Pilot field research
of business process and ERP system use practices
in Sales Orders Management
by small and medium size companies in Greece

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Abstract

The deficiencies observed in the use of business processes, and the use of information system implementations of such processes by Greek SME companies are studied. A method for analyzing the use of business processes and the use of system implementation of these processes is proposed and applied in Sales processes and functions. Data gathered by a questionnaire over a sample of 19 SME companies in Greece are analyzed. The sample companies use an information system suite of a Greek SME information systems manufacturer which includes ERP, CRM, B2B electronic commerce, and Business Intelligence modules. The results show practice inadequacies in the following areas: lack of business processes and functions, lack of business process and function implementation through the information system, lack of systematic data entry, system use only for information retrieval without decision support mechanisms, and lack of process implementations as process work-flows with successive stage transitions. The causes of these deficiencies are studied. Lack of maturity of ERP system use seems to be a principal cause. Finally, some principle guidelines for system implementation in SME companies are put forward.

Keywords: Business process use, ERP system use, Sales Management, SME, Greece, Pilot research, CRM, e-commerce, BI.

1. Introduction

The market of ERP systems for SME companies in Greece is now mature enough regarding ERP system implementation, especially after the significant financial support these companies got, through the Third European Community Support...
Framework, to purchase and implement integrated IT solutions. However, our field experience suggests that the implementation of basic business processes through the ERP systems are not yet handled adequately. Several business processes or functions are not used or they are manually implemented – and do not rely on the ERP system support. Furthermore, several business processes that can only be enforced through the use of an ERP system are not implemented at all. Business data are not always systematically entered into the data repository (usually a relational database) of the information system, loosing as a result potentially useful information for statistical processing and decision support.

2. Framework and goals of the study

Our study aims at:
- Proposing a framework for analyzing the use of business processes and their ERP implementations, focusing particularly on deficient use, and exploring the causes for such deficiencies.
- Proposing a methodology of evaluation of the degree of maturity of an ERP system use by an SME company.
- Offering some new field data drawn from the business area of Sales Orders Management in Greek SME companies, as well as an initial analysis of these data.

Our framework consists of the following steps:

1) Definition of Fundamental Processes and Functions

We define the basic processes and process functions within the business area under consideration (for example, Sales Orders Management in the present study).

2) Classification of Business Processes

We classify processes to the following two categories:

a) Processes that implement simple transactions and/or short term decision support (tactical decisions).

b) Processes that implement long term data analysis and long term decision support (strategic decisions).

An example in the first category is stock availability check, which supports the sales order confirmation decision, and is carried through an ERP system. An example in the second category is the analysis of stock availability check data and its statistical correlation with the data of sales offer acceptance by customers.

Several studies report on the importance of ERP systems in decision support, for example, Holsapple and Sena (2005), Spathis and Constantinides (2003), Stefanou (2001). Here, we consider separately short and long term decision support. The latter pertains to a mature use of the information system, as opposed to an elementary use of a typical implementation of an off-the-shelf accounting software, and is usually carried out by a Business Intelligence application connected with the ERP system.
3) Evaluation of the usage of Business Processes using experimental data

We examine the following 3 parameters:

a) Existence of the Process in the Company:

A company may or may not have a process.

b) Implementation of the process using the ERP system:

A process can be carried out using the ERP system or not. In the later case, the process can be handled manually, or by a simple office application software, usually spreadsheets, or finally by a different information system, such as a legacy system. Of course, we should note that there are processes which cannot be carried out without using an information system.

c) Posting of the process outcome in the ERP system:

The process outcome can be recorded into the system or not. Data posting into the system is important no matter whether these data have been created using the system or not, because they can provide useful information for short and especially long term decision support.

4) Evaluation of the degree of maturity of the ERP system usage

The simple implementation of a business process through the ERP system, or the consistent posting of its data into the system, is not the only prerequisites to assume a "mature use" of the ERP system. Thus, we further consider the following maturity indicators over the experimental data:

a) Implementation of processes that perform inter-modular data transforms:

Several Supply Chain data transforms fall into this class, as for instance, the transform of sales orders to pre-released purchase orders for goods or materials, which projects Sales data to Purchase data. We believe that the presence of such transforms is an important indicator, showing an in-depth implementation and mature use of the ERP system.

b) Implementation of Business processes work flows:

Usually a business transaction consists of a sequence of processes or functions within a process. We define this sequence as a process flow. For instance, the release of a sales order consists of several steps (processes). These steps can be implemented as successive states, with well defined and objective sets of transition rules from one state to the other. Flows allow for strict deployment of business logic and better control of logic fulfillment. We believe that the presence of such flows shows an in-depth implementation and mature use of the information system.

c) System Implementation (customization) for specific Business Logic:

The special set of business rules for each Company, is implemented through information system configuration and/or customization. In the upper-end of ERP systems (such as SAP and Oracle e-Business Suite), one can expect that a big part of business logic is implemented by system configuration, although it is well known that customization is always necessary as well. In "smaller" systems and companies, such as those of the present study, we can expect that business rules should be
explicitly customized and incorporated into the system. In this way, we think that the amount of customization done for a company is an important indicator of the maturity of the use of processes and the system by the company.

d) The use of advanced applications connected with the ERP system:

An important indicator of maturity is the use of CRM, e-commerce, B2B commerce, and BI - Business Intelligence applications, which are connected with the ERP system. The degree of their integration with the ERP system is also important, especially in case that such advanced applications are provided by separate manufacturers.

5) Evaluation of the causes of deficient use

In exploring the causes of deficient use of processes and of their system implementation, we compiled below (Table 1) a list of possible causes. In general, a deficiency could be attributed to a combination of causes. In our study, we tried to find the most important one for each deficiency case.

Table 1. Causes of lack of business process or system implementation of the process

<table>
<thead>
<tr>
<th>1.</th>
<th>Causes of lack of business process</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>The process is not used by the company because of</td>
</tr>
<tr>
<td>1.2.</td>
<td>The company is unable to use the process because of</td>
</tr>
<tr>
<td>1.2.1</td>
<td>Shortage of personnel</td>
</tr>
<tr>
<td>1.2.2</td>
<td>Lack of know-how</td>
</tr>
<tr>
<td>1.2.3</td>
<td>Lack of tools</td>
</tr>
<tr>
<td>1.2.4</td>
<td>Process use is not worthwhile, price-performance wise</td>
</tr>
<tr>
<td>1.3</td>
<td>Business culture of the company</td>
</tr>
<tr>
<td>1.4</td>
<td>The company is not yet mature for using this process</td>
</tr>
<tr>
<td>1.5</td>
<td>Other cause / unknown cause</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.</th>
<th>Causes of lack of business process implementation through the system</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>The process is used, but it is not implemented with the system because of</td>
</tr>
<tr>
<td>2.2</td>
<td>The process is supported by the system, but it is not used because of</td>
</tr>
<tr>
<td>2.2.1</td>
<td>System process implementation is not user friendly</td>
</tr>
<tr>
<td>2.2.2</td>
<td>System use is not worthwhile, price-performance wise</td>
</tr>
<tr>
<td>2.2.3</td>
<td>Additional BRP and customization is needed / business logic rules are not available</td>
</tr>
<tr>
<td>2.2.4</td>
<td>Extra investments are needed (in personnel and/or tools - hardware)</td>
</tr>
<tr>
<td>2.2.5</td>
<td>The company has not yet been interested in this implementation</td>
</tr>
</tbody>
</table>
3. Method

3.1 Scope of the study

In this pilot research, we deal with the Business Suite Applications of a Greek SME information systems manufacturer. The suite applications include an ERP, a CRM, a B2B and a Business Intelligence (BI) solution. We have compiled a sample of the 19 Companies (henceforth referred to as the Companies - with capitalized initial) which have implemented and have been actively using the above mentioned ERP system. Each one of the 19 implementations has a considerable degree of tailored made software to capture the special business needs and characteristics of each case.

We focused on Sales Management processes. Data were gathered using a questionnaire. The questionnaire has been answered by the principal System Implementation Consultant who carried on all implementation projects with the 19 Companies.

We thought that Sales Management is a good starting point for this study, since it is the main business activity in almost every company. Furthermore, in terms of IT management, it interacts with both ERP and CRM systems as well as with B2B and Business Intelligence solutions.

3.2 Business Information Systems

The ERP system was developed based on general principles of software engineering and experience of best practices for business process implementation. As in all "small" system development, functionality was expanding for each new customer's implementation. All system implementations were undertaken by the system manufacturer. The manufacturer encouraged its customers to do business process reengineering.

This ERP system has all the functionality that is analyzed in the present study. In general, the manufacturer provided all necessary functionality for his customers' requirements. We therefore consider that the lack of a business process or function in a customer's implementation is not due to inadequacies of the ERP system (lack of functionality, or inadequate functionality).

The ERP system is based on client-server architecture, on Oracle database, and has been developed using the Oracle Designer και Oracle Developer platform. As we mentioned earlier, the Business Application Suite of the ERP manufacturer, includes, besides the ERP system, three other applications:

- A CRM system, based on the same technology as the ERP system, and fully integrated with the ERP system.
- A B2B electronic commerce system, running over the web, connected transparently to the ERP system.
- A Business Intelligence application, based on Oracle Discoverer, and fully integrated with the ERP and CRM systems.
In the following, the term *system* denotes the ERP system, unless the other information systems are explicitly referred to.

### 3.3 Questionnaire

Our research was based on a questionnaire of approximately 200 structured, semi-structured and unstructured questions that pertain to the following thematic categories:

- General organizational and decisional features of the Company
- Features of system implementation project at the Company
- The use of a business process or function (whether the process is used or not, and if not why)
- The implementation of a business process or function through the system (whether the system is used or not, and if not why)
- Comments on various aspects of Company, processes, and system implementation
- Cases for which an improvement in the use of processes and system implementation would be beneficial for each Company.

The questionnaire contains a large list of processes, which usual for the SME companies in Sales, and concern the principal Sales objects, namely Quotations, Orders, Pricelists, Budgeting, Salespeople. Processes that that pertain to ERP systems, as well as CRM, B2B e-commerce, and BI Analytics have been considered, in accordance with the theoretical framework described in Section 2.

The questionnaire was answered by the principal Implementation Consultant who implemented the system to all the customers. We think that this respondent offered a reliable, unified, and insightful view of the 19 Companies, because he has a deep knowledge of the system technology and functionality, the technical requirements of the system implementations, and the history of installations, as well as the business structure, business needs and business functions of the Companies. The Implementation Consultant was instructed to transfer his customers' views, as they were conveyed during their collaboration. For a special group of questions, the respondent was asked to communicate his personal judgments as well. The respondent was in particular asked to provide the cases for which an improvement in the use of processes and system implementation would be beneficial for each Company according to his judgment.

### 3.4 Limitations

Beyond the obvious constraints of the present study which concern company size (SME), geographical area, company sample size, and the study of a single Business Application Suite, we would like to warn for the following three limitations:

- As we reported previously, we expect that possible inadequacies in process use and process implementation are not due to the information system.
- In relation to this, we do not expect to cope with system integration problems, since all Companies use a Business Application Suite of fully integrated modules provided and implemented by the same vendor.

- There may exist a systematic bias our respondent's point of view who is the Implementation Consultant for at least the reported causes of inadequacies. Companies may not be aware of the maturity issues reported by the implementor. Also, a lack of systematic business rules from the point of view of the implementor, which prevents system use, might have been seen as a deficiency of the system from the Companies point of view. We think that the choice of the implementation consultant as our unique respondent is a good starting point for this exploratory work allowing probably for less noisy results over this small Company size, although possibly systematically biased in some cases.

4. General features of sample Companies

Table 2 provides statistics of basic features over the 19 Company sample, including organizational, system implementation, and system use features. Financial data refer to fiscal year 2005.

**Table 2. Features of the 19 Company sample**

<table>
<thead>
<tr>
<th>Feature</th>
<th>min</th>
<th>max</th>
<th>median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual turnover [ million euro ]</td>
<td>2</td>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td>Annual net profit (or loss) [ thousand euro]</td>
<td>-300</td>
<td>4,000</td>
<td>257</td>
</tr>
<tr>
<td>Net Profit Margin</td>
<td>-15%</td>
<td>20%</td>
<td>6%</td>
</tr>
<tr>
<td>Personnel</td>
<td>8</td>
<td>131</td>
<td>55</td>
</tr>
<tr>
<td>Number of sales quotations per day</td>
<td>4</td>
<td>120</td>
<td>12</td>
</tr>
<tr>
<td>Number of sales orders per day</td>
<td>1</td>
<td>72</td>
<td>8</td>
</tr>
<tr>
<td>Number of salespersons</td>
<td>3</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>First year of system use</td>
<td>1999</td>
<td>2006</td>
<td>2004</td>
</tr>
<tr>
<td>Duration of system implementation project [ months ]</td>
<td>2</td>
<td>18</td>
<td>8</td>
</tr>
<tr>
<td>Cost of system implementation project [ thousand euro ]</td>
<td>17.6</td>
<td>130</td>
<td>60</td>
</tr>
<tr>
<td>Number of system users</td>
<td>3</td>
<td>25</td>
<td>10</td>
</tr>
<tr>
<td>Number of system users in Sales</td>
<td>1</td>
<td>8</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Additionally, we provide the following features of the Companies:

- The sample consists of 2 small, 6 small-medium, and 11 medium size companies with annual turnover less than 3, less than 10, and up to 40 million euros respectively.
- With respect to the legal status of the 19 Companies, there exist 6 SA, 2 Ltd, and 1 G.P. (General Partnership) companies.
- Three Companies are not independent but they belong to a group of companies (two of them are parent companies and one is a subsidiary Company) and one Company belongs to an international group.
- Twelve Companies are family businesses. Top management members of all Companies are bachelor or master degree graduates.
- Four Companies have a purely commercial activity.
- Fifteen are manufacturing companies in different industrial segments. Among them:
  - Eleven Companies have also commercial activity covering 10% to 40% of their total turnover.
  - Two Companies have a purely make-to-stock and four Companies purely make-to-order production (and function as a typical job shop), and nine Companies have both make-to-order and make-to-stock productions.
- 12 out of the 19 system implementation projects have been financed in part by the 3rd Community Support Framework.
- Companies have their headquarters in the Athens area, but their production or store units (if any), are distributed in different geographical areas of Greece.
- Companies use the following sales channels:
  - traveling salespersons (all Companies)
  - salespersons in retail shops (1 Company)
  - resellers (4 Companies)
  - franchisees and representatives (3 Companies)
  - retail sales (2 Companies)
  - Public bids (10 Companies)
  - 3 make-to-order job shop Companies sell through immediate contacts of top management staff.
- All 19 Companies are, more or less, satisfied by the system. 15 Companies extend gradually initial system implementation with additional functionality.

It is worthwhile to note that the majority of the companies of our sample, are cases which favored from the beginning a tailored made system, especially in the business areas covering their specific business logic. In that sense, they represent an above average (in terms of maturity and knowledge of what to expect from the implementation of an ERP system) class of a typical Greek SME company.

5. Results

5.1 Sales Quotations

We considered the following typical functions of sales quotation processes:

1) Determination of Quotation Items
2) Quotation Costing
3) Pricing Policy
4) Discount Policy
5) Stock Availability Check
6) Stock Allocation

It is important to note that Availability Check and Stock Allocation can be practically implemented only through system use.
Results show that all 19 Companies use the sales quotation process. However, only 11 Companies record quotations in the system. 4 more Companies use the system only for information in quotation support, specifically for item pricing based on pricing and discount policies, without recording though quotations in the system. The remaining 4 Companies do not use the system at all.

We discuss now results for each quotation function:

1) Determination of Quotation Items
All Companies use this function and 11 Companies implement it through the system. From the remaining 8 Companies:
   - 6 Companies consider that the system implementation of this function is not worthwhile, price-performance wise, either because quotations refer to make-to-order procedures, where quotations are accompanied by detailed technical specifications, or because of the large daily volume of quotations and the consequent overhead of data entry.
   - 1 Company would need BPR (Business Process Re-engineering) and system customization due to the complexity of business rules needed to implement the sales quotation process.
   - 1 Company has not been interested in this implementation.

2) Quotation Costing
This function is used by 18 Companies. One Company, which sells exclusively out of a price list catalog, does not use the function. 11 Companies implement it through the system or intend to implement it soon. From the remaining 7 Companies:
   - 4 Companies consider that the system implementation of this function is not worthwhile, price-performance wise.
   - 2 Companies would need BPR and system customization due to the complexity of business rules.
   - 1 Company has not been interested in this implementation.

The Implementation Consultant believes that the system implementation of this function would be beneficial for 6 more Companies.

3) Pricing and Discount Policies
The third and fourth functions Pricing and Discount Policies are used by all the Companies. 13 Companies implement it through the system. From the remaining 6 Companies:
   - 5 Companies cannot implement it for lack of rules. Their turnover or a large part of it comes from projects, where price is tailored off the system according to special criteria and rules. Although cost can be calculated based on the standard cost values of project resources, the final price offered is determined according to the specific conditions of each case.
   - 1 Company has not been interested in this implementation.

The Implementation Consultant believes that the system implementation of this function would be beneficial for 7 more Companies.
4) **Stock Availability Check**

This function is used and implemented with the system by 7 Companies. From the remaining 12 Companies:
- 5 Companies do not need this process because of their type of manufacturing (make-to-order and projects).
- 7 Companies have not been interested in this implementation.

5) **Stock Allocation**

The final function is used and implemented with the system by 2 only Companies. From the remaining 17 Companies:
- 9 Companies do not need this process because of their type of manufacturing (make-to-order and projects).
- 8 Companies do not want to use it, because they believe it does not fit to their business culture. This function is also hard to monitor.

Stock availability check creates important information which allows the Companies to monitor if a sales opportunity is lost due to lack of available stock at the time the demand was made. Only one Company performs this long term decision support process.

**5.2 Sales Orders**

All Companies use the system for this process and post all sales orders to the system.

**5.2.1 Sales Order Functions**

We considered the following typical functions of sales order processes:

1) Customer Credit Control  
2) Sales Order Costing  
3) Pricing Policy and Discount Policy  
4) Price Check  
5) Stock Availability Check (Stock Item Allocation)  
6. Order Confirmation  
7) Order Release  
8) Order to Production / Purchase Order for Materials and Goods  
9) Packing List  
10) Dispatching - Dispatch Note  
11) Invoicing – Foreign Invoice  
12) Order Close

All Companies have a basic credit control function for new or existing customers. For new incoming customers, credit control is limited to information provided by the bank.
and not on other data sources. The results of the credit control procedure are posted
into the system only by one Company.

Companies use the following two Budget Order Costing methods:
- Cost per Item, based on cost average or standard cost methods
- Cost of Materials / Production Time

In general, the first method applies to commercial activity and make-to-stock
production, whereas the second method applies to make-to-order production,
including projects.

We also investigated the process of calculating the actual order cost and the
subsequent gross profit per sales order. All the Companies use these procedures
and implement them through the system. Only one Company further calculates net
profit per order.

In 14 Companies, salespersons get informed by the system about the cost of each
sales order at the moment of the order. This information is important for correct order
pricing, and is used for make-to-order activity except for the project case, where
costing is more complex. The Implementation Consultant believes this method would
be beneficial for one more Company. For the remaining 3 Companies, this process
could not be used due to sales nature (sales are made through top management
direct contacts with customers or sales cost is known in advance).

Price calculation based on Pricing Policy and Discount Policy is performed in the
same way as in quotation management.

When a specific pricing policy does not exist (as is the case of job shop production
companies) a final price check is performed usually by authorized personnel. This
check does not rely on system data processing, and it is essentially an external
authorization point of the order workflow. The price calculation and check policy is
used by all the Companies but only one has specifically made the outcome of this
process a specific stage of the sales order workflow. The Implementation Consultant
believes that the system implementation of this function would be beneficial for all the
other Companies as well.

Order Confirmation aims at calculating the delivery time we promise to the order’s
final customer. Delivery time calculation is based on the following two methods:
- Statistical estimation based on past orders
- Master production planning program based on production constraints (such as
  standard times, capacity, etc).

All the Companies use Order Confirmation. The first and second methods are used
by 4 and 15 Companies respectively. Only one Company implements this function
using the system. The rest, follow the aforementioned methods but are based on
empirical data or information (i.e., asking the production manager for the forthcoming
availability, or knowing that on the average products of type X, are delivered in two
The Implementation Consultant believes that the system implementation of this function would be beneficial for the other Companies as well.

Stock Item Allocation is carried as in quotation management. It usually concerns end products / goods only. In few cases of manufacturing Companies, first materials are also allocated. In the rest of cases, allocation is carried when the sales order is transformed to a production order.

The Sales Order to Production Order function is performed, through the system, by all the manufacturing type companies, except one which has a purely make-to-stock production type. The Sales Order to Purchase Order for Goods function is implemented through the system by four of the Companies with commercial activity (out of fifteen). The Sales Order to Purchase Order for Materials function is implemented through the system by six of the manufacturing type companies (out of fifteen).

The Order Release, Dispatch Note issue, Invoicing, and Order Close functions are implemented with the system by all the Companies. Finally, the Packing List function is used and implemented with the system by 4 Companies which have international exports. For domestic deliveries, the Companies use instead the Dispatch Notes document. It is worth mentioning that Dispatch Note, Invoice / Foreign Invoice, and Packing List issues are required by the Greek tax law.

### 5.2.2 Sales Order Flow

We examine whether the Sales Order process is implemented as a flow, according to our definition in Section 2, where flow stages are the outcomes of the functions of the previous Section. The basic stages of this flow (starting with the reception of a new incoming order, which are: order release, order dispatching, order invoicing and order close) are used by all the Companies. However, only one Company has implemented all order functions as a flow, according to the above definition. Transitions are performed by appointed personnel. In case of a transition blocking, due to a non satisfaction of a transition criterion, a rejection or continuation decision is taken by the Sales Director or in extreme cases by the Managing Director.

It is worth noting that the system supports sales order flow modeling. Therefore, the lack of flow modeling and monitoring in the remaining 18 Companies is not due to a lack of system support. It is attributed to the lack of skilled and sufficient personnel, and to immature business culture.

### 5.2.3 Sales Orders MRP

This supply chain process, transforms sales demand onto purchase demand. We consider the 5 following processes connected to this transformation:
1) 4 of the 15 Companies with commercial activity (including 2 of the 4 Companies with purely commercial activity) use this process for obtaining pre-released purchase orders for goods.

2) 6 of the 15 Companies with production activity use also this process for obtaining pre-released purchase orders for imported items. For the remaining 9 Companies:
   - 5 Companies do not need this process, because they either order large quantities of imported raw materials in specific time periods, or stock large quantities of finished goods.
   - 4 Companies are not mature enough to use an MRP type of system (lack of supporting business processes and of appropriate staff in terms of knowledge needed to use an MRP system).

3) One only Company uses a notification process of the salesperson in charge of a sales order upon goods receipt of the corresponding purchase order.

4) All Companies issue dispatch notes using the system by transforming sales order data.

5) 4 Companies issue packing lists using the system by transforming sales order data.

According to the Implementation Consultant, the first 3 processes could be used by the remaining Companies as well. The last process applies only to companies with international exports (it implies some system customizations, to design the packing list form).

5.2.4 Special Functional Requirements in Sales Orders Management

The study of special functional requirements of each Company reveals the degree of depth in implementing their particular business logic. From a technical point of view, the main body of functional requirements is covered by configuring system best practices. However, special business logic requirements rather need system customization. On these grounds, we drew up the following list of customizations carried out in totally 13 Companies:

1) Items Coding (2 Companies)
2) Sales Order Flow (2 Companies)
3) Stock Allocation of sales order items (2 Companies)
4) Sales Policy (Price Lists, Discount Policy) (12 Companies)
5) Product Configurator (for make to order special orders) (5 Companies)
6) Sales Order Costing (5 Companies)
7) Purchase Order-Sales Order Relation (automatic notifications of salespersons and customers) (1 Company)
5.3 Price Lists

15 Companies use Price Lists (of which 5 Companies use multiple active Price Lists). The remaining 4 Companies do not use Price Lists, because their total turnover or a high percentage of it comes from projects (job shops).

14 Companies issue their Price Lists using the system. One Company uses spreadsheet software and has not been interested in using the system.

10 Companies use an automatic sales price update process, based on a corresponding purchase price change in a vendor's Price Lists. This applies only to commercial goods items.

In conclusion, Companies have in general implemented Price Lists processes.

5.4 Sales Budget and Forecast

5.4.1 Sales Budget

Advanced budgeting methods and special tools are usually provided by 3rd party software rather than by "small" ERP systems such as the system in the present study. Simpler budgeting methods can be implemented with spreadsheet software. Our results show that 18 Companies use elementary budgeting methods, usually a simple percentage readjustment of present budget with respect to last year's one, carried with spreadsheets. One only Company is interested in using a more advanced time series analysis method supported by a third party solution.

Budget posting to the system is important, no matter how it is drew up, since it allows for sales progress monitoring. Our results show that only one Company posts budget and monitors sales progress, while 4 more Companies intend to do so soon. The remaining 14 Companies, do not implement these processes and have no sales monitoring capability.

According to the Implementation Consultant, all Companies would benefit from the implementation of these processes. Usually, companies introduce such processes when sufficient historical data are available, typically after 2 or 3 years of system use. These processes have not been usually considered as important by companies. We believe that they pertain to a mature use of the ERP system, as opposed to an elementary implementation of off-the-shelf accounting software. The lack of budget posting into the system is due to business culture, since it is neither time demanding nor needs specialized personnel.

5.4.2 Sales Targets

All Companies have a sales target creation process.
Sales targets are created along the following dimensions with respect to turnover index:

- All products (5 Companies)
- All Products, Products Category (3 Companies)
- All Products, Products Category, Sales Channels (7 Companies)
- All Products, Products Category, Geographical Areas (4 Companies), whereas product category is a multidimensional hierarchy with all products in its root.

The 4 job shop Companies create targets to "all the products" dimension only, given the difficulty to use more dimensions.

One only Company creates and posts targets using the system.

All Companies have a sales monitoring process with reference to targets. 15 Companies use in this monitoring system support for sales data.

In conclusion, although all Companies use sales targets, they do not post them into the system. Consequently, they cannot easily monitor target fulfillment during the financial year.

5.4.3 Sales Forecast

We classified forecasting methods as follows:

1) Empirical method for ad hoc quotations
2) Simple percent readjustments of previous year results
3) Methods using special tools, as time series models
4) Econometric models

The last two are essentially forecasting methods. We included also the first two methods for the purposes of this study. The first method is used when no prediction model is available due to the ad hoc nature of sales orders. In this case, a success probability of each open quotation can be empirically evaluated, based on past history and other available information. Time series methods apply satisfactorily in cases of demand periodicity, high sales volume, and long past history. Econometric models rely on good economic environment knowledge.

Our results show that 5 Companies (including the 4 job shop Companies, which have no quantitative prediction model) use the first method. 13 Companies use the second method. One Company uses both first two methods. Finally, one Company is interested in implementing the third method.

No software is used for the first method, spreadsheets are used for the second, and a third party solution will be used for the third method. No Company uses the ERP system for forecasting - the system does not provide any special tools. Only one Company posts forecasts into the ERP system.
In conclusion, beyond the 4 job shop Companies for which there is an inherent difficulty in forecasting, none of the remaining 15 Companies uses an advanced forecasting method either. This can be attributed to lack of know-how, skilled personnel, and software. The Implementation Consultant believes that in principle all companies could use the last two methods, at least for a part of their manufactured products. In general, the use of advanced forecasting methods, even for big companies in Greece, is apparently at an early stage.

5.5 Salespersons Management

13 Companies use the system for Salespersons Management. They monitor sales, customer, and salesperson relations. 6 out of these 13 Companies use a special CRM module (part of the Business Application Suite), which additionally allows for a detailed salesperson pre-sales activity recording and monitoring (sales cycles, contacts, and activities).

An up-to-dated CRM application provides important information for salesperson activities and expected sales as well. For this reason, the Implementation Consultant believes that a full CRM implementation would be beneficial for an extra 10 Companies.

7 Companies monitor salesperson results with reference to sales targets using the system. The Implementation Consultant believes this practice would be beneficial for 9 more Companies. For the remaining 3 Companies, this process could not be used due to their business culture (sales are made through top management direct contacts with customers).

13 Companies calculate the commission of the salespersons through the ERP system. In general, the commission is based on historical sales data of the last fiscal year. The Implementation Consultant believes that it is worthwhile for every Company to include the salespersons commission calculation as a standard procedure of their ERP system.

Finally, CRM implementation for a detailed salesperson activity monitoring presents the greater lagging. The main reason for this is the negative attitude of the salespersons themselves, because of the necessary data entry effort. However, this is the only systematic way for sales activities management, and creation of a clear and objective picture of forthcoming sales.

5.6 Contracts

One only Company has a contract agreement monitoring process which is implemented through the system.
5.7 B2B e-Order

Four (4) Companies offer to their customers a web enabled sales order process, using the previously mentioned B2B electronic commerce application. Customers can also monitor their balances through a B2B portal which is also part of this suite.

E-order has no application for project Companies. For the remaining ones, the Implementation Consultant believes that there exits a large margin of further development for e-Orders. As of today the majority of Greek SME companies is not yet mature enough to implement B2B and e-Order systems. This service actually needs maturity of both parties involved in, the company and its customers as well. Slowly increased interest is observed for an initial, at least, implementation and use of such services.

5.8 Sales Business Intelligence

Thirteen Companies use the previously mentioned BI application for sales data analysis, using the following parameters: sales turnover, gross profit (along the following dimensions: item categories, companies, sales channels, salespersons, geographical areas, time periods), comparatives with sales budget, index trends, profitability per customer and sales order, sales quotation success percent, CRM contact statistics, customers' solvency (aging of open items), statistics on sales deliveries (for instance, delayed orders).

Companies show a rather advanced use of Sales BI. Apparently, they realize the need for BI analytics more intensively than process implementation through ERP system. This happens because BI offers immediate results and flexibly organized information that cannot be easily obtained manually or with spreadsheets. It is also due to the tenacious BI promotion efforts of the information systems vendors. The Implementation Consultant believes that BI implementation would be beneficial for the remaining 6 Companies as well. There is also a great margin for further BI development in connection with decision support methods. Determining products with large profit margin, as opposed to those with high turnover but low profit margin is a profitability analysis example.

6. Conclusions and future research

We proposed a framework for analyzing the practices of companies the using business processes and their ERP implementations, focusing particularly on deficient use cases, and exploring the causes for such deficiencies. We offered some new field data and initial analysis for the above tasks. In connection to the above, we proposed a methodology to evaluate the degree of “maturity” of an ERP system implementation by a company. The method analyzes business process practices by applying several criteria.
We applied our method over a sample of 19 Greek SME Companies. All Companies have been using the same Business Application Suite of a single manufacturer consisting of an ERP, CRM, B2B e-commerce, and BI applications. All Companies were satisfied by the system. In this sense, our sample contains no failure cases.

We summarize here the main conclusions of the previous Sections:

Sales Quotations and Orders are two main groups of processes/functions that could in principle be implemented as flows, according to our definition in Section 2. Only one Company implements Sales Orders in this way. This implementation is due to the personal business culture and commitment of the Company owner, who believes in the systematic use of business process modeling and in the enforcement and implementation of this modeling through the use of the ERP system.

In our analysis, we observe a general use of processes and system process implementation in cases where system recording and monitoring is mandatory by law or have at least a long history of computerization. The process and system use becomes loose and not universal on more optional subjects or even in more advanced accounting subjects, for instance stock allocation in sales quotations and orders, sales budget costing, and net profit calculation per order. We feel that the old culture and practice of off-the-shelf book keeping software is still persistent and hampers a full deployment of ERP system functionality.

In connection to the above, we observed an avoidance of systematic data entry, resulting in loss of information and decision support in long term business strategic decisions. In particular, we observed a system use for information and short term decision support, without a decision result recording into the system.

Inadequacies were also found in the following cases:

- Lack of processes that help short and long term decision support.
- Lack of processes that involve cross-modular data transforms (for example issue of purchase orders based on sales order data).
- Lagging in using CRM, and e-commerce applications. As mentioned before, Companies show instead a relatively advanced stage in using a Sales BI application.

The main two causes of deficiency are (see Table 1):

- Additional BRP and customization is needed / business logic rules are not available (cause 2.2.3). We think that a simplification of business rules can help their incorporation into the system through the appropriate system customization.
- The company has not yet been interested in this implementation (cause 2.2.5). We think that companies apparently do not have a full understanding of the possibilities offered by modern business systems. This lack of maturity underlies inadequacies such as systematic data entry. The accumulation of experience in system use and the accumulation of data in the system database apparently help the maturation process. Companies realize the empowering potential of technology. The Business Intelligence deployment in the Companies of our sample is a positive sign towards this direction. The studies by Koh et al. (2006), Yu (2005), Al-Mashari et al. (2003) report a period before companies can get ERP system implementation benefits. We
think that for our sample SME Companies the maturation process continues until companies get interested in using the full system functionality and necessary processes for decision support. This corresponds to the "second wave of ERP" (Willis et al., 2002).

Based on our experience we think that a good strategy in ERP system implementation in small and medium size companies, especially with limited resources, should rely on the following guidelines:

- Simplification of business processes and rules, so that they can be implemented and also enforced more easily by an IT system
- System use and data entry simplification in a first phase, in order to convince personnel in a systematic system use and familiarize them with the system. In a second phase, deployment of more advanced functionality. For instance, as a first step, a quotation could be simply entered into the system, but complex rules of costing, pricing, or stock availability could be implemented through the system at a later stage.
- Staff training for the usefulness of business process implementation, strongly supported by top management commitment.
- Hiring of computer skilled personnel, not necessarily power users, but users easily adapted to a computer based work.
- Hardware upgrading.

This pilot work could be extended to other groups of Business Areas namely Purchases, Production and Finance, as well as to more business information systems (ERP systems), and to a bigger or/and multinational company sample.

References


