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# Business Drivers in Contemporary Enterprise System Implementations

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## ABSTRACT

The purpose of this study was to examine ES implementation business drivers in the new millennium and reflect on future directions for ES adoption. The study was designed to explore 'typical' implementations, where typical illustrates what is normal or average. Semi-structured interviews were conducted with 14 key players in ES implementations, including ES vendors, ES consultants, IT research firms, and an ES hardware vendor. Two main issues, the implementation process and the organization, provide a framework to describe variations of typical ES implementations. Organization size, SME or large organizations, can be used to categorize two main types of ES implementations. Given that the ES market of large organizations is saturated, most ES implementations are in the SME category. The drivers behind SME implementations are: SMEs use core ES modules with minimum customization, ES vendors often manage implementation services, the number of users is around a hundred, and cost is below NZ\$3 million.

## Keywords

Enterprise systems, implementation business drivers, case study, SME

## INTRODUCTION

In the late 1990s, the high-end of the ES market became saturated because most large organizations had already implemented an enterprise system (ES). In response to the competition in the industry, ES vendors started including other applications as part of their ES offerings. New modules were added to the product portfolio to include functionalities such as supply chain management (SCM), customer relationship management (CRM), data warehousing, and artificial intelligence. In order to achieve this, ES vendors built the new functionalities in-house and acquired or partnered with specialized enterprise application vendors. Future ES applications are predicted to have less focus on transaction processing, to include managerial support systems as a standard offering, and to support various documents types such as multimedia and CAD (Kumar and Hillegersberg, 2000).

It is well known that most large ES implementations are completed by now, however the ES market is still showing progressive growth after the slowdown of the late 1990s (Broatch, 2001; Pamatatau, 2002a). Set in a New Zealand (NZ) context, the purpose of this study is to discuss ES implementation issues in the new millennium and identify key business drivers influencing ES adoption and implementation.

The study was designed to discuss implementations that can be described as 'typical,' where typical is defined as one that illustrates what is normal or average (Patton, 1990, p. 173). Therefore the main question for this study is: *what are the main issues or drivers associated with typical ES implementations?* To answer this question, empirical findings from interviews with 14 key players in the ES market analyzed and are reported.

This study is divided into four sections. The next section outlines the research methodology. The third section presents the empirical findings from 14 interviews with key players in the ES market. The analysis and discussion in this section identify typical ES implementation drivers in a process-and-organization framework. The fourth section is a concluding summary that draws upon four implementation models that dominate implementation activities in the ES market.

## METHODOLOGY

Although NZ is a small country when compared to many developed countries elsewhere in the world, it is renowned for having one of highest rates of IT adoption in the world. As a result, exploring IT issues in a NZ context provides an insight to futuristic trends and paths in IT development.

The study was carried out between November 2001 and May 2002. The main source of data was interviews with key informants in the ES implementation industry. Secondary data included ES vendors' publications, industry publications, and informal discussions with both colleagues and other informants working in organizations that had implemented an ES system.

To protect the anonymity of participating informants, their names are withheld. Furthermore, all cited comments are not associated with a particular organization unless informants agreed to their inclusion.

### The identification of key informants

The key informants' list was developed to include key players of ES implementation. Table 1 lists the key informants for this study under the four categories of ES vendors, ES consultants, IT research, and ES hardware vendors. Job titles for the 14 informants included: Vice-President, Managing Director (2), General Manager, Consulting Manager (2), Partner Manager, Partner, Consulting Services Manager, Professional Services Manager, Operations Manager, Entrepreneurial Services, Sales Enterprise Technology Trends Analyst, and Senior Analyst.

Type	Organization
ES vendors	Baan, Intenia, J.D. Edwards, Navision, Oracle, PeopleSoft, SAP
ES consultants	Cap Gemini Ernst & Young, Ernst & Young, KPMG Consulting, PricewaterhouseCoopers
IT research	Gartner Limited, IDC
ES hardware	Compaq

Table 1. Key informants

Potential informants were mainly identified through browsing the companies' Web pages and their marketing brochures. If no personnel contacts could be identified, a phone call was made to the head office to ask for the name of the CEO, the managing director, the managing partner or a senior administrator of that organization or its consulting division.

An introduction letter personally addressed to each potential informant was then posted. The letter briefly introduced both the first author and the study, and asked for a 45-60 minute interview to share the informant's experience of ES implementation. These letters were sent in several streams during the period starting late November 2001 until March 2002.

### Establishing contact with informants

Each informant was contacted by phone a week to ten days after the letter was posted. In a few cases, the informant suggested a different person in the same organization be interviewed. Meeting documents were emailed to all informants prior to the meeting. Documents included the confirmation-of-meeting letter, research information sheet, and interview questions.

### Interview procedures

The purpose of the interview was to seek the judgment of experienced ES implementation stakeholders in answering the main question for this study, which is: *what are the main issues or business drivers associated with typical ES implementations?*

Ten of the fourteen meetings were face-to-face meetings and four interviews were teleconference meetings. At the start of each interview, the researcher gave a brief introduction explaining the research project, the contents of the research information sheet, and the concept of a typical ES implementation. The interview was open-ended and explored the concept of a typical case of ES implementation. The several probes that were given to encourage the discussion were:

- The number of users per ES implementation
- The number of modules implemented
- The cost of implementation in dollars
- The number of locations (or independent business units) where ES is implemented
- The size of the organization

Most informants discussed ES implementations in terms of their ES applications, their clients, and their implementation methodologies. As a result, each informant's perspective was limited by the particular experience each had in systems implementations.

## Data analysis

The researcher took handwritten notes during all interviews. Interview notes varied in length between two to four pages and were reviewed and rewritten within 24 hours of the time of the meeting, for clarity of meaning and better organization of the topics discussed. Notes were later typed into a word processor document and added to the electronic case study database.

The Nvivo 1.3 qualitative software tool (QSR, 2002) was used to manage data analysis of interview notes. Coding was semi-structured because responses were influenced by the probes on the interview questions sheet. Furthermore, some codes were pre-identified by the section headings of interview notes documents. The coding tree as shown in Table 2 was incrementally developed in the sequential coding of the fourteen interview documents.

Main category	Group	Issue/Driver	
ES implementation process	Time	Phases	
		Time-to-implement	
		Modules	
	Geography	Implementation models	Locations
			Implementation model-a (vendor-implementer vs. third-party -implementer)
			Implementation model-b (heavy customization vs. out-of-the-box)
Implementation model-c (new, upgrades, add-ons, and replace)			
Size		Implementation model-d (traditional vs. best-of-breed)	
		Cost	
		Users-number of Project structure	
Organization where ES is implemented		Organization size	
		IS maturity (mature, keen to understand IT, and IT is a cost to the business)	
		Organization ownership and profit-making status	
		Reach (global vs. national)	

Table 2. Coding tree

## EMPIRICAL FINDINGS

Two main categories became evident in analyzing interview data. “ES implementation” is related to the system implementation process and “organization” describes the organization in which the ES is implemented. Details of the sub-categories to each, which are listed in Table 2, are discussed next.

### ES implementation

ES implementation pointers, identified in the probes to interview questions, were based on time (phases, time-to-implement, modules, and locations), geography, implementation models, and size (cost, number-of-users, and project structure). Details of these are discussed next.

#### *Phases, modules and the time-to-implement*

ES implementation is usually divided into phase I (first implementation of an ES system) and phase II (supplementary modules implementation). The type of modules in a typical ES implementation differs depending on the implementation

phase. Table 3 summarizes the comments made by several informants to illustrate the relationship between the phase of implementation and the type of modules implemented.

<b>Respondent</b>	<b>Phase I (Core modules)</b>	<b>Phase II (Supplementary modules)</b>
Baan	Finance, Manufacturing, Purchasing & Sales, and Warehousing/ Stock Control	Service and Payroll
Cap Gemini Ernst & Young	Financials, Sales & Distribution, and Material Management Including Procurement	Plant Maintenance, Service Management, HR, Production Planning and Project System
Ernst & Young	Financial, Distribution, CRM, and Limited Manufacturing	Not discussed
Intentia	Financial, Manufacturing, Distribution, Inventory, and Transport Planning	Advance Planning and Business Warehousing
J.D. Edwards	Finance, Distribution, and Manufacturing	CRM, Payroll and HR
KPMG Consulting	Finance, SCM, and CRM	HR
Navision	Core Modules	E-commerce modules
PeopleSoft	Financials, Human Resources, and CRM	Not discussed
PricewaterhouseCoopers	Financials plus something else (e.g. Logistics, Contracts Management, Manufacturing, etc.)	Not discussed

**Table 3. Phase I and Phase II implementation modules by respondents**

Phase I implementations often include the core modules of Financials plus one or two other modules such as Distribution, Contracts Management, Supply Chain Management (SCM), Customer Relationship Management (CRM), and especially Manufacturing. Because of their human resources (HR) specialization, only PeopleSoft includes HR as a core module in phase I.

The length of time to the phase I implementations varied from 2.5 months to 2 years. Implementation durations suggested by four informants varied significantly and included the following ranges: 2.5-6 months, 3 months-2 years, 4-10 months, and 6-8 months.

Most informants agreed that the “majority of large companies have implemented ES since 1999 as part of their preparations for the year 2000. Everyone has core ES systems now. They are now focusing on perfecting their ES systems.” Gartner Group uses the term ERP II to describe the current era (Osborn, 2000), which by definition includes a majority of phase II implementations; especially in the high-end ES market. While theoretically the focus of ERP II should be on external collaboration rather than internal organizational integration (Comport, 2002; Hilsgen, 2001), one informant noted that the “focus of the current era is still internal rather than external and is likely to involve the integration of standalone systems, such as integrating organizational Web sites to back office ES systems.” The difference however is that the initiative for ERP II systems comes from “lower levels of the organization as opposed to being driven by the CEO”, which was the case for typical phase I implementations.

#### *Locations*

Location denotes the one or more sites where the ES system is implemented. Findings revealed that while single site ES implementation was more common in previous years, the number of multiple site implementations is on the rise. Navision reported that “four years ago the percentage was 1 to 4, now it is 3 to 4.” However most of these implementations follow the “one main site and branches” model that includes same image implementation at the branches. Two drivers are believed to be encouraging multi-site ES implementations. First, the ES product is increasingly becoming Internet capable, making it possible to be “implemented in one location and accessed from many.” The second is the growth in the NZ export market, which is demanding systems that are capable of integrating information across the globe.

## ES implementation models

Four models of ES implementation have been identified in analyzing the interview data. They are the ‘vendor-implementer vs. third-party-implementer’ model, the ‘heavy customization vs. out-of-the-box’ implementations model, the ‘new, upgrades and/ or replace’ model and the ‘traditional vs. best-of-breed’ implementation model. These models, and drivers encouraging their adoption, are briefly discussed next.

First, the ‘vendor-implementer vs. third-party-implementer’ model reflects who is responsible for managing the ES project. The research study found that while the third-party or consultant implementer model was more popular in the past, current implementations favor vendors' involvement. There are two main drivers for this trend. The first is vendor driven. In managing the implementation process, vendors are adding another source of revenue, especially when licensing revenues are decreasing. One informant explained that “ES vendors are now focusing on services to generate revenue, while clients respond well because the overall cost can be brought down significantly.” The second driver is the continuous growth in mid-market ES. ES vendors are targeting organizations that are more conservative and less experienced in managing the risks and complexity of IS implementation projects. These SME organizations prefer a “one-stop shop, which means there is no consulting partner. There is only one organization the client needs to deal with and one general manager they shout at when there is a problem.” However, a counter-trend in this area is that ES hardware vendors have started showing increasing involvement in the ES implementation process. Because most of these hardware vendors are likely to partner with a consulting firm in the provision of implementation services, informants suggested that as hardware vendors increase their involvement, this will generate future growth in the third-party ES implementation market.

Second, the ‘heavy customization vs. out-of-the-box’ implementation model reflects the implementation strategy. The heavy customization strategy assumes that the best practice of the ES software does not satisfy business needs. Therefore many, and sometimes major, changes to the software are needed to derive value from the ES. On the contrary, the out-of-the-box or the vanilla alternative assumes that the value of the ES software application is derived from the integration capabilities that are built into the software. Therefore if a misfit exists, the business process and not the software needs to change. However, because of the high cost and complexity of the heavy customization approach, the final choice may not be an issue of assumptions but driven by issues of cost, risk, and the amount of complexity the business can afford. Cost, which is a major driver for a vanilla implementation, had triggered a surge in out-of-the-box implementations products and methodologies that 1st tier ES vendors started pushing into the market since late 1999.

The ‘heavy customization vs. out-of-the-box’ decision has major implications on the change management strategy that accompanies the implementation of ES, because “when best practice is chosen, people issues become top priorities. When the implementation strategy is geared towards customization, it is more of a technical challenge.”

Third, the ‘new, upgrades, add-ons and/ or replace’ model depicts whether the implementation is new—which means a first implementation of an ES system, an upgrade—which is the implementation of a software upgrade to the current implementation, an add-on—which includes adding new modules to existing implementations, or a replace—which replaces an existing ES implementation with a different vendor’s software.

Informants’ feedback suggests that, for many large organizations, upgrades represent a significant amount of the work vendors engage in, especially 1<sup>st</sup> tier vendors. One of the 1<sup>st</sup> tier ES vendors interviewed stated that upgrades accounted for 10-15% of their total efforts. Furthermore, these upgrades are not considered trivial exercises because, most of the time, functionality is changing.

Second tier vendors suggested that companies increasingly will replace a 1<sup>st</sup> tier ES with a 2<sup>nd</sup> tier ES that is cheaper, and easier to configure and maintain (Pullar-Strecker and Braddell, 2002). In some of these examples, organizations saw no value in having a 1<sup>st</sup> tier ES system in place when they could only utilize 20% of its capability, plus they had to maintain legacy applications that supported a major part of their business needs. One 2<sup>nd</sup> tier ES vendor contended that “because of the total cost of ownership becoming very high, some clients also think that the initial decision (ES selection choice) was inappropriate.” This is another driver for ES implementation uncovered in this study.

Fourth, the ‘traditional vs. best-of-breed’ implementations model differentiates between the traditional approach, which is an ES implementation that includes modules that are vendor specific, and the best-of-breed or portfolio implementation that includes ‘cherry picking’ or implementing a mix of different vendors’ modules. Findings revealed that traditional ES implementations have stopped making headlines. One informant contended that “throughout the last 12 months, ES has not been a popular subject. It dropped off people’s radar screen.” Best-of-breed implementations are becoming more common now, especially in large organizations, which are “looking at implementing CRM, data warehousing and business intelligence systems that sit on top of their ERPs.” Another informant stated that “big ES are done. These are more of add-ons and bolt-on implementations now.” This is especially true for systems that need to satisfy NZ specific industries such as forestry or livestock. However, for most SMEs, traditional “ES systems meet most of their business requirements.”

This analysis of four implementation models reveals several drivers of current implementation practice. First, the increasing popularity of the vendor-implementer model is driven by both vendors' service offerings and clients' demand. Second, out-of-the-box implementation strategies are favored by many organizations because of spending constraints. However, for specialized businesses, these 'no frills' strategies might not suit. Third, current implementations are still a mix of new, upgrades, add-ons, and a replace of existing implementations. While the majority of new ES implementations are happening in SMEs, ES implementation activities in large organizations are focused on upgrades and add-ons. Finally, while traditional ES implementations still dominate new implementations, the best-of-breed model is favored in many upgrades, add-ons, and replacements. Furthermore, the best-of-breed model is widely accepted for new implementations in niche industries.

The hosting or the application service provider (ASP) implementation model was not included as a fifth type because it was mentioned by only one informant who noted that this model is only popular in NZ implementations of multi-national corporations. This suggests that adoption of the ASP model is still limited. However, this result may have been influenced by the choice of informants in this study. Adding a few informants from IS integration services firms may have changed the result to indicate ASP as a valid fifth model. Trade publications certainly suggest that ES hosting is becoming popular. Two ASP implementations of an ES, Oracle financials for the Warehouse (Pamatatau, 2002b) and Great Plains accounting for Fonterra (Malcolm, 2002) cited both cost-efficiency and the lack of internal resources as key drivers for choosing the ASP model for their ES implementations.

### Cost

Although NZ ES implementations share similar complexities to those elsewhere in the world, budgets are tighter. This makes cost a key driver. Some informants even identified cost to be "the most important criteria in selecting an ES system in NZ." Because of implementation complexity, one of the vendors interviewed said that there is "no way we can give a price over the phone." However, in comparing the different figures the informants provided, three main cost categories emerged. The first is the small to medium size implementations with costs between NZ\$50,000 and NZ\$700,000. The second is the medium-size implementations with costs between NZ\$700,000 and NZ\$3 million. The third is large implementations where costs are more than NZ\$3 million.

In this study, cost was defined as software and implementation services. Generally, software costs around 40% and 60% is the cost of implementation services. Most respondents agreed that implementation services "used to cost even more, but not any more." Compaq, the only hardware vendor interviewed for this study, added that hardware usually adds between 20%-25% to the overall implementation cost.

### Number of users

Most informants agreed that the majority of current ES implementations are around a hundred users, whereas the range was 200-500 two years ago. However, a 2<sup>nd</sup> tier ES vendor estimated a number between 10-25 per implementation and a maximum of 150. When informants were asked if there was a relationship between the number of users and the complexity of implementation, most noted that "the number of users doesn't always indicate complexity. It is more the product of the 'number of users' multiplied by the 'type of users.' If most of the users are the same type, implementation will be easy because all you have to do is replicate a type."

### ES project structure

The typical ES project structure has two main variations that can be related to the 'vendor vs. third-party-implementer' model discussed earlier. For the vendor-implementer model, the ES project would have two consultants for each suite of modules. These are the consultant from the business (who can also be referred to as the business owner) and the vendor's consultant. Two other key members to the ES implementation project team are the full-time project manager from the business (who can also be referred to as the internal project manager) and the vendor's project manager (who can also be referred to as the external project manager). [Figure 1](#) illustrates this ES project structure.

In a third-party-implementer model, consultant team members take the role of the vendor's team. The vendor's representative role would then be limited to being the vendor's account manager. As a result, the structure of the project remains similar with a change of implementation responsibility from vendors to consultants.

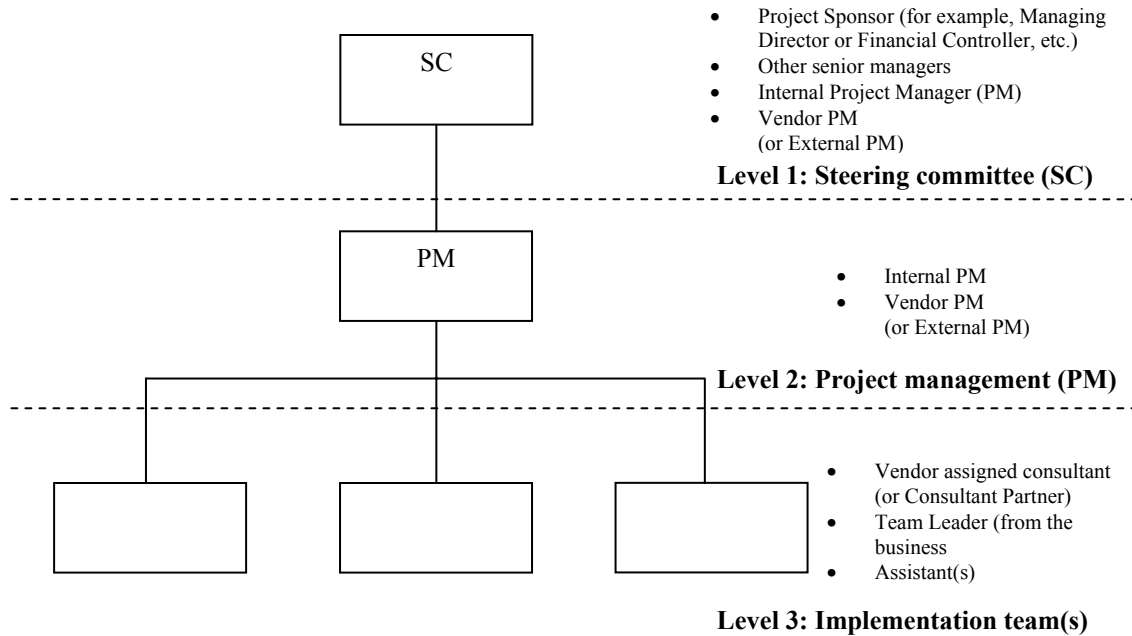


Figure 1. The ES project structure

**Summary**

The discussions of ES implementation in NZ identified different elements that can be used to describe the implementation process. These include phases, modules, time to implement, implementation models, cost, number of users, and the ES project structure.

The next section provides an insight into the organization that is currently implementing an ES system.

**The organization implementing an ES system**

In the second part of the framework, details of organizations implementing enterprise systems were sought. Organizational drivers of interest that emerged from the analysis of interview notes included organization size, IT maturity, organizational ownership, organizational profit-making status, and organizational global reach. Details of each of these categories are discussed next.

**Organization size**

Most informants used revenue, not the number of employees as a measure for organizational size. Furthermore, all informants agreed that future ES implementations are likely to happen in SME-sized organizations. However, two different definitions for an SME organization emerged in the analysis of informants’ responses. Some defined SME organizations to have a revenue of NZ\$20M-NZ\$100M. Others stretched the SME organization size to a revenue of NZ\$150M-NZ\$200M.

Comparing the two definitions with the survey results in the 2001 IDC Forecast for Management report (Hind, 2001) confirms the validity of the two definitions in capturing the state of ES implementations as measured in organizational size. The 2001 IDC survey revealed that around 75 percent of newly reported ES implementations in NZ are in organizations where annual revenues are between \$10 and \$250 million (Hind, 2001). Approximately 50% of these implementations are in organizations that are \$50M-\$250M in size while 25% are in organizations of \$10M-\$50M size. The remaining 25% are divided to the two-thirds in large organizations (\$250M and over) and the one-third in small organizations that have revenue under \$10M (see Table 4).



Organizational size	Year 2001			
	Less than 10M	10-50 M	50-250M	250M and over
Revenue in million (\$NZ)				
Percentage	7%	27%	49%	17%

**Table 4. The distribution of ES implementations in New Zealand organizations**

Source: IDC Forecast for Management survey (Hind, 2001)

Most informants agreed that the size of the organization is a driver in deciding who they want to do business with. One vendor commented that they made sure that their “customers have resources not just big ideas.” They further agreed that “business complexity is the same for both small and big organizations; however the size of their wallet is not the same.”

#### *IT maturity*

IT maturity is the term used to describe the level of IT/IS adoption in organizations. Our findings suggest that ES adoption is positively associated with the IT maturity of the organization. ‘IT mature’ organizations are those that “have taken care of their ES needs and are now extending to CRM, SCM.” ‘IT ready’ organizations are “keen to do and understand IT value.” They are at the stage where they are planning to develop their IT backbone in either an ES or some kind of proprietary system. ‘IT hesitant’ organizations think that “IS is a cost to the business and do not believe in spending money.” Most informants concluded that although NZ is a small country, technological advancement is mature and the number of companies that fall in the third category is decreasing. Specifically, NZ ES implementations, apart from being smaller in size are “on par with what’s happening in the US. For example, everyone has ES implementations and Internet presence now.” Furthermore, most NZ organizations implementing enterprise systems had ES-like solutions that were implemented during the 1980s.

#### *Organization ownership and profit-making status*

Organization ownership and profit making status was suggested by drivers that influence the way implementation decisions are made. For example, in an ES implementation where the business is owned by individuals, the way decisions are made is more personal. One informant suggested that in these organizations, decisions are made “by looking you in the eye and saying I want to do business with you.” Furthermore, whether the organization is a business organization or public sector would impose major differences in the way the business operates, thus affecting the ES implementation decision-making.

#### *Organizational reach: Global vs. national*

Two drivers associated with organizational reach were found to impact on ES implementation. The first is related to SMEs that have a global reach. Although these organizations are relatively small in size, they are more likely to implement an ES solution than their NZ-only counterparts, and the solution they choose is more likely to be a 1<sup>st</sup> tier ES. The second driver concerns multi-national organizations that implement an ES in their NZ companies. These implementations are often based on a global template that includes standard business processes. Regional teams have only minor involvement in providing the localization that includes things such as NZ taxation. Therefore, whenever possible, the global template prevails and most critical decisions are “all made off shore,” while “NZ businesses have little input into their decisions.”

#### *Summary*

Organizational drivers related to ES implementation include the size of the organization, IT maturity, organizational ownership, organizational profit-making status, and organizational reach. Using a definition of large organizations to have revenue of NZ\$250M or more, the majority of new ES implementations in NZ are happening in SMEs. These SMEs are expected to be relatively IT mature and have a global reach.

### **CONCLUDING SUMMARY**

The aim of this exploratory study was to provide descriptive pointers to typical ES implementations. The implementation process and the organization were used in a framework to describe variations of typical ES implementations. Business drivers that reflect on current ES implementation practice were discussed. A synthesis of these findings is summarized in [Table 5](#).

[Table 5](#) suggests different drivers apply to SMEs and large organizations. Given that the ES market of large organization is saturated, it is clear that typical cases of ES implementation are described by drivers in the SME column in [Table 5](#). These

implementations are likely to be new implementations of two or more core ES modules; they can be single or multi-site implementations and ES vendors are likely to be involved in implementation management. The majority of these implementations aim to be 'vanilla' using only core ES modules; however this may not always be possible due to business specialization. The number of users for current implementations is estimated to be around a hundred and implementations cost is in the range of NZ\$700, 000-NZ\$3 million.

Study findings are limited by the small sample size. However, the diversity of the sample is believed to have strengthened the results. Diversity was illustrated in the different perspectives informants had, which was reflected in informants providing their interpretations of typical implementations in terms of the particular experiences each had.

ES process pointers	Organizational size	
	SME (SME \$NZ 50-250M)	Large (\$NZ 250M and over)
ES implementation phase	Phase I	Phase II
Time to implement	Varies (2.5 months to 2 years)	
Modules	Core modules (Two or more core modules including financials).	Supplementary modules (With a focus on HR, CRM, e-commerce, and data warehousing.)
Locations	More multi-site implementations, especially for organizations with a global reach	Not discussed
Implementation model-a vendor vs. third-party	Vendor-implementer	Third-party implementer
Implementation model-b out-of-the-box vs. heavy customization	Out-of-the-box (However, for specialized businesses, it might not suit.)	Heavy customization
Implementation model-c new, upgrades/ add-ons & replace	New	Upgrades, add-ons & replace
Implementation model-d traditional vs. best-of-breed	Traditional (However, best-of-breed is becoming a key consideration for organizations operating in niche industries).	Best-of-breed
Cost of implementation	NZ\$700,000 - NZ\$3 M	Above NZ\$3 million
Users (number of)	Around 100	Not discussed
Project structure	Refer to <a href="#">Figure 1</a>	

**Table 5. Variations of typical ES implementations**

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