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ADOPTING CVA TO EVALUATE ES BENEFITS’ IMPACT ON ORGANISATIONAL EFFECTIVENESS IN AUSTRALIA

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Abstract

This paper is an evaluation of Enterprise Systems (ES) implemented in Australian organisations in the last ten years. This study is interpretive, addressing the impact of ES on the whole organisation via case studies. The impact of ES was investigated in the organisation both internally and externally addressing both intangible and tangible benefits. The evaluation was based on the Competing Value Approach (CVA) to establish the outcomes of ES on human resource, internal processes, on external opportunities and on management. Major contribution this paper makes to ES theory is that interpretive studies can equally evaluate ES impact, and CVA based evaluation enables the establishment of tangible and intangible benefits both internally and externally. Research presented in this paper is a set of preliminary findings of ES in nine Australian organisations.

Keywords: Enterprise Resource Planning, Enterprise Systems, Benefits Evaluation, Competing Value Approach, Organisational Effectiveness.
1 INTRODUCTION

Enterprise Systems are large and complex software packages (Davenport, 1998) that provide real time information processing and analytical capabilities (Seddon et al., 2010) which attempt to improve the overall organisational effectiveness of the adopting organisations (Shang and Seddon, 2000). The ES market growth remains positive with global ES market growth predicted to be USD50.3 billion by 2014 (Forrester, 2011). SAP currently dominates the ES market at 24%, with Oracle and Microsoft trailing at 18% and 11% respectively (Panorama, 2011). ES is now considered the standard technology in many organizations for their business operations (Al-Mashari, 2003a). The growth of the ES markets and the benefits of ES are well documented in the works of various researchers (Al-Mashari et al., 2003; Bajwa et al., 2004; Aloini et al., 2007).

Due to the large amount of ES investments, the study of ES benefits has become one of the most prominent streams in ES research (Esteves and Pastor, 2001). Extant ES benefits evaluation studies have a strong emphasis on quantitative performance-based metrics for financials and operational (Chand et al., 2005; Cotteleer, 2006; Cotteleer and Bendoly, 2006). Although there are numerous studies on one or more aspects of performance-based ES evaluation, to date studies that evaluate benefits holistically including both tangible and intangible benefits are sparse. A review of the ES literature shows that ES benefits are intangible as well as tangible (Murphy and Simon, 2002) and may vary from operational, managerial, strategic, technological to organisational (Shang and Seddon, 2000). To fill void of a holistic evaluation of ES this paper adopts the Competing Value Framework (CVF) as a theoretical lens to evaluate ES benefits’ impact on organisational effectiveness internally as well as externally.

The following sections of this paper include a review of literature on ES benefits, current studies on ES evaluation, issues in relation to ES evaluation highlighting the need for a holistic approach to evaluation of ES. It then describes the competing values approach, followed by a description of the research methodology for the evaluation of nine Australian organisations that implemented ES in the last ten years. It then discusses the findings followed by a discussion and conclusion.

2 LITERATURE REVIEW

One of the strongest arguments for ES implementation lies in its ability to deliver benefits for the adopting organisations (Shang and Seddon, 2000; 2002; Karsak and Özogul, 2009; Seddon et al., 2010). It is well documented that when ES is fully implemented in a business organization, it delivers numerous benefits (Abdinnour-Helm et al., 2003; Al-Mashari, 2003b; Seddon et al., 2010). Shang & Seddon (2000) classified ES benefits into the following five categories:

1. Operational – benefits associated mainly with the use of information technology to cut costs, raise outputs by automation of basic repetitive operations;
2. Managerial – analytics informational benefits provided to management by ES with their centralised databases and data processing capabilities;
3. Strategic – strategic benefits associated with long-term welfare of the organisation;
4. IT infrastructure – benefits provided by sharable and reusable IT infrastructure that provide stability for the current business and flexibility for the future;
5. Organisational – benefits that primarily impact organisation structure, human resources and system users.

As ES benefits impact adopting organisations in various dimensions (Shang and Seddon, 2000) and organisational levels (Murphy and Simon, 2002), it is also important for management to evaluate what benefits have been derived from their ES (Shang and Seddon, 2002) in order to justify the investments made (Al-Mashari and Al-Mudimigh, 2003). Therefore the following section discusses the approaches used to evaluate ES benefits.
2.1 ES Benefit Evaluation Approaches

According to Ahituv (1980) ES evaluation approaches can be classified into two categories, the pragmatic assessment such as benefit analysis, and theoretical evaluation. However, the diversity of approaches and theories available seems to suggest that evaluation of ES remains diversified (Ahituv, 1980; Remenyi & Sherwood-Smith, 1999; Seddon et al., 2010). A review of literature on ES evaluation (1999 - present) is presented in Table 1 indicating three generic approaches: i) performance-based; ii) interpretative; & iii) theoretical.

<table>
<thead>
<tr>
<th>Evaluation Focus</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance-based: (financial, operational, accounting, balanced scorecard)</td>
<td>(Rosemann and Wiese, 1999; Poston and Grabski, 2000; Edwards, 2001; Murphy and Simon, 2001; Hitt et al., 2002; Murphy and Simon, 2002; Hunton et al., 2003; Chand et al., 2005; Cotteleer, 2006; Cotteleer and Bendoly, 2006; Wieder et al., 2006; Hendricks et al., 2007)</td>
</tr>
<tr>
<td>Interpretative-evaluated via case studies and interviews</td>
<td>(Markus et al., 2000; Shang and Seddon, 2000; Themistocleous and Irani, 2001; Shang and Seddon, 2002; Ash and Burn, 2003; Hawking et al., 2004; Themistocleous, 2004; Themistocleous and Chen, 2004; Gefen and Ragowsky, 2005; Holsapple and Sena, 2005; Spathis and Ananiadis, 2005; Ifinedo, 2007; Ifinedo and Nahar, 2009)</td>
</tr>
<tr>
<td>Theoretical-use of theories or conceptual models for the evaluation of ES benefits</td>
<td>(Kennerley and Neely, 2001; Stefanou, 2001; Beretta, 2002; Legare, 2002; Singletary, 2002; Beard and Sumner, 2004; Hedman and Borell, 2004; Hsu and Chen, 2004; Bendoly and Schoenherr, 2005)</td>
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Table 1. ES Benefits Evaluation Perspectives

Other methods include the use of traditional appraisal methods to justify investments in IT and information systems (Poston and Grabski, 2000; Hitt et al., 2002). The primary reason for the growing need to evaluate investments in ES implementations is the need to justify the capital spend on these systems (Anandarajan and Wen, 1999; Alshawi et al., 2003). Accountants or financial staff have long been the key players in decisions regarding IT investment, and it is noted that due to their background and training, they traditionally seek answers in terms of monetary terms (Anandarajan and Wen, 1999). Their tendency to focus purely on a cost-benefit analysis and key methods favoured by them are net present value (NPV) and internal rate of return (IRR) (Bacon, 1992; Ballantine and Stray, 1999), Cost Benefits Analysis (CBA) and Return on Investments (ROI) (Ballantine and Stray, 1999).

The use of financial techniques do have their advantages (Anandarajan and Wen, 1999), however, traditional financial tools and techniques lack the precision in definition and results that management executives expect and require (Alshawi et al., 2003). Alshawi et al. (2003)suggest that the costs of IT is often perceived to be easier to estimate than the benefits. The costs associated with IT implementations appear to be more tangible due to the assumptions and dependencies on which they are based (Alshawi et al., 2003). Management and system analysts also sometimes ignore the significance of qualitative benefits when conducting evaluation (Anandarajan and Wen, 1999). Benefits such as improved decision making, customers satisfaction and enhanced employee productivity achieved from ES contribute significantly to the business but are usually not well incorporated in the evaluation process (Anandarajan and Wen, 1999).

Traditionally, evaluation approaches focussed on technical questions, largely ignoring social implications (Ballantine et al., 2000). However, Hirschheim & Smithson (1987) have argued that for IT/IS evaluation to be meaningful, the inclusion of both social and technical aspects are essential, although social aspects tend to be subjective in nature and are difficult to analyse (Hirschheim and Smithson, 1987). The lack of effective quantitative methods to justify the IT and ES contribution has resulted in the increase in alternative measures (Lesjak and Vehovar, 2005). More recent IT/IS evaluation approaches are shifting towards the social aspects and incorporate subjective and qualitative factors(Shang and Seddon, 2000; Hawking et al., 2004; Holsapple and Sena, 2005).
attempts by ES researchers to adopt theoretical approaches to evaluate ES benefits, (Beard and Sumner, 2004; Hsu and Chen, 2004; Bendoly and Schoenherr, 2005). Serafeimidis and Smithson (2000) noted that there was a gap in theoretical works on IS evaluation and the practices found within literature. Lesjak and Vehovar (2005) suggest that quantitative approaches relating to hard statistical measures can only be possible with financial data therefore qualitative approaches have a higher tendency to justify IT investments. This view is supported by Kleist (2003, cited in Lesjak & Vehovar, 2005) who recommends the need for a balance between both approaches – not overly qualitative to encourage improper projects but not overly quantitative to discourage good projects.

2.2 Issues with ES Benefits Evaluation

ES benefits are crucial for the establishment of the business case for ES adoption (O’Leary, 2004) as well as justification of the ES investment (Gefen, 2004; Gefen and Ragowsky, 2005). Earlier studies (Ross and Vitale, 2000; Murphy and Simon, 2002; Al-Mashari and Al-Mudimigh, 2003) have shown that organizations do not always achieve all their expected/anticipated benefits from IT investments. It is also noted that benefits achieved from ES may vary across industries (O’Leary, 2004). Given that ES benefits evaluation is complicated (Gefen, 2004; Gefen and Ragowsky, 2005; Seddon et al., 2010), current literature highlights the need to include social and soft in the measurement of IT benefits. The impact of ES benefits may be immediate, short term or long term (Murphy and Simon, 2001; Murphy and Simon, 2002). According to Murphy & Simon (2002), tangible benefits tend to be operational and financial and more quantitative in nature whereas intangible benefits tend to be strategic and less quantitative in nature. From what has been identified in the literature review, it is clear that ES benefits entail both tangible and intangible benefits that are operational, financial, internal and external.

2.2.1 Tangible and Intangible Benefits

IT adoption particularly ES implementations results in both tangible and intangible benefits (Anandarajan and Wen, 1999; Murphy and Simon, 2001; 2002; Al-Mashari and Al-Mudimigh, 2003; Hsu and Chen, 2004). O’leary (2004) noted that tangible benefits are largely industry-independent and intangible benefits is industry-dependent. According to Al-Mashari and Al-Mudimigh (2003), tangible benefits are in the form of inventory reduction, reduction of personnel, increased productivity, improvement in order management, more rapid closing of financial cycles, reduction in IT and procurement costs, improvement of cash flow management, increased revenue and profits, reduction in transportation and logistics costs, reduction in the need for system maintenance, and improvements in delivery. On the other hand, intangible benefits refer to increased visibility of corporate data, improved business processes, improved responsiveness to customers, unanticipated reduction in cost, tighter integration between systems, standardization of computing platforms, increased flexibility, global sharing of information, Y2K compliance, visibility into SCM processes (Al-Mashari and Al-Mudimigh, 2003), performance improvements that primarily impact internal processes (Berghout and Remenyi, 2005). Other forms of intangible benefits include business flexibility to meet market changes, empowerment of users, facilitate business learning, and ability to support organisation changes (Murphy and Simon). Soft or intangible benefits do not always lead to identifiable performance improvements and cannot be easily evaluated with traditional financial means (Murphy and Simon, 2001; Murphy and Simon, 2002; Berghout and Remenyi, 2005). However, there is a need to capture the qualitative and quantitative benefits to justify the changes achieved from ES implementations (Al-Mashari, 2003b), and it is imperative that intangible benefits are where possible quantified and incorporated into the evaluation process (Anandarajan and Wen, 1999).

Al-Mudimigh et al. (2001) have suggested that ES implementations can impact adopting organizations at three levels: strategic, tactical and operational. These levels have their own issues but are interdependent and impact each other, with different benefits derived (Al-Mudimigh et al., 2001) from IT implementations. Similarly, Irani & Love (Irani and Love, 2001; Irani and Love, 2002; Irani et al., 2003) associate IS benefits to traditional levels of top management, middle management and
operational management. Other researchers (Gable et al., 2003; Dolins, 2006) have also attempted to classify IT value according to levels or dimensions. Gefen & Ragowsky (2005) show that there exists a certain degree of discrepancy in terms of benefits gained when evaluation is done at different levels especially at the subunit level (i.e. manufacturing plant) of an organisation. Issues affecting benefits evaluation discussed above indicate that for the evaluation of ES benefits it is important to look at benefits achieved from various perspectives.

2.3 Need for a New Approach for ES Evaluation

ES, despite being rigid in nature and lacking flexibility (Lindley et al., 2008), provide wide ranging benefits for the adopting organisations (Shang and Seddon, 2002; 2007) and tend to be internal (Borell and Hedman, 2000; Hedman, 2000) and process oriented (Gattiker and Goodhue; Cotteleer and Bendoly, 2006). However, it is also evident that ES can deliver intangible, external, tactical and strategic benefits (Murphy and Simon, 2002). Kohli & Devaraj (2003) highlight that evaluations of IT contributions to organisations need to address three main issues: 1) what is measured; 2) how is it measured and; 3) where is it measured. In “what is measured”, the data source and analysis approach have an impact on the evaluation results. The duration of data collection describe how the data was gathered determined by the sample size or data points in the study. On the issue of “where is it measured”. Kohli & Devaraj (2003) suggest that IT performance evaluation should be associated with variables that go beyond traditional measures and encompass both productivity and profitability measures. The review of current literature demonstrates a strong emphasis on performance-based evaluations and a lack of an all encompassing theoretical approach considering all types of benefits. As such, the use of Competing Value Approach is adopted for evaluating ES benefits in this research study.

3 COMPETING VALUES APPROACH

The CVF is an accepted method for assessing overall organizational effectiveness since it combines diverse indicators of performance. The four models of CVF (Quinn and Rohrbaugh, 1983) provide competing views on the meaning of organizational effectiveness. Human relations is characterized with a focus on internal flexibility to develop employee cohesion and moral and is focused on human resource development, participation and empowerment. Open systems model is focused on external flexibility and relies on readiness and flexibility to gain growth, resource acquisition, and external support. Internal process model is focussed on internal stability and control. Rational goal model is focused on external control and relies on planning and goal setting to gain an increase in productivity. CVF also incorporates three sets of competing values, flexibility and spontaneity vs stability and predictability (related to organizational structure); internal vs external (related to organizational focus) and means vs ends (Buenger et al., 1996). Hedman & Borell (2002) noted, “that while different organisational models reflect different effectiveness criteria, they are not dichotomous” (p. 130). The four quadrants of the CVA is presented in Figure 1.

<table>
<thead>
<tr>
<th>Human Relationship Model</th>
<th>Flexibility</th>
<th>Open System</th>
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<tbody>
<tr>
<td>Cohesion; morale</td>
<td>Flexibility; readiness</td>
<td></td>
</tr>
<tr>
<td>Internal</td>
<td></td>
<td>External</td>
</tr>
<tr>
<td>Information management; communication</td>
<td>Planning; goal setting</td>
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</tr>
<tr>
<td>Internal Process</td>
<td>Structure</td>
<td>Rational Goal Model</td>
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CVA has been used by researchers to study executive leadership and to evaluate organisational effectiveness (Hart and Quinn, 1993; Rojas, 2000), organisational life cycles (Quinn and Cameron, 1983), and organisational value (Cameron et al., 2006). CVA has also been utilised in the information system discipline to investigate the relationship between environment, technology values and structure (Buenger et al., 1996), study of executive support systems (Carlsson and Widmeyer, 1994), evaluation of marketing information systems (Sääksjärvi and Talvinen, 1996) and the evaluation of B2E systems (Mooetherill and Singh, 2009). More recently, the framework has been extended to discuss address organisational effectiveness achieved from Enterprise Systems (Borell and Hedman, 2000; Hedman, 2000). They suggest that CVA is useful for evaluating ES by mapping ES impact based on the four effectiveness criteria described below.

1. ES – Human Resource (ES-HR) is the first subtype and assists an organisation in the area of human-capital development. HR capabilities and features achieved from ES are E-mail, voice mail and videoconferencing. These ES capabilities enable communication and collaboration amongst the employees, and the management to empower, monitor and motivate employees.

2. ES – Open System (ES-OS) focus on structural flexibility with an external emphasis. This ES features support environmental scanning, and issues of tracking and probing for marketing opportunities and entrepreneurship.

3. ES – Internal Process (ES-IP) is the third subtype that focuses on internal controls which supports associated organisational roles, processes and workflows. ES supports effective management and control of business processes including finance, production, warehousing, accounts and marketing.

4. ES - Rational Goals (ES – RG) has an external focus which assists managers with goal setting, forecasting, simulations and sensitivity analysis.

To establish ES benefits both internal and external to organisations, the CVA is an appropriate framework addressing human resource, internal processes, marketing and entrepreneurship and organisational management. This paper extends the CVA framework for evaluating ES proposed by (Hedman and Borell, 2002) to the Australian context.

4 MOTIVATION & RESEARCH QUESTION

The realisation of ES benefits is essential for the justification of the investments made by the organisation (Seddon et al., 2010). The focus of earlier ES evaluations have been mostly performance based focusing on financial (Poston and Grabski, 2000; Hitt et al., 2002) and operational (Cotteleer, 2006; Cotteleer and Bendoly, 2006) indicators. Furthermore, these studies were mostly undertaken with Fortune 500 companies (Poston and Grabski, 2000; Hitt et al., 2002), US-based organisations (Murphy and Simon, 2001; Murphy and Simon, 2002) or Europe-based organisations (Themistocleous et al., 2001; Ifinedo, 2007). Although ES is widely used in Australia (Gartner, 2007), there is still a lack of studies undertaken to understand the ES benefits achieved by Australian organisations. Hence, this research attempts to evaluate the benefits achieved from ES by Australian organisations, utilising the CVA framework, using an interpretative approach to address the following research question:

- Which internal and external benefits are achieved from ES for organisational effectiveness?

5 RESEARCH METHODOLOGY

An interpretive (Walsham, 1995; Walsham, 2006) and qualitative multiple case studies (Benbasat et al., 1987) approach was used to investigate the benefits achieved from ES by organisations in Australia. Case studies approach has been successfully utilised in the understanding of various individual, group, organisational, social, and political related phenomena (Benbasat et al., 1987; Yin, 1993; 1994). Case studies allow researchers to concentrate on the dynamics present within the organisational settings (Eisenhardt, 1989). Interpretive case studies allow the researchers to understand
complex social phenomena (Walsham, 1995) by focusing on the “human thought and action in social organisational contexts situation” (Klein and Myers, 1999, p. 67). In addition, an interpretive approach emphasises on the complexities and complications of human actions and provides the researchers insights to the phenomena through the meanings that people assign to them (Klein and Myers, 1999). Multiple-case designs are appropriate for descriptive, theory building or theory testing and also allow for cross case analysis (Benbasat et al., 1987). Therefore a case study approach was adopted to study the ES benefits achieved by organisations from an organisational effectiveness perspective.

Data was collected via document and web site analysis and face to face interviews with nine large (ATO, 2006) Australia-based organisations that had implemented a SAP ES in the last ten years. Initial contact with ES managers was made at a SAP conference held in Melbourne, Australia. ES managers were purposely selected for this study due to their role as ES project managers who were responsible for the evaluation of post-implementation, business process optimisation, and benefits realisation from the ES. Based on Nolan and Norton’s (2000) suggestion that ES benefits tend to mature after 3 years, a key criterion for the selection of the managers to participate in this study was that they have to be managing the project for more than three years. Given the nature of this study was primarily exploratory, the number of case studies conducted was deemed appropriate by the researchers. Furthermore the use of multiple-case studies allows for cross analysis and extension of the theory or model and provides more general research results (Benbasat et al., 1987).

The interview tool for the case studies entailed a mix of semi-structured and open-ended questions that allowed the researchers to solicit opinions and comments on the benefits achieved from the ES implementations. Each interview lasted about two hours, was audio-recorded and later transcribed and written up. Thematic coding (Miles and Huberman, 1994; Boyatzis, 1998) was applied to the data collected to capture the qualitative richness of the phenomenon that assisted in the identification and development of themes (Boyatzis, 1998) for internal and external outcomes of the ES implemented. Descriptive or inferential information from the analysis were labelled and catalogued. Information was organised to detect similarities from the nine case studies to establish the internal and external benefits achieved by the organisations.

6 FINDINGS

A set of preliminary findings indicate that six out of the nine organisations investigated were Australian, two European and one American owned, with number of employees ranging from 1to 7.5 thousand. Nature of business for these organisations ranged from manufacturing and retail to entertainment and government services. Annual turnover for the organisations were in between AUD 700,000 and 2,500 million. Although three of the organisations were at the early stages on ES implementation with only one to three ES modules implemented, most others were fairly well established with more than 5 ES modules implemented. Some of these organisations were still operating different business processes on systems other than ES. As described in the research methodology section, all implementations were more than three years old, and less than ten. Organisational demography is presented in Table 1, in Appendix One.

The findings from the nine case studies are discussed in the following section of this paper under the four quadrants of the CVA framework for ES. The data for these findings are presented in Table 2 in Appendix One.

6.1 Impact of ES on Human Resource

ES benefits in the nine Australian organisations that impacted on human resource effectiveness include:

**Empowering employees** - With the exception of organisation F, all organisations indicated that ES managed business processes enabled transparency of data, with clear indication of who completed the task/s, enabling more input from other employees and supported improved and more detailed reports.
ES built in dashboards that were important facilitators of information between top management and employees in most organisations enabled empowering of employees and seeking their input.

A common vision– Managers of organisations A, B, G& H suggested that ES provided a channel for employees to understand organisational goals and Key Performance Indicators especially regarding financial targets. Organisation G reported that the implementation of ES allowed users to be more aware of best practices and models for change management.

Improved communication among staff members – The ES capabilities of email, video conferencing and voice mail supported improved communication and formalised communication channels. With the formalised communications channel Organisation H managed conflict management and promoted clear channels for accountability and responsibility.

Improved communication amongst different departments – Most respondents indicated that ES supported standardised transaction and processes facilitated better communication among departments and greater transparency in all processes.

Reorganisation of positions – Respondents from organisations A, B, C, D, E, F & H were required to learn new skills as a result of the ES implementation. The managers in these organisations expressed that there was a change in the nature of job descriptions resulting from the centralisation effect brought about by the ES implementation leading to new skill requirements.

Improved work life balance – Although there was limited evidence of an improved work life balance for employees in the organisations investigated, reduced time to manage different business processes was evident in organisations B, C&G.

Improved staff performance – The automation of tasks, transactions and authorisations, with the availability of information, increased employee performance in all organisations.

The above findings clearly indicate that ES helps improve employee productivity with its characteristics of transparency, efficiency and automation of processes. This finding is one of the first to highlight that a cohesive workforce with improved morale and better human resource development is achieved from ES.

Impact of ES benefits on Organisational Effectiveness from OS Dimension

ES benefits, which allow for structural flexibility, that contribute to organisational effectiveness from the open system perspective are presented in this subsection.

Business growth – Most managers (A, B, D, F, G, H, I) suggested that ES implementations provided their organisations with the capability to grow through better transaction processing, capitalise on supply chain opportunities, better customer management and improve asset utilisation.

New business alliances – The establishment of business alliances was limited from the cases, as there is a high dependency on partners to adopt the same ES platform and application i.e SAP. However, organisations D, E, G & H were successful in establishing business alliance with e-business partners.

Innovation –Organisations A, C, D, E, G & H were able to experience some form of innovation from their ES implementations. For example, Organisation A designed a new global ES project management template to be rolled out to their various international sites. Organisation C implemented new functionalities, such as travel management, project management systems and dashboards, not part of the initial ES projects. Organisation D implemented a third party application for its ES to image capture paper invoices.

Product/service differentiation –Organisations B &E reported that the ES provided the capability to differentiate its service offerings through e-commerce.

External linkages– Managers, except those of organisations A & B, stated that they were able to build external linkages with other organisations. The use of EDI (Electronic Data Interchange) was strengthened with standard ES data structure and templates.
**Extended market reach** – Organisations A, D, G & H demonstrated that ES helped increase their market share and helped them enter new markets. This can be attributed to the new e-commerce initiatives embarked by organisations A, D, G & H made possible by their ES platform.

**Improved customer service** – Overall, all except one manager, pointed out that customer service has improved with ES monitoring and delivery tracking capabilities. The information provided by the ES also allowed them to handle returns and customer complaints relatively quick and the visibilities of deliveries enhanced their ability to forecast and plan better. Most of the managers indicated that their customers were better satisfied with ES processes.

**Organisation learning** – The change management that took place due to the ES implementation allowed users to understand more about the business processes and at the same time learn more about the functionalities of the ES.

**Organisational changes** – Most of the nine organisations adopting ES achieved positive organisational changes although it varied from organisation to organisation. Some of these changes included a tighter control of workflows and business processes (Case C) and shared finance and IT services management (Case E).

**IT flexibility for organisational changes** – All organisations agreed that the ES platform provided their organisations with greater flexibility for future changes for the creation of new divisions/units, entering new markets and new products.

**Provided a greater ease of integration, scalability or portability of IT systems** – All respondents indicated that ES provided their organisations with better integration, scalability and portability capabilities. Mergers of departments, upgrades to multiple ES platforms were now easier and cheaper. The same ES platform that the organisation is using can be easily adopted by subsidiaries or acquisitions and cater to increasing numbers of customers.

### 6.2 Impact of ES benefits on Internal Processes

Impact of ES benefits on internal processes is discussed in the following section.

**Standardised user interface** – ES enabled a standard interface in most organisations. As indicated by the manager from organisation B, users can now move from one division to another without the need for retraining.

> "The people that are doing customer based activities, call centre, sales and operational activities, they tend to all work from that one screen and they like the SAP screen because in the past legacy system (used) two different fronts and interfaces" Manager of organisation B

**Improved data and information quality** – All organisations experienced improvements in the quality of their data with ES capturing and processing real time data.

**Increased understanding and control of process and shared services** – All managers except one (G) concurred that their ES helped users gain a better understanding of processes. The better understanding of processes led to the creation of shared services, allowed business improvements and also created accountability for transactions. ES implementations enabled shared services, more commonly with finance and IT.

**Improved reporting and auditing** – Consolidated or customised reports generated by the ES have improved the process of reporting and auditing for all organisations. Transactions are accountable and there is greater visibility of the audit trail provided by ES.

> "We are audited three times a year... it’s a laborious process to go through that process not just once. But it’s a lot easier with SAP. Ten times easier, because SAP even provides all the audit trails for all the things you do, it provides the methodology of change and control.” Manager of organisation A
Easier maintenance of IT systems – Seven of the nine managers (A, C, D, E, F, H & I) reported that it is easier to maintain and support the ES platform although it incurred higher costs for maintenance. Technical expertise is more readily available to recruit and less manpower was required. However, ES vendors tend to roll out enhancements and upgrades frequently and hence organisations have to pay for the support.

Conformity to new national taxation, laws and regulations – All managers commented that the use of ES allowed their organisations to quickly adapt to new government taxation and regulations as the ES vendor incorporated the new rules in their upgrade packs.

6.3 Impact of ES from the rational goal dimension

This section describes the ES benefits that contribute to the organisation’s management.

Improved decision making and planning – All managers stated that ES has enabled easier and quicker generation of reports for forecasting, planning, procurement and market responses.

Cost reduction – Six organisations (B, E, F, G, H & I) experienced cost reductions in their operations due to ES supported resources management, optimisation of production operations and ES accelerated tools allowing for scalable functionalities and business processes.

Reduced cycle time – All organisations have reduced their production cycle time primarily as a result of better planning and control. For example, organisation H’s better planning led to a 20% decrease in production time and labour hours in their assembly lines.

Improved productivity – Eight of the nine managers indicated that overall productivity in their organisations increased which is primarily attributed to the application of ES. An example that was given by the manager of organisation I:

“They couldn’t reconcile their GL accounts in those areas …. So they’ve gone from a position from not being able to reconcile at all to being able to reconcile pretty much up to date on a daily basis.” Manager of organisation I

Improved product/service quality – Organisations B, C, D, E, F & H improved their product/service quality as a result of ES implementation. Managers in these organisations commented that the use of ES provided a high degree of consistency and quality across their product lines. Procurement functionalities in the ES allowed the management to monitor defective rates.

Business efficiencies – Most managers agree that the use of ES allowed their organizations to do business more efficiently with streamlined business processes, reduction in overheads and resources. This helped managers on new and additional tasks.

Improved logistics & supply chain management – Most of the managers indicated that their organisations’ logistics & supply chain management improved as result of ES implementation. Improvements include effective distribution of products, timely product deliveries, efficient transportation management, warehouse management and inventory control.

Improved partner services – Managers of organisation D, E, G & H noted improvements in services to trading partners, some of which supported their EDI systems as well.

Return on investment of ES – Only organisations C, E and H believed that there was a return on investment for their ES implementations. Their justification for the return on investment is driven primarily by the recognition of the soft benefits such as useful information for decision making, cost reduction in operations or increment in revenue.

Reduced lost sales orders – Organisations F & H reported that the tracking and monitoring capability of the ES led to a decrease in lost sales orders in their organisations. ES led transparency resulted in accountability for processing customer orders and all transactions processed.
Reduced work-in-process (WIP) – Organisations F, G & H experienced a decrease in work-in-process as a result of ES automation and analytics capabilities. The tighter controls for production led to a leaner production line and less inventory required for production. This reduced the work-in-process load for the manufacturing facilities.

7 DISCUSSION & CONCLUSION

The findings discussed above indicate that using the CVA framework, impact of ES is established both internally and externally. ES positively impacted on Human Resource (HR), Internal Processes (IP), dealing with customers and business partners (Open Systems), and management (Rational Goals).

**Figure 2. Summary of ES benefits common to all organisations**

- **HR**
  - Better staff individual performance, staff empowerment
- **IP**
  - Improved data and information
  - Better reporting and auditing
  - Conformity to new taxations, laws and regulations
- **OS**
  - IT flexibility
  - Ease of integration, scalability & portability
  - Better customer service
- **RG**
  - Better decision making & planning,
  - Improved management

The findings discussed above indicate that this research identified the positive impact of ES on human resource efficiencies, which was established using the CVA framework. This study confirmed that ES automate and integrated business processes in an organization confirming Bakry and Bakry’s (2005); Davenport, (1998); Shang and Seddon (2002) and Su and Yang, (2009) findings on ES’s ability to integrate processes. The findings also confirmed that ES supports computational, data storage and data transmission supporting information flows, reporting and business analytics within and between organisations, confirming Seddon et al’s , (2010) earlier finding on ES data and information flows. This research confirmed that ES reduces costs (Davenport cited (1998) cited in Beard & Sumner ; Anandarajan & Wen, (1999), reduces cycle time (Shang & Seddon, 2000); Hawking et al, 2004), improves productivity, quality and customer service (Chand et al, 2005; Spathis & Anniadis, 2005). It also showed that ES enables better resource management, decision making and managerial control (Shang & Seddon(2002), while enabling business growth, innovation and business alliances (Spathis & Anniadis, 2005). Finally this research also highlighted that ES result in infrastructure development (Chung & Snyder, 2000; Davenport, 2000 b; Poston & Grabski, 2000 and Shang & Seddon, 2002).

In conclusion, the research showed that regardless of the ES modules implemented, organisational effectiveness from ES is realised both internally and externally in the form of both tangible and intangible benefits. It highlights that ES benefits in organisations should be measured as a whole rather than in parts since highly motivated and skilled employees, as well as improved business processes achieved from ES lead to greater business opportunities and improved customer service. It also shows that improved planning and strategy development for effective management results from ES implementation due to transparent processes, easy to monitor employee activities, and information management.

Research on ES discussed in this paper is a preliminary analysis of data, which needs to be validated via a survey of a larger sample of organisations with ES. However, the study reveals that interpretive studies are equally able to identify the benefits of ES just as positivist studies do. It also confirms that CVA is an effective tool for establishing organisational effectiveness achieved from new technologies.
References


Appendix One

<table>
<thead>
<tr>
<th>CVF</th>
<th>Theme (Benefits)</th>
<th>Organisations</th>
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<tbody>
<tr>
<td>HR</td>
<td>Empowers staff members</td>
<td>X X X X X X X X</td>
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<td></td>
<td>Provides common vision &amp; goals</td>
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<td></td>
<td>Improves communication among staff members</td>
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<td>Improves communication amongst different departments</td>
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<td></td>
<td>Reorganisation of jobs / personnel</td>
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<td></td>
<td>Improves work life quality</td>
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<td></td>
<td>Improves staff individual performance</td>
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<td>OS</td>
<td>Enables business growth</td>
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<td></td>
<td>Builds new business alliances</td>
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<td>Enables innovations</td>
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<td>Allows product / service differentiation</td>
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<td></td>
<td>Builds external linkages to other organisations (via system integration)</td>
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<td>Extends market reach</td>
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Table 2. Background of organisations approached for this research

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<tr>
<th>No. of employees (in '000s)</th>
<th>Annual revenue or budget (in AUD million)</th>
<th>Finance &amp; Control (FICO)</th>
<th>Material Management (MM)</th>
<th>Human Resource (HR)</th>
<th>Sales &amp; Distribution (SD)</th>
<th>Production Planning (PP)</th>
<th>Warehouse Management (WM)</th>
<th>Plan Maintenance (PM)</th>
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Table 2. Background of organisations approached for this research
<table>
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<th>Benefits</th>
<th>Code</th>
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<tr>
<td>Enhances customer satisfaction</td>
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<td>Enables organisation learning</td>
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<tr>
<td>Supports organisational changes</td>
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<td>Provides IT flexibility for organisational changes</td>
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<td>Provides greater ease of integration, scalability or portability of IT systems</td>
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<tr>
<td>IP: Standardises user interface</td>
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<td>Improves data or information quality</td>
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<td>Increases understanding and control of process</td>
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<td>Enables shared services</td>
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<td>Improves reporting and auditing</td>
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<td>Allows easier maintenance of IT systems</td>
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<td>Allows conformity to new taxation, laws and regulations</td>
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<td>RG: Improves decision making and planning</td>
<td>X X X X X X X</td>
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<tr>
<td>Reduces cost in operations</td>
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<td>Reduces cycle time</td>
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<td>Improves overall productivity</td>
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<td>Improves product/service quality</td>
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<td>Allows organisation to do business more efficiently</td>
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<td>Improves logistic &amp; supply chain management</td>
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<td>Improves partner’s (e.g. suppliers, customers) services</td>
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<tr>
<td>Achieves return on investment on the ES</td>
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<tr>
<td>Reduces lost sales from lost orders</td>
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<tr>
<td>Reduces work-in-process</td>
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Table 3.  Summary of ES benefits obtained from coding