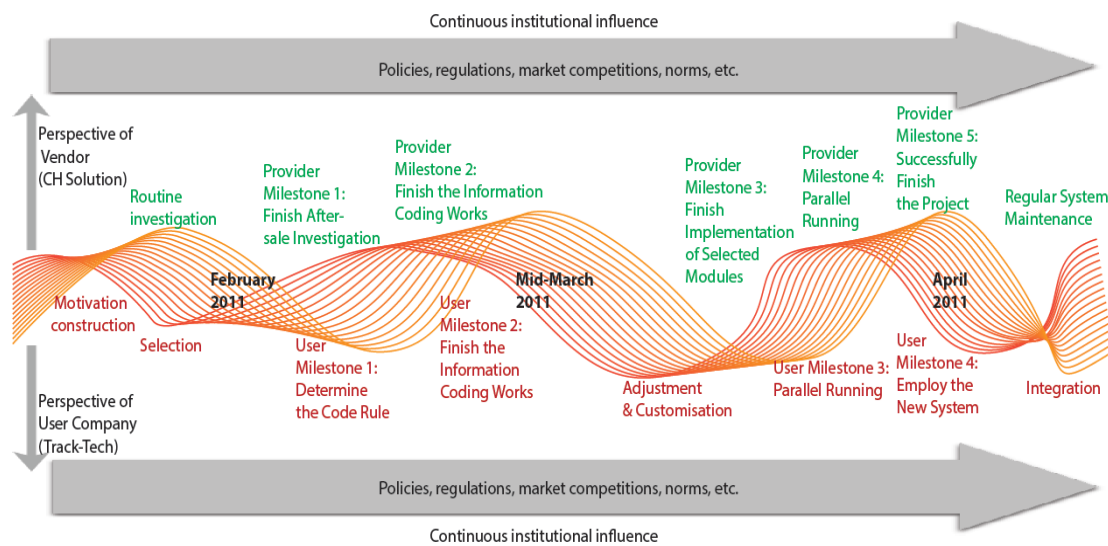


**Figure 1: Overall process schema**

The experience of working with a large scale ES in a securities company endowed the V-GM with the knowledge to explain the problems Track-Tech was encountering, which subsequently motivated the reform. However, since the V-GM had no sufficient knowledge about the ES market, selecting the ES vendor was difficult. Although criteria were initially designed before the selection, the V-GM had to make compromises since none of the ES providers had experience in the industry of Track-Tech. CHS was eventually selected considering its experience in the manufacturing industry and its good reputation, and a budget was set to 100 thousand RMB. As the requirements of Track-Tech were considered basic to CHS, an entry-level ES package was recommended and selected.

In addition to the active interventions of the V-GM, the local authorities were observed playing passive influential roles in the process of ES adoption. Track-Tech had a tradition of cooperating with local universities (e.g. ShenZhen University) to develop new GPS products, and the V-GM revealed the passive influence from local authorities such as ShenZhen Institute of Electronics (SZIE) and the Economy, and Trade and Information Commission of ShenZhen Municipality (ETICSM) for potential funding support. Also, to take advantage of a tax rate reduction, Track-Tech had applied for 'Double-soft Certification' in 2009, and successfully obtained the 'Software Company Certification' in July 2010. It was confirmed that the V-GM was planning to assist the company to obtain the 'Software Product Certification' through ES adoption.

To prepare for the ES implementation, the consultant conducted an investigation to generate the implementation plan, which was followed by the general training, information coding work, and departmental training. The employees had the opportunity to not only understand the general functionalities of the ES, but also practically operate the corresponding modules to process real orders. The experience of the V-GM gained from his former company assisted Track-Tech to quickly determine the code rule, and the continuous hierarchical pressure ensured the good progress of information coding work.

The consultant integrated more training into the module implementation, however problems still emerged when different departments were required to work together with the system to process orders. The consultant had to make adjustments to the system such as changing the setting of authority management and the document format. At the end of the module implementation, parallel running was carried out to test the accuracy of the system and increase the speed of transition.

Track-Tech spent more than four months to master the ES after the module implementation. Although most problems were solved, the solution for outsourcing management was still ineffective. CHS on the other hand did not expect any further cooperation with Track-Tech. No customisation and module addition were identified at the post implementation stage.

## 5.3. Governmental and Non-governmental Influence

The process of adoption and implementation described above took place within the wider context of Government policy. Table 3 uses the six institutional actions from King et al. (1994) to examine the influence of these governmental policies on the ES initiative taken by Track-Tech. It summarises key policies aimed at incentivising companies to adopt information systems, how these policies have been interpreted at the local governmental level, and the influence, if any, that these policies have had at the company level, at least in the case of Track-Tech.

| Institutional Actions | Central Governmental Policies | Local Governmental Policies | Direct applicability to Track-Tech (user) and CHS (provider) |
|---|---|---|---|
| Knowledge Building | o 'Law on Science and Technology Progress' (MoST 1993) impelled the construction of industrial parks to encourage hi-tech research; <br> o Education (ICT) training elaborated in China's five-year-plan (2006-2010) | 'Blue tunnel project' was initiated to establish an administrative service platform to provide ICT training (ShenZhen City Council 2005). | No impact on either |
| Knowledge Deployment | 'Law of Popularisation of Science and Technology' (MoST 2002) required government at all levels to integrate ICT knowledge into student curriculum. | 'Blue tunnel project' aimed to enhance local SMEs' recognition of preferential policies (ShenZhen City Council 2005). | Track-Tech has some connections with SZIE, thus it learned that local government has some support for the development of informatisation. |
| Subsidy | o 'Law of Popularisation of Science and Technology' (MoST 2002) required government at different levels to provide various funding support for ICT dissemination; <br> o 'National mid-and-long-term plan for science and technology development (2006-2020)' (GOSC 2005) specified the use of special grants to motivate ICT innovation. | o Employ 'Blue tunnel project' to intensify the application of information systems, and enhance ICT competence in SMEs. It intended to register 20% of SMEs in the project by 2006, 50% by 2007 and 100% by 2008 (ShenZhen City Council 2005). <br> o 'Provisional measures for the development of SMEs in ShenZhen' Approved SMEs can receive funds to carry out ICT-related projects. | o Interest in potential funding support from local government - no application was made by Track-tech; <br> o Track-Tech strove to obtain 'Double-soft Certification' to benefit from favourable tax policies (in process); <br> o CHS receives funding support from government as a software company. However, no direct use is made of the certification for the Track-Tech project. |
| Standard Setting | 'Torch Programme' set clear requirements for obtaining national hi-tech company certificate, such as annual | Software company certification and software product certification involve the identification of | o The pursuit of 'Double-soft Certification' by Track-Tech raises Track-Tech |

| | | | |
|---|---|---|---|
| | investment in R&D is greater than 5% of annual turnover, number of employees with college or above qualifications >30%, etc. (MoST Torch Programme). | intellectual property, software product testing and registration, etc. It is not compulsory, but successful applicants could benefit from favorable tax policies (Double-Soft Certification). | profile; assists in securing ES adoption and implementation projects generally; o CHS is aware of the certification, however, no data has been obtained relating to its application. |
| Innovation Directive | The 'Torch Programme' has specific requirements to construct hi-tech industrial parks to boost ICT development | Local tax bureau has particular pieces of authorised taxation software for the company to use for governance on tax reports, validation of tax receipts, etc. | No impact on either |
| Mobilization | The 863 Programme released particular national project contracts for public bidding to encouraged ICT adoption and innovation (MoST 863 Programme). | The 'Peacock Scheme' was released to attract overseas high-tech persons. 300-500 million RMB was invested to support innovation and entrepreneurship (ShenZhen City Council 2011. no.9) | o The interactions with SZIE and ETICSM indirectly encouraged Track-Tech to conduct ES adoption; o The encouraging ES environment offered legitimate explanations for ES innovation in Track-Tech; o CHS is aware of the supportive environment. |

**Table 3. Governmental Influence and Intervention**

The concept of institutional isomorphism proposed by DiMaggio & Powell (1983) can be utilised to complement the King et al. (1994) institutional model to focus on non-governmental influences. Normative power was shown to be a critical influence in the case of Track-Tech, especially during the process of ES adoption. The normative power came from the collective influence of ES providers. This can be illustrated since similar ES products are offered from different providers on the market, and the V-GM intended to follow the industrial norms created by the providers and employ 'standard' setting of ES modules (e.g. the adoption of entry-level ES package).

## 6.0    Discussion and Conclusions

Much of the available ES literature is set in the context of large Western organisations, with an emphasis on the user perspective. The survey method is dominant, with a focus on what motivates a firm to implement ES and on the factors that are critical to implementation success. In contrast, this paper has examined in depth the implementation of ES in one selected Chinese SME using the case study

method, but utilising the findings from three other cases. It does this in the context of the Chinese government's ICT/ES policies – at both central and local levels – with the involvement of the perspective of an ES vendor. We are unaware of any other equivalent study. Three key findings relating to the employment of institutional theory and to the two original research aims are presented below:

1) The Western focus on a user perspective is problematic in the context of Chinese SMEs. The institutional setting is different and impacts on incentivisation and the decision to adopt. Exploring the studied area from an institutional perspective (particularly the Chinese government) is especially invaluable for Chinese SMEs since extant research in both the China and SME contexts has shown the characteristics of being resource constrained (Ge & Voß 2009; He & Wu 2006) and externally dependent (Brown & He 2007; Brown & Kaewkitipong 2009). This suggests that user focused theories such as Technology Adoption Models (TAM) (Davies, 1989), and derivatives (Venkatesh & Davies 2000) are not comprehensive enough. The institutional context needs to be taken into account and this extends beyond policy to regulation and sector norms.

2) It is evident that the government potentially has a great influence on ES adoption and implementation in Chinese SMEs, however the supply-push (King et al. 1994) national strategy seems to be less effective than anticipated. Issues identified in relation to policy implementation furthermore attenuate the effectiveness of governmental influence.

With the appreciation of the pivotal role of government, the policy section (Section 3.0) is considered novel by examining the governmental setting and policy environment in China with regard to ES initiatives in SMEs. China's national policy initiatives in this area are concerned with IT and SMEs with a view to increasing innovation and productivity. Specific initiatives linking ICT, ES and SMEs fall within these initiatives and are implemented through the agency of local governments. ES providers are private companies and subject to normal conditions within a socialist-market economy, including market competition. However, the development of the ES market is still immature, and both user companies and ES providers have experienced difficulties in establishing effective

relationships. Given the importance of the SME sector to the Chinese economy this represents a failure in terms of the government's policy intent.

The gaps between policy intent and implementation are expanded on further when evaluating the studied cases, as suggested by the example case. The user and provider companies may introduce their own agendas to challenge the effectiveness of policy design. The empirical data indicates that while governmental influence is reasonably effective at the pre-implementation stage — to motivate and stimulate decision-making — it is inadequate to sustain the process of implementation. This finding reinforces the issues of policy implementation (see Vega et al. 2013) but is evidenced at the micro level in the context of China.

Given the above, the implication for practice suggests that the Chinese government should enhance its intervention by introducing more clearly defined guidance for SMEs and mandatory regulations for ES providers for enhanced outcomes. Effective policy implementation requires better coordination and negotiation among central and local government, and user and provider companies. A mechanism of policy evaluation is necessary to collect feedback from lower hierarchical levels to support policy design, and a better supervision of policy implementation is also required.

3) According to DiMaggio & Powell (1983), mimetic isomorphic power is generated from emphasis on the power of uncertainty, and normative isomorphism is primarily from professionalization. In the case of Track-Tech, both mimetic power and normative power are distinct, and such a finding is also reflected in the other three cases. Arguably, the relatively weak influence of Chinese policy aimed at introducing technology innovations and good practice to SMEs means that SMEs lack guidance. Without this, SMEs become more uncertain about how to incorporate, and benefit from, the new technologies.

The role of the ES vendor in both the adoption decision and implementation for SMEs is particularly important and generally ignored. From the institutional perspective, the influence of ES providers can be manifested in the significance of normative power. Unlike large companies with informed ICT resources, SMEs are

vulnerable and even choosing a provider is difficult. They are hugely influenced by the ES providers and this lack of expertise puts SMEs in a weak position in the initial selection and contract stages. Norms developed within the ES provider community have greatly influenced the practice of ES adoption and implementation, and this can be observed in the similar ES packages offered in the market and the routine practice of ES implementation provided.

In this way the institutional isomorphic effect is shown in this research to be very important, much more so in fact than the firm centric classic CSFs such as senior management support or educational levels (e.g. Esteves and Bohorquez 2007). This is an important insight and complements our understanding of the adoption of ES and other complex ICT applications in SMEs. Although evidenced in a Chinese setting this finding is likely to have wider applicability.

Finally, we recognise the limitations in this paper. It has focused on one case and on the employment of selected theoretical theory, based on King et al.'s (1994) institutional actions and DiMaggio & Powell's (1983) institutional isomorphism. However, the indications from the other three cases are largely consistent with the Track-Tech example. The implications for theory relating to SMEs in transitional economies, and possibly elsewhere, are profound. It suggests that an ES 'user-provider partnership' model, in an institutional setting, is likely to provide a more relevant and robust approach to the issues involved in bringing ES – a complex technology – to successful implementation.

## References

Alves, M.D.C. & Matos, S.I.A. (2012). *ERP Adoption by Public and Private Organizations - A Comparative Analysis of Successful Implementations.* Journal of Business Economics and Management, 14(3) 500-519.

Avison, D. & Malaurent, J. (2007). *Impact of cultural differences: A case study of ERP introduction in China.* International Journal of Information Management, 27(5) 368-374.

Baki, B. & Çakar, K. (2005). *Determining the ERP package-selecting criteria: the case of Turkish manufacturing companies.* Business Process Management Journal, 11(1) 75-86.

Berchet, C. and Habchi, G. (2005). *The Implementation and Deployment of an ERP System: An Industrial Case Study.* Computers in Industry, 56(6) 588-605.

Brown, D.H. & Kaewkitipong, L. (2009). *Relative size and complexity: e-business use in small and medium sized tourism enterprises in Thailand.* Journal of Enterprise Information Management, 22(1/2) 212-231.

Brown, D.H. & Lockett, N. (2004). *Potential of Critical E-applications for Engaging SMEs in E-business: A Provider Perspective.* European Journal of Information Systems, 13(1), 21-34.

Brown, D.H. & Thompson, S. (2011). *Priorities, Policies and Practice of E-government in A Developing Country Context: ICT Infrastructure and Diffusion in Jamaica.* European Journal of Information Systems, 20(3) 329-342.

Chen, R.S., Sun, C.M., Helms, M.M., and Jih, W.J. (2008). *Role Negotiation and Interaction: An Exploratory Case Study of the Impact of Management Consultants on ERP System Implementation in SMEs in Taiwan.* Information Systems Management, 25(2) 159-173.

Currie, W.L. (2004). *The Organizing Vision of Application Service Provision: a Process-oriented Analysis.* Information and Organization, 14(4), 237-267.

Davis, F. D. (1989). *Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology.* MIS Quarterly, 13(3) 319–340.

DiMaggio, P.J. & Powell, W.W. (1983). *The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields.* American Sociological Review, 48(2) 147-160.

Double-soft Certification 2012. Available from <http://210.76.65.143/srrd/jsp/main/index.jsp>, ShenZhen City, People's Republic of China, [Accessed 20th July 2012]

Esteves, J. & Bohorquez, V. (2007). *An Updated ERP Systems Annotated Bibliography: 2001-2005.* Communications of the Association for Information Systems, 19(20) 286-446.

Esteves, J. and Pastor, J. (2001). *Enterprise Resource Planning Systems Research: an Annotated Bibliography.* Communications of the Association for Information Systems, 7(8) 1-52.

Easterby-Smith, M., Thorpe, R., and Jackson, P. (2008). Management Research, 3rd Edition, SAGE publication, London.

Ge, L.P. & Voß, S. (2009). *ERP Application in China: An Overview.* International Journal of Production Economics, 122(1) 501-507.

Gu, V.C., Cao, Q. and Duan, W.J. (2012). *Unified Modeling Language (UML) IT adoption - A Holistic Model of Organizational Capabilities Perspective.* Decision Support Systems, 54(1) 257-269.

Haller, S.A. & Siedschlag, L. (2011). *Determinants of ICT Adoption: Evidence from Firm-level Data.* Applied Economics , 43(26) 3775-3788.

Holland, C & Light, B. (1999). *A Critical Success Factors Model For ERP Implementation.* Journal IEEE, 16(3) 30-36.

Huang, Q.H. & Gamble, J. (2011). *Informal Institutional Constraints and Their Impact on HRM and Employee Satisfaction: Evidence from China's Retail Sector.* The International Journal of Human Resource Management, 22(15) 3168-3186.

Ifinedo, P. (2011). *Examining the Influences of External Expertise and In-House Computer/IT Knowledge on ERP System Success.* Journal of Systems and Software, 84(12) 2065-2078.

Kamal, M.M., Hackney, R. and Ali, M.( 2013). *Facilitating Enterprise Application Integration Adoption: An Empirical Analysis of UK Local Government Authorities*. International Journal of Information Management, 33(1) 66-75.

King, J.L., Guibaxani, V., Kraemer, K.L., McFarlan, F.W., Raman, K.S., and Yap, C.S. (1994). "Institutional Factors in Information Technology Innovation." Information System Research 5(2), 139-169.

Liang, H. & Xue, Y. (2004). *Coping with ERP-related Contextual Issues in SMEs: A Vendor's Perspective.* The Journal of Strategic Information Systems, 13(4) 399-415.

Lun, Y.H.V. & Quaddus, M.A. (2011). *Firm Size and Performance: A Study on the Use of Electronic Commerce by Container Transport Operators in Hong Kong.* Expert Systems with Applications, 38(6) 7227-7234.

Marble, R.P. & Lu, Y.P. (2007). *Culturalizing Enterprise Software for The Chinese Context: An Argument for Accommodating Guanxi-based Business Practices.* International Journal of Production Economics, 107(2) 364-379.

Molnár, B., Szabó, G., and Benczúr, A. (2013). *Selection Process of ERP System.* Business Systems Research, 4(1) 36-48.

Nandhakumar, J., Rossi, M. and Talvinen, J. (2005). *The Dynamics of Contextual Forces of ERP Implementation.* The Journal of Strategic Information Systems, 14(2) 221-242.

Panorama consulting, 2013 ERP report, Available from <http://panorama-consulting.com/services/erp-software-implementation/> [ accessed 26.02.2014].

Parker, C.M., Burgess, S. and Al-Qirim, N. (2015). *A review of studies on information systems and SMEs in high ranked IS journals (2000-2014).* Australasion Journal of Information Systems, 19 153-173.

ShenZhen City Council 2005. Implementation Plan for the Convenient Services (Blue Tunnel Project) for SMEs in ShenZhen, Available from <http://www.szsmb.gov.cn/content.asp?id=26218> [accessed 28.02.2014].

ShenZhen City Council, 2011[No.9], Opinions to Implement 'Peacock Scheme' to Introduce Oversea High-level Talents, People's Republic of China, Available from <http://www.szsti.gov.cn/info/policy/sz/4> [Accessed 3rd June 2013]

ShenZhen City Council 2011[No.210], Policies to Develop the Industry of Information Technology, People's Republic of China, Available from <http://www.szsti.gov.cn/info/ policy/sz/20>[Accessed 3rd June 2013].

Srivastava, M. & Gips, B.J. (2009). *Chinese Cultural Implications for ERP Implementation.* Journal of Technology Management and Innovation 4(1), 105-113.

Stevenson, M., Hendry, L.C. and Kingsman, B.G. (2005). *A Review of Production Planning and Control: The Applicability of Key Concepts to the Make-To-Order Industry.* International Journal of Production Research, 43(5) 869-898.

Tan, J., Tyler, K. and Manica, A. (2007). *Business-to-Business Adoption of eCommerce in China.* Information & Management, 44(3) 332-351.

The General Office of the State Council 2005[No.44], National Mid-and-long-term Plan for Science and Technology Development (2006-2020), People's Republic of China, Available from <http://www.gov.cn /jrzg/2006-02/09/content183787.htm>[Accessed 11th July 2012].

The Ministry of Industry and Information Technology 2008, Opinions and Notifications about Consolidating the Governmental Services and Motivating the Informatisation in SMEs, People's Republic of China, Available from

<http://www.miit.gov.cn/n11293472 /n11295074/n11298733/11623376.html>
[Accessed 31stMay 2013].

The Ministry of Industry and Information Technology of China 2013. The Completion Status of Main Economic Indicators of Software and Information Technology Service Sector (January–November, 2013), Available from <http://www.miit.gov.cn/n11293472/n11293832/n11294132/ n12858477/15780902.html> [accessed 28.02.2014].

The Ministry of Science and Technology, National Hi-tech Research Development Programme (863 Programme)", People's Republic of China, Available from <http://www.863.gov .cn/default.htm> [Accessed 15th July 2012]

The Ministry of Science and Technology, The Development Centre of Torch Hi-tech Industry (Torch Programme), People's Republic of China, Available from <http://www. chinatorch.gov.cn> [Accessed 15th July 2012]

The Ministry of Science and Technology 1993, Law of the People's Republic of China on Science and Technology Progress, People's Republic of China, Available from <http://www.most.gov.cn/fggw/fl/200710/t20071025_56667.htm> [Accessed 10th July 2012].

The Ministry of Science and Technology 2002, Law of the People's Republic of China on Popularization of Science and Technology, People's Republic of China, Available from <http://www.most.gov.cn/fggw/fl/200601/t20060106_53394.htm>[Accessed 15th July 2012]

Vega, A., Chiasson, M. & Brown, D.H. (2008). *Extending the Research Agenda on Diffusion: The Case of Public Program Interventions for the Adoption of e-business Systems in SMEs.* Journal of Information Technology, 23(2) 109-117.

Venkatesh, V. & Davis, F. D. (2000). *A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies.* Management Science, 46(2) 186–204.

Weerakkody, V., Dwivedi, Y.K. and Kurunananda, A. (2009). *Implementing E-government in Sri Lanka: Lessons from the UK.* Information Technology for Development, 15(3) 171- 192.

Xia, Y.Q., Lok, P. and Yang, S. (2009). *The ERP Implementation of SME in China.* In Proceedings of 6th International Conference on Service Systems and Service Management, 135-140.

Xu, Q. & Ma, Q. (2008). *Determinants of ERP Implementation Knowledge Transfer.* Information & Management, 45(8) 528-539.

Yin, R.K. (2009). Case Study Research: Design and Methods, 4th Edition, SAGE Publishing