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Can ERP and informality achieve a trade-off between efficiency and flexibility?

A simulation study on service operation

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ABSTRACT:

The paper presents a simulation study to examine tenancy service performance in a shopping centre. Our findings suggest a service company with informal activities to a certain degree could achieve a trade-off between efficiency and flexibility, because it overcomes inflexibility of fixed design enterprise system with continual improvements by frontline practises.

Keyword:

Informality, ERP (Enterprise resource planning), discrete-event simulation, service operation, activity based cost, flexibility measurement

1. INTRODUCTION

Enterprise planning systems are well known as a way of implementing efficient business process management and have been implemented by many companies (Harwood, 2003). However, these systems are also well known for their high failure rate, because the fixed designed planning system cannot satisfy flexibility performance requests (Al-Mashari, 2003). The benefit of informality is that it involves employees and leads to increased flexibility in meeting business needs (Morand, 2005). Recently literature on enterprise social software (enterprise 2.0) also suggests that informal structured communication supports flexibility and helps deal with uncertainty (McAfee, 2009; Bruno et al., 2010). Moreover informality is a significant feature in successful service companies that have customer-orientated services and show innovation in how they motivate individual employees. However, flexible informal interactions have limitations in individual-level and task-based

communications, which stem from the lack of guiding principles involved in this way of working (Wasko et al., 2009; Cook, 2008; Gutwin et al., 2008). Consequently costs may be incurred due to inappropriate informal activities.

It is thus proposed that a 'hybrid' system of ERP and informality might achieve both efficiency and flexibility in a complementary manner. However a traditional view is that efficiency and flexibility objectives are incompatible in that they are different business objectives which are pursued separately in different organizational environments (Mintzberg, 1979). Moreover, trade-off theory (Skinner, 1985) challenges the efforts of hybrid systems because it states that to gain an improvement on one side of the performance (i.e. flexibility), there will be a consequent penalty to be paid on the other (i.e. efficiency). Past research in this area includes the use of a combination of informal communication software and enterprise systems by SAP™ which has integrated Google Wave and BPMN based business process modelling in order to achieve real-time collaboration (Bruno et al., 2010). However there is little empirical evidence on the performance of hybrid systems that is grounded in operation reality and most literature on ERP implementation is based on identifying success factors in the manufacturer sector (Mabert et al., 2003; Poba-Naou et al., 2008; Snider et al., 2009; Forslund & Jonsson., 2010). Thus there is a lack of research examining enterprise system performance in service firms where informal processes are more prevalent. The research aims to provide The paper aims to provide evaluation study on efficiency and flexibility performance of hybrid system that combining theory on information system (ERP) adoption and theory on the concept of informality in organisations through discrete even simulation approach, which is based on service company background.

2. LITERATURE REVIEW

ERP and limitations

According to Slack (2010), operational efficiency means to reduce of complexity in operations, reduce the costs and decrease throughput time. ERP is well known for its efficiency capability in reducing process cycle time, quickly producing documentation, eliminating errors and duplicated data entry (Harwood, 2003). It is focused on optimal production, service, and resource scheduling, business performance forecasting, and intelligence execution to maximize the use of the enterprise's resources. The ERP systems use a standardized business processes design in order to integrate and streamline processes. Consequently, the streamlined processes benefit operational efficiency, reducing process cycle time, while the integrated environment enables an improvement in business outcomes to be achieved by sharing accurate information and optimising resource planning (Seddon and Shange, 2000).

The efficient nature of ERP systems is derived from its development from manufacturing firms' material requirement planning (MRP) systems and was technology originally designed for large organizations. The major function of MRP is to satisfy the needs for management control in large organizations by concentrating all information into one system. The technology integrated with inventory, bill of materials and master production scheduling (MPS) operation procedures. Consequently, business process management will be more efficient by reducing the delays, duplicated business processes, and effective scheduling of the usage of resource. (Jacobs and Weston, 2007) From MRP to MRPII (manufacture resource planning) and contemporary ERP, the integration of functions was extended to production data management (PDM), supply chain management (SCM), customer relationship management (CRM), executive information system (EIS) and business intelligence (BI)

systems. Thus the aim of efficient process management was developed to cover the entire enterprise.

However, the efficient business process management of ERP systems relies on the documented and standardized processes (Hyvonen, 2009; Irani, 2003). These documented processes will have negative impacts on operational flexibility, because the enterprise cannot react to changes quickly from internal and external events. (Bruno et al., 2011) Thus ERP systems are limited in terms of dynamical reconfiguration to match changing business models.

Informal management and limitation

Krackhardt and Hanson (1993) defined the informal organization as one in which work is based on social networks that employees from across functions and divisions use to accomplish tasks quickly. The informal networks enable firms to make unexpected achievements by cutting through formal reporting procedures to 'jump start' stalled initiatives (Foss, 2007). That is to say people working in the informal organization are flexible enough to deal with changes in the working environment. Thus front-line employees' experiences and intuitions can support the business operations and even organizational long-term strategy (Mullins, 2007). The distinctive traits of the informal enterprise are a flattened organization structure, more spontaneous interactions and communication, experienced and intuition based working manners, and a harmonious corporate environment.

According to Greasley (2009), flexibility means be able to change to offer a variety of products and services, or to react to customer demands quickly. As we have discussed informality could spur employees to use their knowledge in daily operations, rather than follow the existing norms. (Heeks, 2002) Thus they could provide an agile response to environmental changes and uncertainty. Moreover, informality could cut through formal procedures to speed up changes. Additionally, in the informal organization, the communication networks are of central importance for the dynamic workflows and

for flexible performance and innovation.

However, flexible informal interactions have limitations in individual-level and task-based communications, which might lead the informal communications to be from a lack of guiding principles. (Wasko et al., 2009; Cook, 2008; Gutwin et al., 2008) Consequently, inevitable costs will be incurred due to inappropriate informal activities. Furthermore, informal communication is difficult to measure and monitor, which implies a challenge for many firms to motivate staff to adopt informal networks.

Service operation and measurement

Chase (2010) pointed out service system with high customer contact is difficult to control and rationalize service performance due to frequent interactions and high involvement of customers. What is more, clients intrude make difficult to provide standardized activities by technology (Thompson, 1967). Thus, it is not appropriate for the service company copies the way of manufacturing firm using ERP, which is with standardized procedures design. However, Efficiency operation is important in services strategy, as the example of Sampson and Forehle (2006)'s research on 'Unified Service Theory'.

In term of service operation measurement, traditional service operation measurement only highlights the none-financial factor, which is relevant and specific feedback in order to take effective decisions in a changing environment (Aranda, 2003). Flexibility is dominant factor in the service operation research. However, in the efficiency OM concepts, such as batch scheduling, inventory control and simplification to back-office technology support to front-office service operation (Chase 2010). Therefore, the research measures the enterprise system in a service firm with efficiency and flexibility studies.

3. CASE STUDY

Jinsheng group is a middle size Chinese departmental store, which owns 10 furniture shopping centres in the East of China. It is based on leasing business model to operate shops in furniture shopping malls. The major business services are 'register tenant', 'sign contract', 'end contract' and 'renew contract'. Informal activities are based around the concept of Informal activities are based around the concept of 'good relationship' tenants. These are tenants designated by experienced marketing staff on the basis of having a good reputation, are large furniture retailers or have a previous good relationship with the company. Spaces for tenants in the mall are classified by floor and size. Usually a tenant will require a particular floor, depending on what type of goods they are selling, and a particular size, depending on the scale of their operation. A typical mall would have 6 floors and 3 space sizes (small, medium and large). However, good relationship tenants have propriety to jump queue to get the space that they required. It is quite informally that experienced frontline-staffs could adjust shop layout and tenants' contract duration in order to serve more 'good relationship' tenants.

Informal scenario

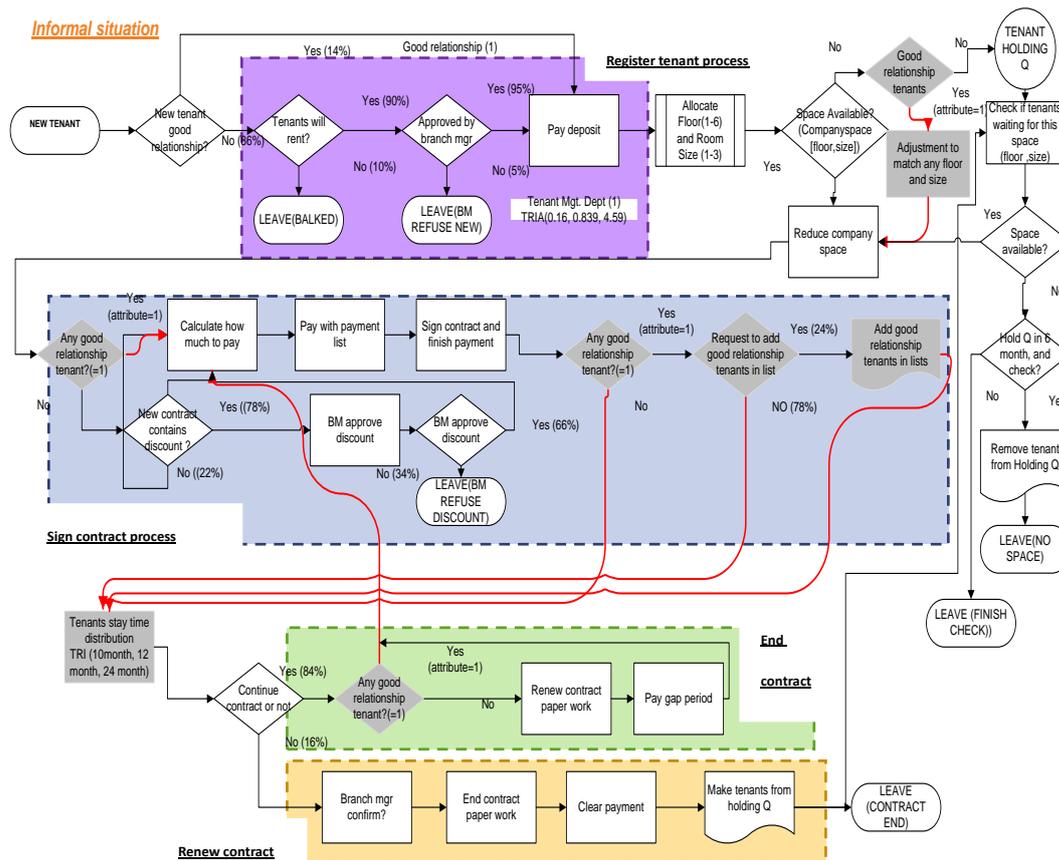


Figure 1. Conceptual model 1: informal scenario

The above conceptual model 1 shows how the company provide tenancy services with informal management.

When a tenant arrives, staff in the tenant management department will negotiate a contract and pass this for approval to the branch manager. The tenants' information will be documented. Staff will then check current available space in the shopping mall and if there is a space suitable for the tenant, a company space will be allocated to them. If there is no space available to the tenant, staffs will check whether the tenant in 'good relationship tenants list'. If no relationship exists, the tenant information will be held in six weeks to see if a suitable space becomes available. After then, if there is still no space available to them, the tenants will be removed from waiting queue list. However for 'good relationship' tenants experienced tenant department staff will make adjustments and allocate a space based on a match for either the floor or the size of space for the tenant. This is an informal activity

based on the experience of frontline staff to flexibly allocate space to tenants in order to improve service to their valuable customers.

In 'sign contract' process, a good relationship tenant can jump the process of approving discount by a branch manager, and obtain discounts by branch manager. The other tenants' contracts need to be checked and confirmed with discounts by manager. Manager does not sit at desktop every day. Thus the approval time is longer, which may last from a day to a week. After finish 'sign contract' procedures, experienced marketing staffs usually add good reputation or large furniture retailers to their good relationship lists, and have frequently contacts with them, which is the other informal activity based on staffs' experiences.

Usually contract duration is for 12 month. But some large tenants who play an important role in the furniture market can extend the contract to maintain a longer term relationship. When a contract is finished, the tenant can choose to continue or to end the contract. If the tenant wants to leave, he/she needs to inform the branch 2 month early. Thus tenant department staffs have time to find a new tenant. If the tenant's request is confirmed by the branch manager to ensure all payments are clear. Information on the tenant space released will be communicated to the tenant management department which will then attempt to allocate a suitable tenant to this space when possible. Thus in a summary of Jinsheng's document in 2010, the contract duration is from 10 month to 24 month. The decision of changes of contract duration is made after signing a formal contract.

In 'renew contract' service, A 'good relationship' tenant can jump the normal credit check procedures for new and existing contracts and sign a contract directly. The informal activity is as similar as in 'sign contract'.

In a summary, informal activities can be summarized into three types: (1) flexible adjust shop

layout based staff's experienced in order to provide priority to 'good relationship' tenants (2) jump long service procedures to 'good relationship' tenant (3) flexible changes existing contract duration

Hybrid system in the case study

Top managers in the executive board treasure these valuable experienced activities made by frontline staffs. However, the limitations of informal process management cannot be ignored. It is hard avoid bias to identity which tenant is good to tenants only base upon one staff or one interest group's opinion. However, staffs' experienced could not be measured by system. What is more, informal performance cannot be assessed in time because daily operation information is blocked within each branch. It is thus, an enterprise social communication platform was decided to build up simultaneously to provide a platform to share and track experienced based performance.

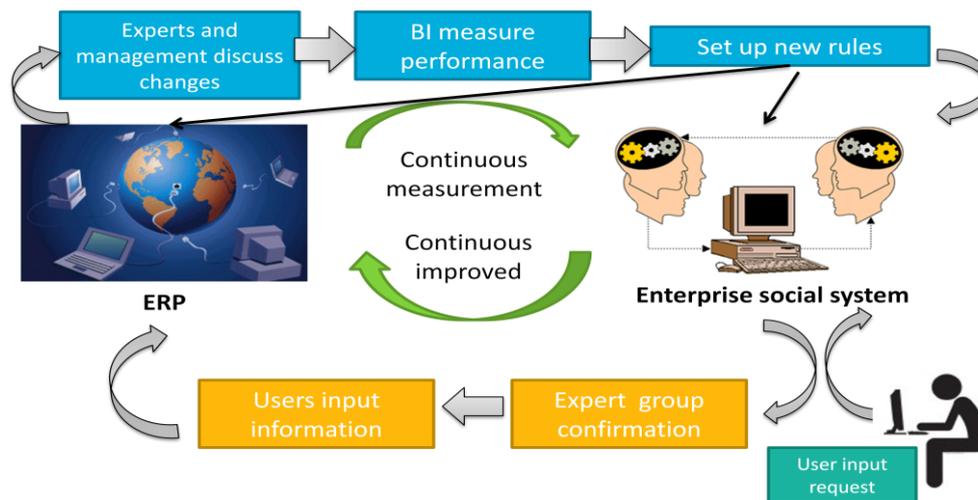


Figure 2. Hybrid system decision-making process

Stage 1: SENSE: frontline staff notices customer needs

Stage2: SHARE: The request is sheared online and region expert group approve on it.

Stage 3: TEMPORARY CHANGE: Users make apply temporary change

Stage 4: LEARN: Other branches learn and discuss it

Stage 5: TRACK & MEASURE: BI monitors and measures the change

Stage 6: PERMANENT CHANGE: Staffs make temperate changes in the system

As shown in the figure 2, hybrid system embedding enterprise social system with ERP supports to informal activities measurement in 5 stages. Frontline staff serves in branch shop every day. It is easy for them to notice local furniture market changes in related to each tenant's sales, consumers' interests, and nearby shopping centre production structure. For example, marketing department notices that it is necessary to change shop layout and production structure in order to satisfy changes of local consumers' interests. That is stage 1 'SENSE'. Some existing tenants need to move out from shop malls, and the other valuable tenants will come in. Then, stage 2 'SHARE' is to the request will be shared enterprise social system, and regional expert group approve on it through online platform. As it is approved, staffs can start to implement large shop layout adjustment. In order to attract more valuable tenants to them, they may request to change price structure or contract duration for these tenants. Stage 3 'TEMPERATE CHANGE' is made that staffs can apply the changes to valuable tenants in the ERP. The other branches also can 'LEARN' the changes through enterprise social system. After the changes can been done in the shop centre, business intelligence tools of ERP system can 'TRACK' the changes and 'MEASURE' the performance results in the branch, such as monthly mall profit, monthly tenant sales and monthly number of consumers in. These results guide region expert group to make decision to do 'PERMANENT CHANGE' on modify 'good relationship' tenant list from new tenants or changes contract contents to benefit establish good connection with them.

In order to simplify the hybrid system conceptual model (figure 3) and focus on main service procedures analysis, the results of hybrid system will be represented in the following model, without decision-making process in detail. In 'sign and renew contract' procedures, informal activities are approved by region expert group. Thus the probability of occurrence of modifying contract content and

4. THE SIMULATION STUDY

The main purpose of the study to measure performances in two scenarios (informal operation model and hybrid system) and ensure which model is best to the firm. The simulation model is built based on the tenants' services procedures, which includes four activities: 1) register a tenant; 2) sign a contract for the tenant; 3) end a contract for a tenant; or 4) renew a contract for a tenant. The thesis is to use simulation to assess operation performance between different scenarios.

- **The first scenario** contents is manual operation model with mass of informal activities, such as providing short routes to valuable tenants based on staffs' experience, flexible indentifying contract duration and make adjustment to provide more available space to valuable tenants. For valuable tenants, and flexible changes the layout of mall centre to fulfil tenants' requests. The model is built up based on observation of before ERP implementation operation model in Jinsheng Group. (Conceptual model 1)
- **The second scenario** demonstrates hybrid system that combines both of formal ERP systems and informality to some certain degrees. The informal activities are only purely based on staffs' experiences, but also regional expert group are involved in approval the informal procedures and increase the credible of usage informality. The conceptual model is established based on after ERP implementation operation model. (Conceptual model 2)

Data collection and analysis method

The data collection of process time and cost is through 3-month observation and interviews in stage of before and after enterprise implementation in Jinsheng Group. Simulation input distribution of tenant's requests is selected from Jinsheng group's documents in 2010-2011. The analysis of input data is used of ARENATM curve-fitting software from data collected on observing the duration in each

activity. The average of data sample for each experiment factor is more than 50. Continuous distributions available include the uniform, exponential, normal, triangular, lognormal, gamma and Weibull (Greasley, 2004). The study is used of goodness-of-fit to choose the most appropriate distribution.

Performance parameters

In order to achieve the objectives, the performance measurement the simulation is used to provide metrics in terms of both efficiency and flexibility in the mall operation. According to Slack et al. (2010) operational efficiency means to reduce the complexity in operations and so to reduce costs and throughput time. Ruch (1982) states that greater efficiency is achieved when reducing inputs whilst maintaining the same level of output. Thus the simulation will use the measures of tenant throughput time and process costs as a measure of efficiency. Flexibility is a very general concept that describes a firm's ability to match production or service to market demand under conditions of uncertainty and variability (Iravani et al., 2005). Flexibility can be measured in terms of range (the amount of change) and response (the speed of the change). In this case the time that 'good relationship' tenants wait for a space is used to reflect the flexibility the organisation provides when allocating tenants to spaces. The proportion of spaces utilised by 'good relationship' tenants is another output measure used to evaluate flexibility. The summary of simulation output is shown in the following figure 4.

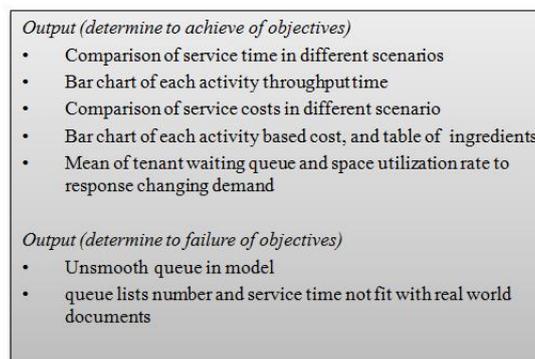


Figure 4. Model output

Simulation software

ARENA™ is marked with system modelling corporation (Kelton et al., 2009). It is beneficial to connect models to indicate process flows of entities through the simulation system, and then detailing the models using dialog boxes to identify. The software also contains animation function and allows displaying results in dynamic graphics and extensive reports in texts (Law and Kelton, 2000). The study uses the tool to model before and after hybrid system implementation scenarios, and compares the experimental parameters with software animation. Figure 5 shows the simulation model 'before ERP (informal) scenario'.

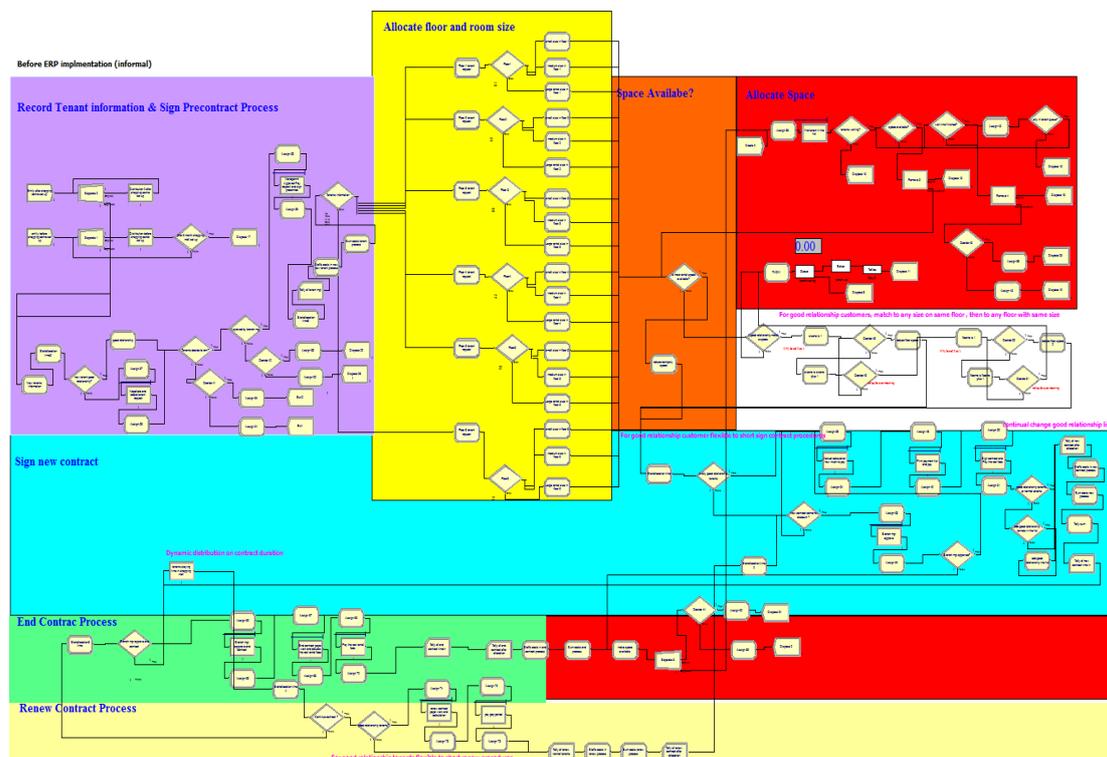


Figure 5. Informal scenario: Simulation model and animation

Result Validation

The study result validation is to check the documented model with real ERP system project flow chat, and observe the simulation experiment running with project manager, and check the model with validation criteria. Validation of model is conceptual validation is to ensure conceptual model is close

to reality. (Greasley 2004) As shown in the following table, the model validation is achieved by comparing the difference between experiment results and the company's documents. The comparison includes the number of tenants in the shop centre, number of tenants waiting in the queue, and each service time. In the two model result validation, the average difference in service time is below 15% is considered to be acceptable (table 1).

	Simulation	Reality	Difference
Informal scenario			
Number of tenants in shopping mall	486	460	5.35%
Number of tenants waiting in the queue	29.4	27	8.16%
Register tenant service time (minutes)	16.2	18	-11.11%
Sign contract service time (minutes)	33.2	31	6.63%
End contract service time (minutes)	31.2	32	-2.56%
Renew contract service time (minutes)	2.55	3	-17.65%
Hybrid system scenario			
Number of tenant in shopping mall (minutes)	490	480	2.04%
Tenant waiting in the queue (minutes)	27.7	25	9.75%
Register tenant service time (minutes)	9.22	9	2.39%
Sign contract service time (minutes)	11.5	12	-4.35%
End contract service time (minutes)	14.3	14	2.10%
Renew contract service time (minutes)	4.41	5	-13.38%

Table 1. Results validation: average number of process time in key service activities & number of tenants in mall

5. RESULTS:

The following shows efficiency and flexibility measurement results for twenty simulation runs over 10 years operation. The study first assesses efficiency performance from the perspectives of process times and costs.

Efficiency measurement

Activity based time

Table 2 shows the compare average process time in each activity. Through compare-t test in simulation output analysis, the informal and hybrid system models have distinctive difference. The figure 6 shows

43.6 minutes differences in the overall average service time. In comparing each activity based time the 'tenant registration' and 'end contract' service time has decreased after adoption hybrid system, which are over than 45%. (Table 2) But as shown in the figure 9, the 'new contract' process time is not decreased as much as the other two activities. Moreover, the 'renew contract' process time has increased after implementing hybrid system. That is due to long approval procedures of expert group when dealing with 'good relationship' tenants. (Figure 7) However, the implementation of hybrid system still provides better efficiency performance by decreasing process time in compare with implementation informal operation model.

Process time comparsion			
Average Activities time	Informal OM (mean)	Hybrid system OM (mean)	
Tenant mgt. activity	16.2		9.22
New contract mgt. activity	33.2		11.5
End contract mgt. activity	31.2		14.3
Renew contract mgt. activity	2.55		4.41
Total time	83.15		39.43

Table 2. Process time for key service activities

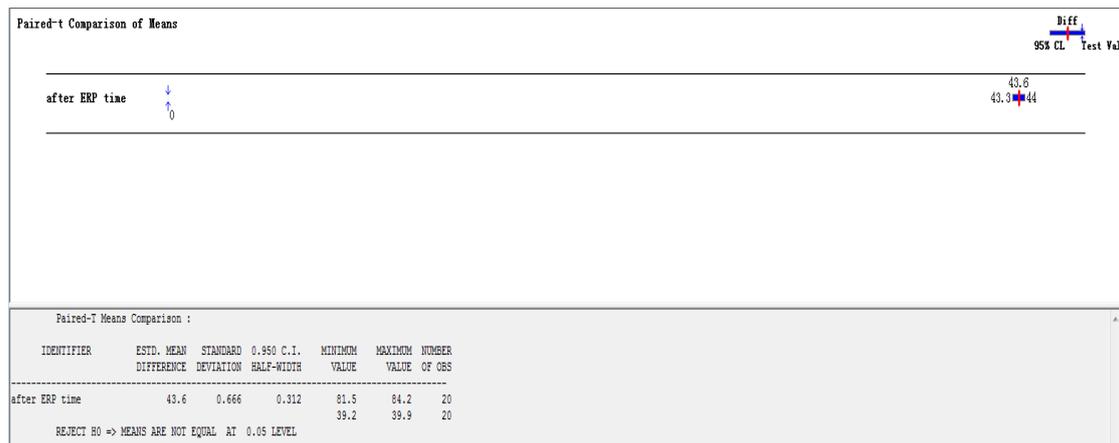


Figure 6 Compare-t test: compare two models of process time on mean

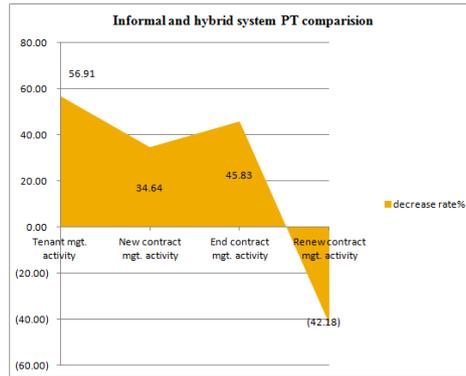


Figure 7. Process time decrease rate after implement hybrid system

Activity based cost

The cost analysis uses an activity based costing (ABC) approach which is defined as a measurement tool that assigns cost to activities based on the usage of resources, and assigns cost to cost objects based on the usage of activities (Turney, 1996). The distinctive benefit of ABC is not only analysing costs, but also unraveling the stories behind the numbers (Kaplan and Cooper, 1998), because it recognizes the causal relationship of the driver of costs to activities. In this study the ABC approach is used to measure the cost performance of the hybrid system in comparison to the informal system. The ABC approach is used to compare cost in three perspectives: cost driver, resource driver and activity driver.

- Cost driver relates to the design efficiency of the activities within the tenant management process such as the ‘new tenant’ and ‘renew tenant’ processes.
- Resource driver relates to the resource costs within the process such as tenant management departmental staffing costs, finance departmental staffing costs, marketing staffing costs, and management group costs.
- Activities driver relates to the time and frequency of an activity. In this study, activity driver analysis is done by analysis average time and frequency of each activity.

Figure 8 shows the two model has distinctive difference on costs. The average of costs after hybrid system implementation is decreased, which is 786 RMB each month.



Figure 8. Compare t test: compare two models of costs per month on mean

Figure 9 summarizes the cost driver analysis in the two experimental scenarios. It was found that ‘renew contract’ activity cost has not reduced. However, it has increased nearly 90%. ‘Tenant registration; and ‘end contract’ service has a sharp decreased on cost. Tenant registration’ and ‘end contract’ services show a sharp decrease in cost with changes of more than 70%.

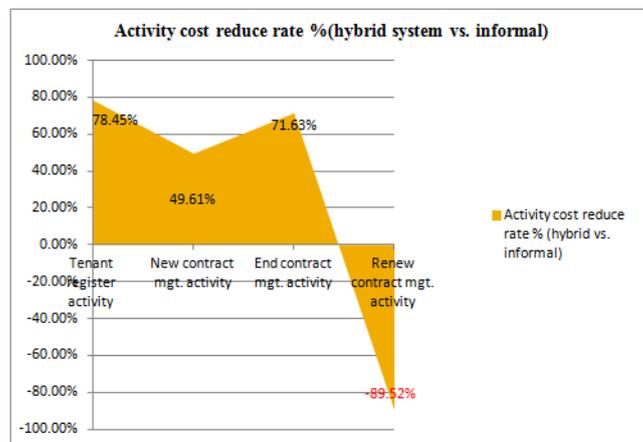


Figure 9. Cost driver: cost decrease rate after implement hybrid system

In the resource driver perspective (Figure 10) the new system brings significant changes in manager’s costs, especially in the activities of ‘new contract’ and ‘renew contract’. In the ‘new contract’ process the proportion of managers’ cost is increased from 3% to 72%. What is more, the percentage of managers’ costs in the ‘renew contract’ process is changed from no costs to a high ratio, which is close

to 95%. Costs are higher as management’s resource cost is more than double the salary compared with normal workers. Costs are also higher as within the expert group there is both a branch manager and a top manager who sits on the executive board who participate in the approval of important informal activities. Most of the informal activities need to be approved in the ‘new contract’ and ‘renew contract’ services, such as approval of short procedures on confirming ‘good relationship’ tenant’s discount and credit check in renewing a contract, or modifying good relationship tenant’s lists after finishing a contract. This provides one of the reasons why the average costs on renewing contract have been increased after using the hybrid system.

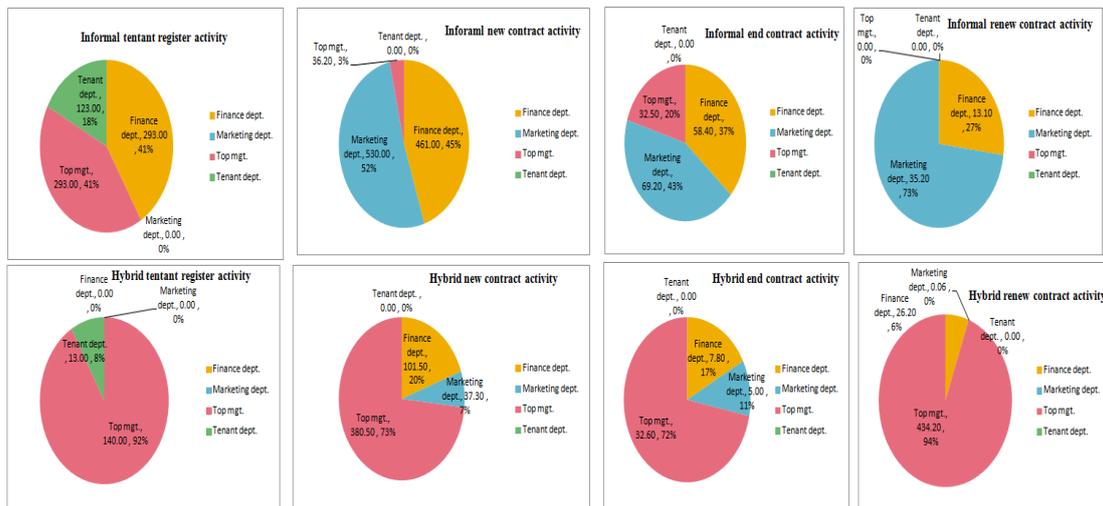


Figure 10. Resource driver analysis

In an activity driver perspective, table 3 shows the frequency of occurrence in ‘new contract’ and ‘renew contract’ activities have increased in the hybrid system scenario. The higher frequency of these activities will increase costs.

Activity driver	Informal	Hybrid	increase rate (%)
Tenant register activity	4617.00	4489.00	-2.85
Sign a new contract activity	5027.00	5151.00	2.41
End contract activity	934.00	913.00	-2.30
Renew contract activity	3603.00	3738.00	3.61

Table 3. Activity driver analysis: frequency of each activity

Flexibility measurement:

Flexibility evaluation is achieved by assessing flexibility responsiveness speed in face to changing volume of customer demands. And the available capacity of shopping centre in different experiment scenario is analysed to measure flexibility volume. Table 4 compares speed in flexibility and modification capability between informal and hybrid system scenario.

	Informal			Hybrid		
	Overall utilization rate	GR space utilization rate	queue speed	Overall utilization rate	GR space utilization rate	queue speed
120 + EXPO(407)	99	27.2	12.8	97.6	14.4	2.19
30 + EXPO(303)	99.6	26.9	12.1	99	13.6	1.93
120 + EXPO(165)	99.8	27.6	14.5	99.3	14.1	1.76
Expo (275)	99.7	28.4	13.3	99.5	14.4	1.55
32 + EXPO(215)	99.8	31.2	12.1	99.7	14.5	1.93
36 + EXPO(210)	99.8	31	12.1	99.6	14.3	1.99
30 + EXPO(209)	99.8	30.9	11.8	99.7	14.4	2.04
45 + EXPO(162)	99.7	34.8	13.7	99.8	13.9	1.87
27 + EXPO(166)	99.8	34.2	12.2	99.8	14.5	1.64
45 + EXPO(148)	99.8	35.6	14.5	99.7	14.2	2.06
11 + EXPO(167)	99.8	35.4	12.9	99.7	13.9	2.47
32 + EXPO(131)	99.8	36.9	11.2	99.8	13.9	1.53
32 + EXPO(103)	99.8	38	15.4	99.8	14.5	2.14
24 + EXPO(99)	99.9	39	13.7	99.8	14.2	2.38
30 + EXPO(97.5)	99.8	38.4	11.7	99.7	14	2.19
32 + EXPO(94.2)	99.8	38.8	13.1	99.8	14	1.79
32 + EXPO(88.7)	99.8	39.5	13.3	99.7	13.6	1.69
27 + EXPO(86.4)	99.8	39.9	16.1	99.8	14.5	2.23
21 + EXPO(85.7)	99.7	28.4	16	99.8	14.3	1.89
24 + EXPO(77.8)	99.9	39.9	12.5	99.8	14.4	2.18
18 + EXPO(76.3)	99.9	40.5	16	99.9	14.4	1.66
21 + EXPO(70.9)	99.9	39.8	14.9	99.9	14.4	1.8
30 + EXPO(57)	99.9	40.9	13.5	99.8	14	1.45
18 + EXPO(54.2)	99.9	42.1	12.3	99.9	14	1.86
18 + EXPO(32.2)	99.9	43.5	12	100	14.6	2.49
Average	99.776	35.552	13.348	99.636	14.2	1.9484

Table 4. Flexibility measurement: Compare queue speed and space utilization rate

As customer's demand increased, the average speed to allocate a space to a tenant is 13.3 minutes in the informal scenario. However, under the hybrid system staff can use the ERP system to find suitable shop space for tenants and the response speed is no more than 2 minutes.

From the perspective of evaluation the ability to modify available capacity to meet tenants' changing demands the performance in the hybrid system model is reduced slightly because it maintains informal management in 'sign and renew contract' procedures, but it cannot flexibly adjust the shop layout.

In addition, informal model present a better performance on flexibility on adjust shop layout for good relationship tenants. The percentage of good relationship tenants before using hybrid system is two times more than after implementation. The more good relationship tenants in the shop centre, the more profit will be gain. It is because that good relationship tenants are usually large or high reputation furniture retailers, whose contract incomes are 3 times more than normal tenants' contracts. And good relationship tenants' reputation can help the shopping centre to increase sales, and then increase rental fees in the mall.

6.DISCUSSION:

In a summary, efficiency performance has been improved after implemented hybrid system. In the perspective of activity based analysis, process time and costs on most service activities has significant improvements expect renewing contract service. Also signing contract service's time and cost are not decreased as much as the other services. One reason is because of approval procedures of informal activities are long and costly. The other reason is the frequency of occurrence in signing and renewing contract service is increased as well. However, increasing these two activities' occurrence is beneficial to company to gain more profits.

The benefit of flexibility in allocating tenant space in the informal model is clear. It can improve customer service. For example, informal model has better performance in average space utilization and

has more good relationship tenants in the shop. Consequently, the company with informal management mechanism can earn more from good relationship tenants. However, it must be noted that flexible informal interactions have limitations in individual-level and task-based communications, which might lead the informal communications to be from a lack of guiding principles (Wasko et al., 2009; Cook, 2010; Gutwin et al., 2008). The informal management encourages the involvement of social participants' knowledge, which are opacity, facelessness, and anonymity emerging from person, being interpersonal and social relation, without well documented. (Mullins, 2007) Thus it is hard to track and control invisible informal process, let alone retrieve related information for analysis. For instance it may be risky to rely on an individual front-line staff member to select a particular tenant from the waiting queue for preferential treatment. The hybrid system provides a communication platform to share people's experiences and so guide frontline staff in their decisions and help to minimise the waste that might be generated due to inappropriate informal activities.

7. CONCLUSION

To conclude, provide a dynamic understanding of how informal management mechanisms enhance ERP systems through the use of a discrete-event simulation approach. The research shows the benefits of embedding informal concepts within an ERP adoption at a service firm. This shows the potential of combining the traditional strengths of ERP in providing better efficiency with flexibility to react to customer's requests. Informal management has better performance to satisfy customer's requests that make modification based on frontline-staffs' experience, while ERP is efficiency in service speed and cost. The hybrid system supports informal procedures, but enterprise social system support online platform to share, guide, and document staffs' experiences. Finally, ERP tools can measure experienced

based activities in order to improve the performance. It is therefore, hybrid system could achieve trade-off efficiency and flexibility in operation.

REFERENCES

Aranda, A. D. (2003) "Service operations strategy, flexibility and performance in engineering consulting firms", *International Journal of Operations & Production Management*, Vol. 23 No. 11, pp. 1401-1421.

Bruno, G., Dengier, F., Jennings, B., Khalaf, R., Nurcan, S., Prilla, M., Sarini, M., Schmidt, R., & Silva, Rito. (2011). Key challenges for enabling agile BPM with social software, *Journal of Software Maintenance and Evolution: Research and Practice*, 23(4), 297-326.

Cook, N. (2010) *Enterprise 2.0: how social software will change the future*, Burlington: Gower Publishing limited.

Chase B. R. (2010) Revisiting "Where does the customer fit in a service operation" background and future development of contract theory, *Handbook of Service Science*, Service Science: Research and Innovation in the Service Economy, Springer Science Business Media, LLC.

Elmes., B. M., Strong., M. D., & Volkoff., O. (2004) Panoptic empowerment and reflective conformity in enterprise system-based organization, *information and organization*, 15, 1-37.

Foss, J. N. (2007). The emerging knowledge governance approach: challenges and characteristics. *Organization*, 14(1),29-52.

Forslund, H., & Jonsson, P. (2010) Selection, implementation and use of ERP systems for supply chain performance management, *Industrial Management & Data Systems*, 110(8), 1159-1175.

Greasley, A (2001) Costing police custody operation. *Policing: An International Journal of Police*

- Strategies and Management*, 24(2), 216-227.
- Greasley, A (2004) *Simulation modelling for business*, England: Ashgate Publishing Ltd.
- Greasley, A (2008) *Enabling a simulation capability in the organization*, London:Springer-Verlag London Ltd.
- Gutwin, C., Greenberg, S., Blum, R., Dyck, J., Tee, K., & McEwan, G. (2008). Supporting informal collaboration in shared-workspace groupware, *Journal of Universal Computing*, 14 (9), 1411–1434.
- Heeks, R. (2002). Information system and developing countries: failures, success, and local improvisations, *The information society*, 18, 101-112.
- Harwood, S.(2003) *ERP the implementation cycle*, Burlington: Butterworth-Heinemann.
- Hwang, Y. (2005) Investigating enterprise system adoption uncertainty avoidance, intrinsic motivation and the technology acceptance model, *European Journal of Information Systems*, 14, 150-161.
- Irani, Z., Themistocleous, M., & Love, P. (2003). The Impact of Enterprise Application Integration on Information Systems Lifecycles, *Information & Management*, 41(2), 117-187.
- Iravani. M. S., Oyen. V.P.M., Sims. T. K. (2005). Structural flexibility: a new perspective on design of manufacturing and service operation, *Management Science*, 15(2) 151-166.
- Jacobs, F. R., & Weston, T. J. (2007). Enterprise resource planning (ERP)- A brief history. *Journal of operational management*, 25(2), 357-363.
- Krackhardt, D., & Hanson R.J. (1993). Informal Networks: The Company Behind the Chart, *Harvard Business Review*, July, pp. 104-105.
- Kaplan. S. R., & Cooper, R. (1998) *Cost and effect using Integrated cost system to drive system to profitability and performance*, Boston: Harvard Business School Press.

Koontz, H., & Weihrich, H. (2005) *Essentials of management*, (7th edition), Tata McGraw-Hill Publishing Company Limited.

Kelton, D. W., Sadowski. P.R., Sturrock T.D. (2009) *Simulation with Arena*, New York: McGraw-Hill Companies, Inc.

Law. M. A., & Kelton. D. W. (2000) *Simulation modeling and analysis* (3rd edition), USA: Mc Graw Hill, Inc.

Mintzberg, H. (1979).*The structuring of organizations*. Englewood Cliffs, NJ: Prentice-Hall

Mabert , A. V., Soni, A., & Venkataramanan (2003) *Enterprise resource planning: Managing the implementation process*, European Journal of operational research, 146(2), 302-314.

Morand.D. A.(2005). The role of behavioral formality and informality in the enactment of bureaucratic versus organic organizations, *The Academy of Management Review*, 20(4),831–872.

Mullins.L, J (2007) *Management and organizational behavior*, (8th edition), Person Education Limited.

McAfee, A. (2009). *Enterprise 2.0: New Collaborative Tools for Your Organization's Toughest Challenges*, Boston: Mcgraw-Hill Professional.

Poba-Nzaou, P., Raymond, L., & Fabi, B. (2008) Adoption and risk of ERP systems in manufacturing SMEs: a positive case study, *Business Process Management Journal*, 14(4), 530-550.

Ruch, W.A. (1982) “The measurement of white-collar productivity”, National Productivity Management Review, Winter, pp.47-58.

Skinner, W. (1985) *Manufacturing: The Formidable Competitive Weapon*, John-Wiley & Sons, Ltd.

Seddon B. P and Shang: S.(2002) A comprehensive framework for classifying the benefits of ERP systems, *MCIS 2000 Proceedings*, (pp:1005-1014), Retrieved 16 July, 2010, from

<http://aisel.aisnet.org/amcis2000/39>.

- Sampson, S. E., and Froehle, C.M., (2006). Foundations and Implications of a Proposed Unified Services Theory. *Production and Operations Management* 15(2), pp. 329-343.
- Sinder, B., da Silveira, J.C.G., & Balakrishnan, J. (2008) ERP implementation in SMEs: analysis of five Canadian cases, *International Journal of operation & Production Management*, 29(1), 4-29.
- Slack, N., Chambers, S., & Johnston, R. (2010) *Operations management* (6th edition), Essex: Prentice Hall.
- Thompson, J. D. (1967). *Organizations in Action* , New York: McGraw-Hill, p. 20.
- Turney, B.B.P. (1996) *Activity based costing: the performance breakthrough*, London: Kogan Page Ltd.
- Wasko, M.M., Teigland, R., & Faraj, S. (2009). The provision of online public goods: Examining social structure in an electronic network of practice, *Decision Support Systems*, 47(3),254-265.