Technology Driven ERP Strategy for Corporate Growth and Sustainability

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Abstract

This paper is an extension of a study conducted by Frazee and Khan (3) on ERP implementation for corporate growth and sustainability. It explores how a growing high-tech manufacturing company has used the data and functionality of its new ERP system to develop and create reports, charts and graphs to improve its business functions for reaching its short term and long range goals of customer satisfaction, growth, profitability and sustainability. Problems and issues are identified and discussed as the Pre-Visual ERP and Post-Visual ERP performances are assessed. By reviewing and analyzing how the manufacturer used the data, incorporated and integrated the information generated by the system for functional improvements and efficiency, the managers will realize the benefits from investment in an ERP strategy. The metrics presented in this study will discuss three main areas of business: Strategy, Tactics and Operations. In addition, the influence of the new ERP system on the quantitative and qualitative enhancements as well as the corporate culture of the firm will be appraised.

Key Words: Visual ERP, Metrics, Tactics, Operations, Execution, Production, Performance, Growth, Sustainability.

1. Introduction

In the global market, a business organization must be competitive in the areas of quality, service, technological expertise, and total cost to the customers to earn their satisfaction and trust. Continuous improvement in all functional areas is needed to remain competitive. This paper reports the progress of a young high-tech firm that developed and deployed a strategic approach to reach its short-term and long-range corporate goals to remain competitive, profitable, and expand into new markets. It examines the strategy, tactics, and operations that the company adopted to meet its objectives and assesses the effectiveness of these measures in the actualization of the targeted outcomes. Some implementation problems and issues are also identified for further improvements.

Years of experience facing challenges and uncertainties in meeting its commitments and quality goals led the management of the DAM Corp. to overhaul and streamline all its operations from vendors to customers. The company realized that its strength lied in its talented employees, its engineering and technological capability. Also the EVO software at the time in use for Enterprise Requirement Planning (ERP) lacked the capability to offer all of the needed Supply Chain Management functionalities. The company was in dire need of a software system equipped with necessary tools to integrate all business functions, including Customer Relationship Management, Marketing & Sales, Engineering, Quality Control, Production and Inventory Control, Finance and Accounting, and Purchasing. The Management felt the need of training and guiding its workforce to maintain a competitive edge by fully utilizing a new ERP system and the procedures, policies and guidelines it would promote.

An earlier study by Frazee and Khan (3) described the corporate goals set by the company and the strategy to be pursued by its management team to achieve them. The study also outlined the selection of the Infor Visual ERP software by the company, the training of employees to work on the new system and, finally, the implementation process.

The current paper, however, presents the results of an impact study that measures the effectiveness of the newly implemented ERP system on profitability, growth and sustainability through improvements, as the company executives describe, in *strategic, tactical, and operational/executional* capabilities of the company.

2. Background Information

The DAM Corp. designs and manufactures precision rotary joints and slip rings used in air traffic control radar and generator/motor applications. These rotary joints are used in radar systems and satellite communications worldwide. It's the largest independent manufacturer of microwave rotary joints in the United States with $10m in sales in 2010. The company competes in a niche market that totals about $100m worldwide. About 40% of its sales stem from commercial applications, such as municipal airports, and 60% from the US Government sales providing military applications, satellites, and communications equipment.

In 2010, DAM management selected and began the implementation process of new Enterprise Resource Planning (ERP) software to monitor and manage their business. The new Infor Visual ERP system they selected went online in May 2011. The selection process, implementation and training of the new ERP system are described by Frazee and Khan (3). This study attempts to discuss and document the challenges and improvements DAM has experienced since the installation of the new system by reviewing the functionality, integration, and the data generated by the ERP system (4, 6).

The senior management at DAM developed objectives, goals and strategies utilizing the functionality and capabilities of their new ERP system. Their goals focused on stability, profitability, growth, and long term sustainability. To attain the corporate goals and objectives, three main areas, termed as Strategic, Tactical, and Operational, were targeted by the management.

3. Rationale for Selected ERP System

As early as 2009, the management realized that their current operations software did not offer the ability to control and analyze their business functions and to help the corporation grow sustainably in the future. The year that followed turned out to be a banner year in shipments, registering a record of $10M in sales. This was not, however, without creating a chaos throughout the organization. For instance, promised delivery dates to customers were not made consistently, quality was a problem both the from the suppliers' side and at the production end, resulting in many returns and reworks and displeased customers. The delivery and quality from suppliers lacked the caliber needed by DAM to become a world class manufacturer. Often 'silos' existed within the firm, but communication and coordination across departments was missing, making timely analysis of data difficult. The cumulative impact of these problems and more, the management felt, was hampering Diamond's ability to grow and prosper. The top management team, thus, concluded that a new software tool – Enterprise Resource Planning software, was essential to integrate all functions within the firm and to provide all groups within the organization critical information in a timely manner for effective decision making to succeed in planned operations and scheduled deliveries. The company's rationale to invest in a new ERP system essentially translated into a rigorous control of its destiny and ability to grow, doubling revenues within the decade, enhance profitability, and succeed in acquiring a commanding position in the industry, while satisfying its customers and shareholders.

4. Literature Review

Numerous published articles provide helpful guidance in understanding the value of successfully implementing an Enterprise Resource Planning (ERP) software in an organization. Through the application of ERP, a company can integrate all its functions within the organization by having a quick and easy access to pertinent data needed to analyze, monitor and ultimately control its destiny (1, 2, 3, 6). For an ERP system to be successful, a number of important points must be considered. An overview of the history of IT since the 1950's, for instance, and the background of ERP in particular is useful (2) in understanding that the estimated market of ERP is $23 Billion in annual sales and that there is a wide range of ERP software providers to choose from – making the selection of an ERP software for a firm demanding and challenging as well as costly. A new system may have an expected lifespan of 10 years or more, making a successful launching of an ERP system a sound strategy for effective accounting and management – especially internal control over many departmental activities and functional efficiency.

The implementation of an ERP system and 'go-live' can, however, create a number of problems and challenges for an organization (3,4,5,7,9,10), including resistance to change, employee/worker acceptance, training, management's ability to articulate a strategic business vision (mission) of ERP, involving users in the implementation, security risk (6), and Metrics and KPI's (1,3,6). When a newly implemented ERP 'goes-live' there may actually be a short term backsliding (5) – the stabilization phase. The management must concentrate on getting the users and workers into the continuous improvement phase where the productivity will begin to improve. An ERP system allows quick access to data, allowing to measure output, monitor, control, and improve operations (1, 2, 3, 4, 6). Further, an ERP system can be customized to a firm's unique operations (8), but this is always a costly alternative (3).

5. Analysis and Control

This study will explore how the Strategy, Tactics, and Operations areas within the firm, as defined by the management, utilized the functionality and data provided by the integrated ERP software system. Reports were developed and categorized, as shown in Table 1.

Table 1: Reports by Category DAM developed utilizing the data from ERP system

Strategic: Value in determining long-term direction and correction
Tactical: Value in determining the detail focus points - how/what tools to use to implement the strategies
Executional: Value in managing the day-to-day activity of the business

BUNDLE	REPORT	CATEGORY	BRIEF DESCRIPTION OF PURPOSE
Vendor Management	Quality	Tactical	Capture and Communicate Vendor Quality Performance to the Business and Vendor
	On-Time Delivery	Tactical	Capture and Communicate Vendor Delivery Performance to the Business and Vendor
	Strategic Vendors	Strategic	Identify Critical Vendors for Collaborative Efforts
	Vendor Improvement Glide Path	Tactical	Monitor Vendor Performance Rating to Attain and Sustain Business Goals
	Supplier Performance Report	Execution	Publish a Quarterly Aggregate Vendor Performance (AVP) Score to Each Vendor with Activity in the Selected Quarter
	Detail Supplier Performance	Execution	Compilation of Individual Records used to generate the Vendor's AVP
	Vendor Survey	Execution	Tracking Count of Vendor Surveys
	Delivery Lead Time Analysis	Tactical	Comparison of Standard Lead Time Versus Actual Lead Time
Business Health	Sales Backlog Analysis	Strategic	Evaluate Order Position to Historical Performance and Fiscal Goal
	Open Purchase Orders by Month	Tactical	Monitor Expected Monthly Cash Outlay and Inspection Resource Load
	Open Purchase Orders by Product Code	Strategic	Monitor Expected Cash Outlay in Terms of Major Material Categories
	Margin Analysis	Tactical	Analytical Review of Incurred Costs Relative to Selling Price to Drive Improvement and/or Re-assess Selling Price
	Slow Moving Inventory	Tactical	Evaluate Parts in Inventory with Little or No Usage During Time Period Selected
	On-Time Shipment	Strategic	Capture Customer On-Time Shipment Performance
	Year-Over-Year Shipment Line Graph	Strategic	Evaluate Cumulative Shipment Performance to Historical Performance and Fiscal Goal

	Inventory by Product Code	Strategic	Monitor Distribution of $ Invested in Terms of Major Material Categories
	Purchased $ Received Compared to Material $ Issued	Tactical	Inventory Throughput
	Engineering Throughput	Tactical	Number of Designs Pending, Number of Designs Generated, Number of Designs Released to Mfg. Engineering Time from Order to Release
	ECN Throughput	Tactical	Number of ECNs Pending, Number of ECNs Generated, Number of ECNs closed
	Delivery Lead Time Analysis	Tactical	Analysis of Delivery Lead Times
	Engineering as a Profit Center	Strategic	$ Spent on Customer NRE Versus $ Billed for Customer NRE.
	Rework Costs	Tactical	Evaluate Cost of Rework Activity by Source of Error
	Part Lead Time Review	Tactical	Analytical Review of System Standard Lead Time Compared to Actual Lead Time
	Part Shortage Report	Execution	Presentation of Outstanding Material Needed for Date Range of Job
	QC Expedite Report	Execution	Presentation of Material Needed for Open Receipts in QC Inspection
Business Health (cont.)	Job Operation Review	Tactical	Evaluate Actual vs. Standard Hours for Operations Completed Prior Week. Hours, Value, and % Variance
Quality Root-Cause	NCMs Created for Selected Date Range	Tactical	Presentation of NCM Occurrences for Problem Resolution
	NCMs Closed for Selected Date Range	Tactical	Presentation of NCM Competitions for Root-Cause and Systemic Correction
	NCMs Pending	Tactical	Presentation of NCM Occurrences to Monitor Progress
	Cost of Internal NCMs	Tactical	Capture Cost of Rework During Production Process
	Warranty Analysis	Strategic	Analytical review of Warranty Units and Cost to Repair
	NCMs by Department	Strategic	Presentation of NCM Occurrences to Monitor Progress by Department

The reports and graphs DAM has documented have assisted the management to set its goals and to measure, monitor and control its business destiny. The goals of growth, profitability and sustainability can be accomplished by the workforce utilizing the functionality and capabilities of the ERP software and by being flexible and thoughtful as business changes both in and outside the business. These reports are dynamic and the revisions, updates or additional new reports will be developed to further fine tune the analysis and control of the business.
A review of some these documents generated by the new set up demonstrates the functionality and robustness of the ERP system and, more importantly, how this dynamic software tool is assisting the attainment of objectives and goals of the enterprise. For DAM to maintain its competitive edge and grow to the point of developing long term relationships with corporate global customers, such as Panasonic, Boeing and Raytheon, they must prove that they can monitor, manage and excel in manufacturing, engineering, customer support, and resource allocation. Management is convinced that the Visual ERP has helped the organization move from operating in chaos to operating in control. Each category, described above, will now be discussed and analyzed in turn.

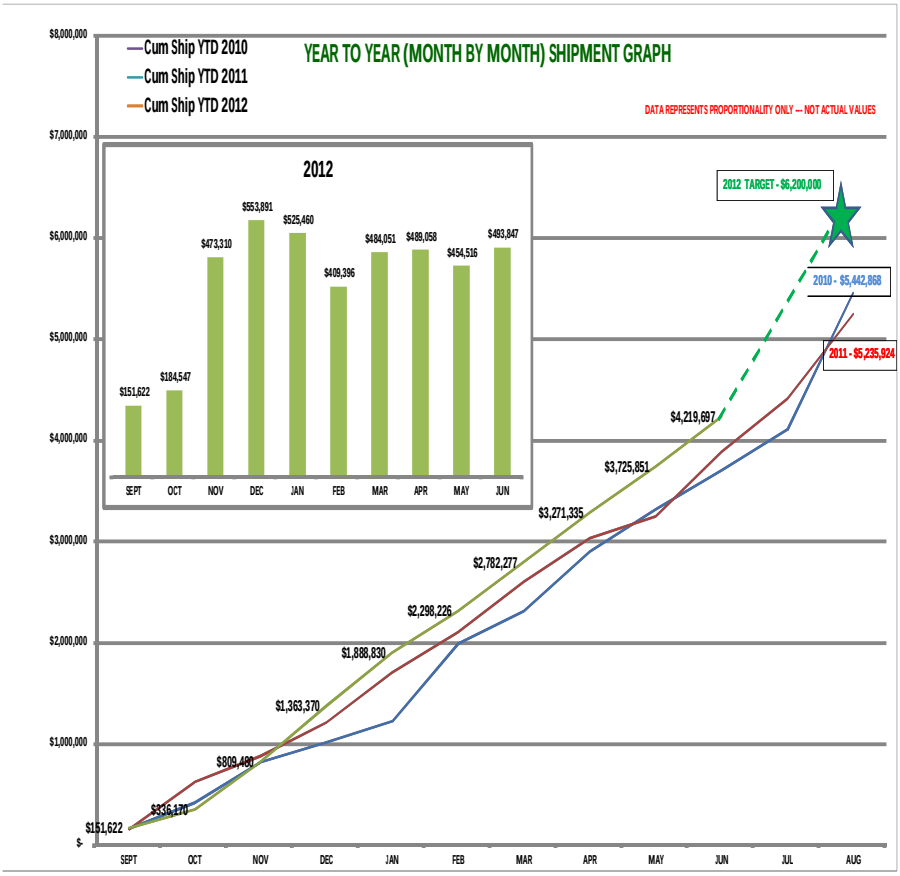
Strategic Category: From the Strategic - Management area, for instance, a shipment graph is presented in Figure 1 for illustration. This graph compares month by month and year to year current Actual Shipments vs. Target/Plan Shipments. It also compares to previous years' shipments.

It serves as a quick indicator for Management and Operations to see whether or not they are achieving planned short range goals and whether the company is tracking the yearly goal/objective of shipments and revenues. If some slipups are noticed, corrective measures must be set into motion.

The insert for year 2012 in Fig. 1 shows a significant improvement in shipment regularity over the previous years. They are increasingly more consistent by month, especially from November through June, suggesting that DAM is utilizing capacity efficiently as well as fostering integration across departments, such as Sales/Marketing, Engineering, Quality, Production, and Finance; and working toward efficient use of its vital resources and integrated planning, all supported by data collected from ERP.

Specifically, the new ERP system provides the needed data to compare year to year results as well as month to month performance measured for the current year and compared against the previous years. This dynamic approach that constantly updates report enables the management to measure monthly performance against the forecasted revenues; and also allows it to measure year to year improvement and growth, moving toward the corporate goal of doubling its shipment revenues to $20M by the year 2020. Beside the top management, the report has its usefulness at other levels of the organization. For example, it has its use at the production level loading to insure good efficiency and utilization, by HR for hiring new employees, and on the financial side in the critical areas of cash flow, ROI, and the needed capital acquisition. The firm's goal is to be in control of its operations and, by frequent analysis of this metric, it can promptly identify and understand the root causes of any deviations from the target and make necessary adjustments in a timely manner to reach the targeted goals. Prior to the new ERP system the data needed to create this report was a challenge to generate.

Figure 1: Year to Year (Month by Month) Shipments



The data for drawing year-to-year graphs describing the shipment trends in 2010 – 2012 are presented in Table 2.

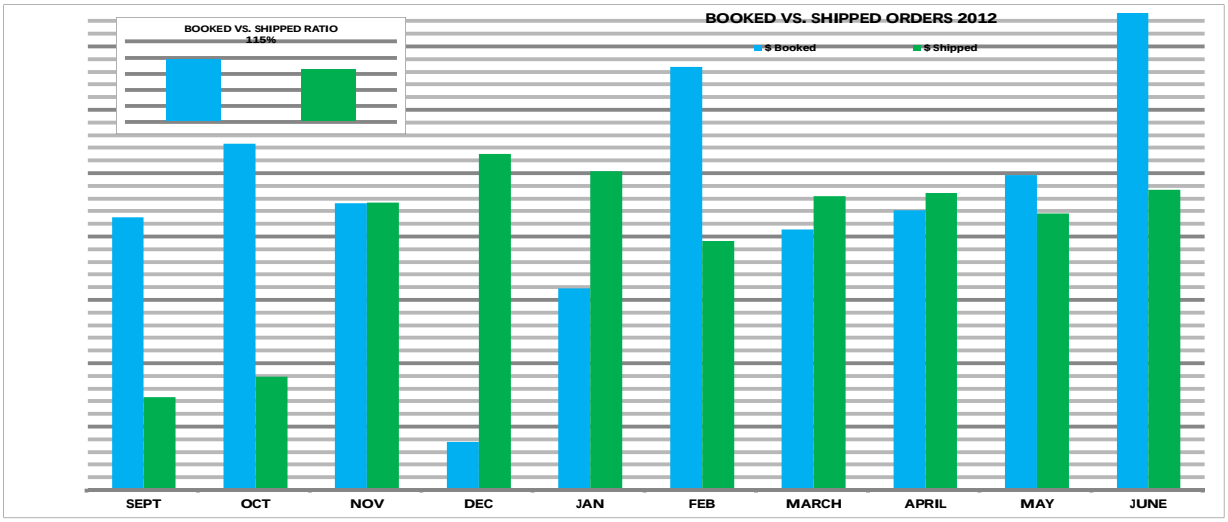
Table 2: Data for Year-to-Year Graphs

DATA FOR YEAR TO YEAR GRAPH													
Year	**Sept**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Total**
2012	151,622	184,547	473,310	553,891	525,460	409,396	484,051	489,058	454,516	493,847			
YTD 2010 Cum Shipments	147,038	405,283	804,494	1,000,964	1,208,661	1,975,768	2,299,528	2,886,102	3,303,894	3,690,547	4,092,048	5,442,868	5,442,868
YTD 2011 Cum Shipments	144,595	608,834	866,552	1,198,082	1,690,999	2,091,647	2,589,424	3,019,049	3,233,466	3,871,539	4,398,832	5,235,924	5,235,924
YTD 2012 Cum Shipments	151,622	336,170	809,480	1,363,370	1,888,830	2,298,226	2,782,277	3,271,335	3,725,851	4,219,697			

It can be noticed how YTD Shipments for October and November 2012 lagged the same time period of 2011. The root causes for this lag were determined and DAM recovered to plan by December. In the future, the management will have the ability to look back many years to compare how inside and outside forces affected their business growth, favorably or unfavorably, and take necessary steps to put policies and procedures in place to remain on the target.

Tactical Category: From the Tactical side, the Functional Managers of various departments, such as Sales & Marketing, Engineering, Production, Materials, Quality Control, Logistics, and Finance, need good information to be successful in performing their specific functions that aid the firm in achieving its goals (1,4,5,6). A few of the tools that the company uses to analyze and control its operations will be examined here for illustration. The new ERP system offers tremendous capability to DAM to analyze data and use this data for making better business decisions. The analysis of data on order bookings and shipments, for instance, can provide a quick check on the backlogs whether they are growing or diminishing, as well as on potential backorders. The statistics on booking and shipping for 2012 are graphed in Figure 2.

Figure 2: Booked vs. Shipped Orders 2012



While a moderate backlog may indicate a healthy business, a growing backlog may indicate a lack of capacity to meet customers' needs, causing potential problems in production, purchasing and operations. Prior to the implementation of its new ERP system, DAM had been experiencing growing Backorders. That required the company to expedite its operations, further causing disruptions and challenges to the Quality Control, Purchasing, Engineering, and Production Departments. The graph in Fig. 2 also alerts Accounts, Receivables, and Finance to the financial health of the firm and its cash flow needs. Notice how March, April and May are consistent and stable.

The currently ration of DAM's booked to shipped orders is 115%. Some months, like Oct, Feb, and June have very high bookings compared to shipments, putting high pressure on Purchasing, Production, Quality, and Engineering Departments, as well as Finance due to cash flow. The underlying data that supports this graph will enlighten the Operations Department as it searches the root causes of the problem and resolve the issues. The Marketing and Sales can also use this analysis to better quote lead times to customers so that the backlogs do not become backorders, which would potentially affect future business and firm's ability to maintain a healthy margin. The backorders often drive up production costs due to expedited material and required overtime to complete orders on time. Also poor customer relations, that can affect future business, and inefficient uses of company resources, like capital, Engineering Capacity, Quality Control, Manpower, and Plant & Equipment needs, are factors that add to the production cost significantly.

Vendors and suppliers performance has direct impact on DAM's ability to process all its functions on the production side in keeping pace with the schedules. An analysis of suppliers' performance history can provide insight in establishing their reliability factors and classifying them in various categories. These factors must be built into time estimations. The Class A Vendor percentage of DAM's purchasing spends lists is shown in Table 3. A short list of just 14 suppliers, that account for only 6.5% of company's total supplier base, represent nearly 60% of DAM's yearly purchasing spend.

Table 3: Class A Vendor Percentage of DAM'S Purchasing Spends

VENDOR ID	RECEIVED QTY	QTY OPEN	% $ SPENT	CLASS A
MAGMAC	25007	2244	8.70%	YES
MKS	4277	321	8.46%	YES
ALPBEA	2246	637	6.17%	YES
DETAIL	4147	165	6.02%	YES
BTENGI	4672	615	5.77%	YES
METCAR	4739	2384	5.06%	YES
BEARING	422	22	4.49%	YES
HURLEY	3152	1475	2.89%	YES
EDNORM	2595	56	2.16%	YES
KC	1577	144	1.90%	YES
MONALEX	2302	98	1.76%	YES
MARCAM	2707	1710	1.51%	YES
CABASS	1341	32	1.50%	YES
PLASTECH	1084	25	0.28%	YES
TOTALS	60268	9928	56.68%	
Class Vendor Count				14
Total Production Vendor Count				216
Percent Class A of Production Vendors				6.48%

The importance here lies is measuring the supplier performance, which implies cost, quality, on-time delivery as well as forms the basis for building long term mutually beneficial supplier relationships. A composite score, in which quality is weighted 2/3 and on-time-delivery 1/3, measures how well the key suppliers are doing and is used by the management to uncover problems and to work with important suppliers to improve their performance. At least one key supplier visits DAM each month to go over their rating, discuss areas needing improvements, better understand DAM's needs, and how both parties can work together more effectively. One recent vendor visit led to an agreement with the company to move orders forward helping the vendor fill his capacity. Analysis of Purchasing and Production data showed that if a vendor's order was 14 days or more late, DAM could not recover and this would have impact on lead time and delivery to DAM's customers. This would in turn create a backorder situation and potentially loss of business and revenues; and would therefore be considered a catastrophic event. The "Class A Vendor Purchasing" chart has identified a supplier with a very poor performance, and the Purchasing Management is actively seeking a replacement. The firm has designed a Vendor Glide Path to Improvement program to help under achieving vendors improve their Quality, on time delivery, and other metrics. The poor performing vendors must either show improvement or DAM will actively seek a new vendor. The Tier 1 suppliers, considered as Strategic Vendors, are key partners in company's long term success.

It's interesting to note that, by being able to monitor measure and analyze data from the ERP system, the Purchasing has reduced Past Due POs by 75% compared to the Pre-Visual ERP. This ability to gather data and information from the ERP system has been invaluable in helping them dramatically improve vendor performance. A sample of selected vendor improvement in delivery performance, forged by DAM as a result of the new system, is included in Table 4.

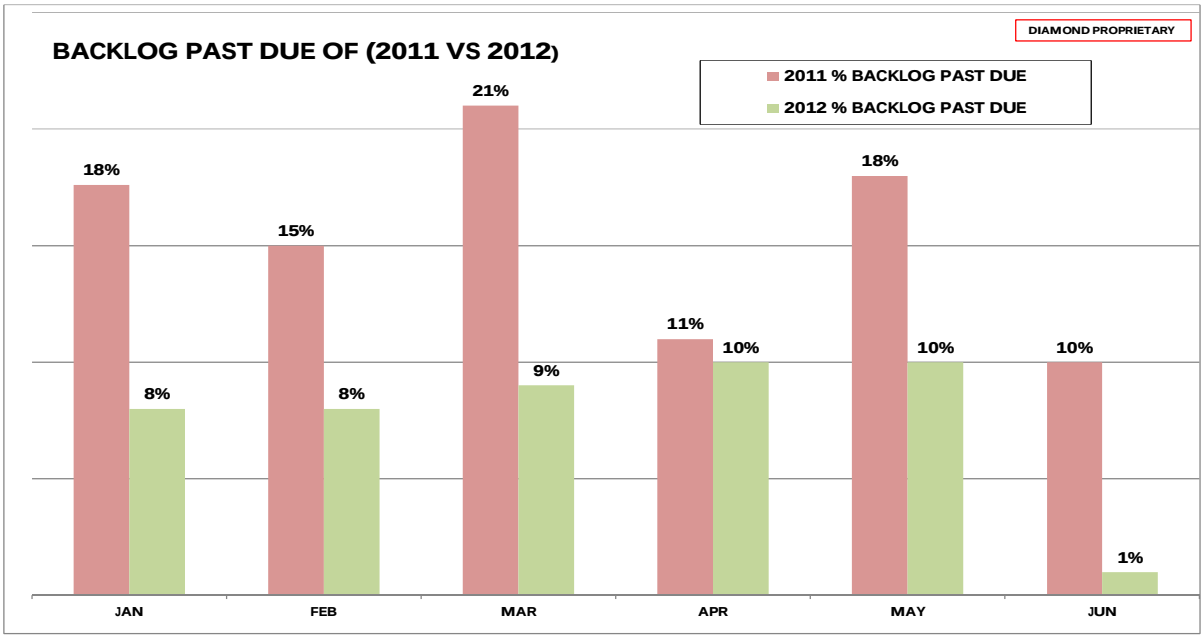
Table 4: Selected Vendor Improvement Post-Visual ERP

Selected Vendor Improvement - As a group (Alpine, BT, Detail and MKS)		
Before Training	Delivery Score	51% On Time
	Quality Rating	93%
	Total Performance Score	79%
After Training	Delivery Score	93%)n Time
	Quality Rating	94%
	Total Performance Score	94%

These statistics clearly reveal the extent to which DAM has been able to improve vendor delivery performance from a Pre-Visual ERP total performance score of 79% to a Post-Visual ERP score of 94% taken on a select number of Class A Vendors.

Obviously, improved vendors' delivery performance has direct impact on DAM's ability to improve its on-time delivery to its customers. This enhancement is reflected in Figure 3, which shows declining past due orders and a dramatic improved on-time delivery to customers.

Figure 3: Improved On-time Delivery to Customers

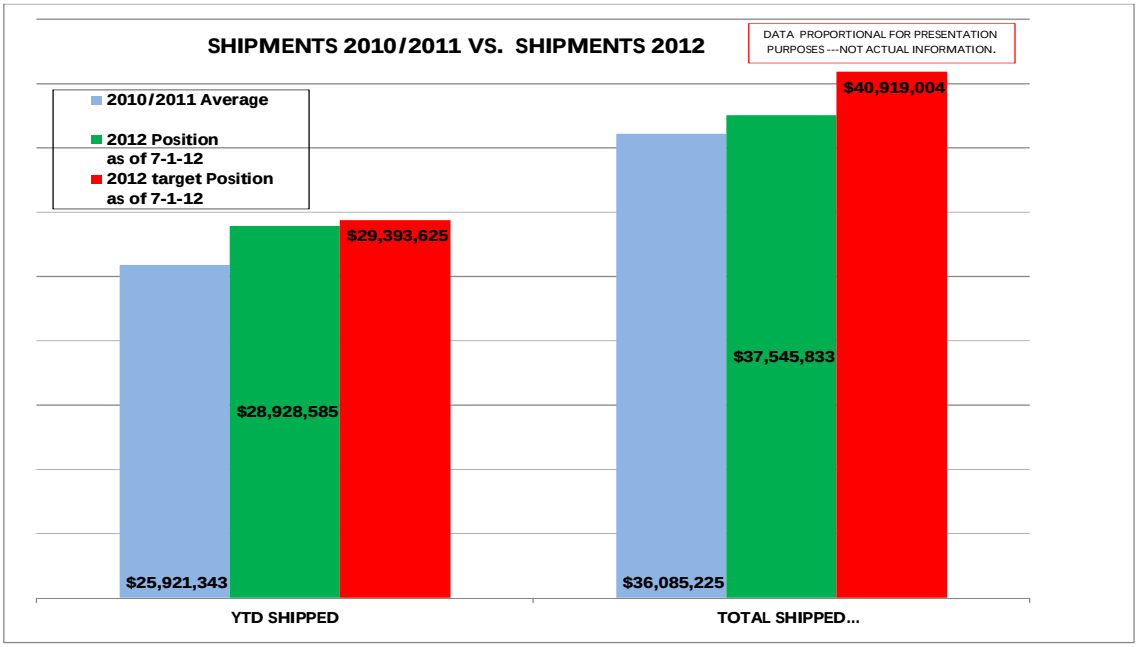


It should be noted here that, in June 2012, DAM had driven Past Due Orders to 1%. This was not due to any operational problem, rather a customer was on a credit hold. The order, however, is still considered past due to the original request date. DAM's goal is to consistently have no past due orders and, with the data and information available from itsr ERP system and continued monitoring, analysis, and proactive management involvement, the set goal is very attainable. This graph depicts positive or negative trends that can be further explored and analized to get to the root causes of issues that must be addressed and corrcted. The urgency of this need is underscored by the fact that almost 60% of DAM's business is with US Government agencies that have strict guidelines and stipulate serious economic penalties if the contract terms are not met precisely. These terms include on-time delivery, quality, warranty, and pricing.

The past due orders indicate being out of control. But hard work by the managers and employees have brought functions and processes under control in measureable ways.

Installation and implementation of the new ERP system has helped generate valuable Data that the management can review and analyze to troubleshoot the problems. A comparision of year to year shipments provides the management with useful information to measure the yearly goal and also to trace the trend toward the long term strategic goals of growth and expansion. The shipment graphs for 2010 – 2012 are presented in Figure 4. The shipment graph for 2012 compares the year to year shipment information to the average shipped in 2010 and 2011.

Figure 4: Shipments 2010/2011 vs. Shipments 2012

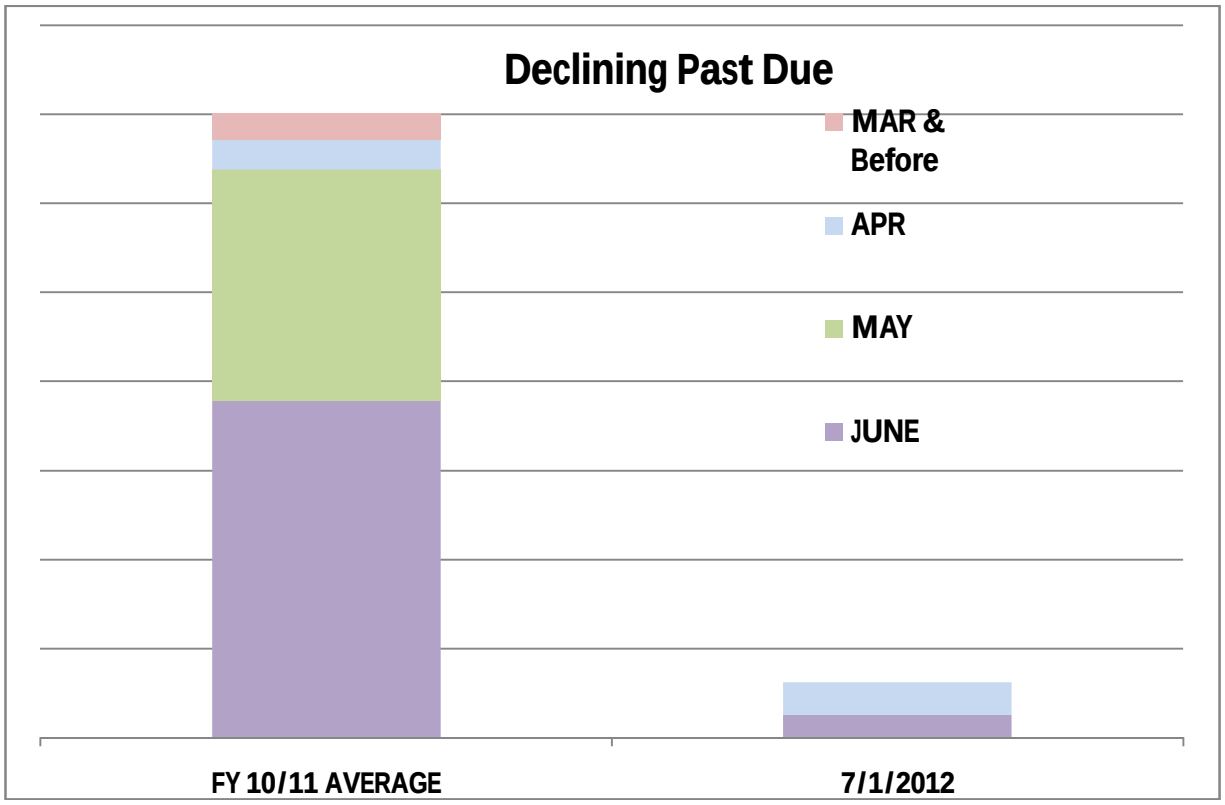


This information is used by both the top management and functional managers and supervisors. This is a quick snapshot to alert management if it's on target to reach its yearly goal as well as whether they are trending to their long range goal of doubling shipment revenues within this decade. As can be seen, as of July 1 the company is slightly behind its year to date goal and the yearly goal. Further analysis will help the management uncover root causes for this deficiency and rectify them to bring its actual shipments in line with the stated goal. With the data available from the ERP system, the firm can make good decisions. In some cases, however, shipments are delayed due to the customer being on credit hold, or customers have requested additional work or engineering changes not spelled out in the original contract.

A closer examination of month to month variations in shipments provided management with further insight in balancing the shipments throughout the year. Progress from fiscal year 2010 through fiscal year 2013 showed that production was becoming more stable and level which allowed more accurate lead time quotes to customers, more efficient use of production resources and more predictable cash flow.

Backorders or past due orders is a major issue in the tactical area and it can adversely affect a firms' reputation and quickly impact its cash flow position, profitability, growth, ROI, and the Employee Stock Option Plan (ESOP). Prior to the Visual ERP implementation the backorders had affected all areas of the firm and had created chaotic conditions at DAM. The availability of integrated data allowed the management to analyze its business by developing Pareto charts, control charts, and to undertake analysis to improve vendor lead times and production processes and standards. These reports guided the company to discover root causes of problems and redevise strategies to effectively reach the corporate goals. A declining backorders trend is visible in Figure 5 below, which shows a dramatic improvement that the ERP software has contributed. The management at DAM has been proactive in managing and eliminating past due orders, and by doing so their year to year growth is up along with profits and a promising outlook for a sustained trend in the future. This provides further evidence that the new system is aiding the firm in working away from a state of chaos to a state of control.

Figure 5: Declining Backorders



How and/or what tools to use to implement the corporate strategy are Tactical decisions. It's review of reports, such as Vendor Improvement Glide Path (6) and Margin Analysis, will provide additional details of the Tactical side of company's operations.

Unreliable and poor performing vendors jeopardize other phases of the process that follow with a chain reaction and serious consequences. Suppliers, in general, should be evaluated by their performance and classified by ratings, whereas the poor performing vendors need to be identified and warned or weeded out. Vendors associated with DAM are rated primarily on the basis of quality and On-Time Delivery, weighted respectively as 2/3 and 1/3. The company simply does not want to work with poor performing vendors. By rating its vendors and identifying poor performers, the company is able to make sound business decisions. Top suppliers are graded and placed on a "Vendor Improvement Glide Path." They are informed where they stand on this scale and, if there are areas where they need to improve, they are so advised. Long term supplier relationships are important, but performance must be measured, communicated and acted upon for such relationship to continue beneficially.

The Quality Report is a critical measurement tool in DAM's long term success. It uses data from the ERP system (9) to measure not only quality from the vendors but also in house production quality, reflecting reworks cost time and money to improve communication, systems and processes. DAM makes rotary couplers and other precision instruments that are part of bigger systems and quality is tantamount. As an analogy, it is similar to a poor brake component on an automobile – if quality is poor and the system fails, the whole vehicle with riders is at risk.
The Purchasing Department can review the status of Purchasing Orders by glancing at the "Open PO's by Month" report for making sure that the right material is coming in at the right time. The Purchasing can use this report to help minimize Past Due PO's and to eliminate surprises that could impact the production floor and quality. It can also be used by the Finance Department to gauge cash needs and by Quality to anticipate labor needs.

The Margin Analysis is yet another tool available to finance and marketing executives to judge whether a particular product is profitable or not and what is the margin on it. Sometimes a product with slim margin is acceptable if the volume is big or the order is from a key customer. Often it's also a part of business strategy to keep the price on the low side in anticipation of bigger contracts or future business.

By analyzing margin for each job or customer, DAM's management team can learn and develop better quoting to the customers. Moreover, it can gain a better understanding of production issues to be able to set more accurate production standard times, minimize and eliminate reworks, whether caused by worker skills and training or whether there was a communication problem with areas such as Design Engineering, Quality, Purchasing or Marketing/Sales.

By being able to track actual costs versus standard costs, as well as the impact of Lead Time quoting, will dramatically help DAM in the future. This knowledge will boost their confidence level, help them better plan, coordinate, and communicate to ensure that they are working in a state of control and not one of chaos.

Operational/Executional Category: Managing day-to-day operations is critical to achieving the tactical and strategic goals of an organization. On the Operations side also, DAM's management focused on generating a number of valuable reports that would allow analysis of data for improvement. For instance, the PO Expedite Report and QC Expedite Report are used by company's respective units to manage day to day operations. These are the tools developed and used by department workers. A PO Expedite Report for DAM is included in Table 5. This report is used by the Purchasing Department to expedite backorders and to prioritize vendors to be contacted to insure they will deliver on time.

In Table 5, the column designated as "Where Used" is also an important field that allows the Purchasing to communicate areas of concern, like POs late or part shortage, to Production.

The Supplier Performance Report shows details on the performance of suppliers, including on-time delivery, cost, quality, intangible, and tangible elements.

Table 5: PO Expedite Report Used by Purchasing Department

OPEN PO's AND PAST DUE ORDERS as of July 20, 2012						
Part Number	**Description**	**Vendor**	**Quantity**	**Due Date**	**Where Used**	**Comment /Action**
5-1201	Oil Seal Collar	Magmac	10	July 23, 2012	80-2255-0	
5-787	BRG1.0X.50X1.50	Fafnir	36	August 8, 2012	2322-0	
2-6182	Valve	Hurley	6	August 12, 2012	2322-0	
12-2841	Housing	BTENGI	4	July 18, 2012	58-845-0	Expedite Vendor, Alert Production
0-199	Cover seal lower	Plastech	4	July 27, 2012	80-2255-0	
0-291	Solenoid Valve	Detail	12	August 28, 2012	57-845-0	
5-5922	Shaft	Marcam	8	Sept 5, 2012	58-845-0	
5-1200	Thrust washer	KC	50	August 26, 2012	21-2202C-0	
7-1298	Circuit Board Controller	MKS	12	July 27, 2012	58-845-0	
7-4376	Motor, controller	MKS	12	July 16, 2012	58-845-0	Expedite Vendor, Alert Production
For illustration only - not actual data						

This report, in combination with Detailed Supplier Performance Report, measures a vendor's performance. Using this information as the basis, DAM developed a Glide Path to Improvement for vendors that are not performing up to its expectations. Similarly, the Part Shortage Report will show immediate concerns affecting production, shipments, customer service, and the financial implication these concerns entail.

The QC Expedite Report shows items needed by the Production to satisfy customers' orders. It is also used by QC to prioritize its work with the potential for overtime (OT) or adding inspectors. A QC Expedite Report for DAM is set in Table 6.

The reports and graphs included and analyzed in this study for illustration are just a few of many that can be created by deploying the data mining capability of an ERP software system. The wealth of information the system generates provides tremendous value to DAM and supports its strategic, tactical and executional corporate goals.

Table 6: QC Expedite Report Used by Production and QC

QC Expedite Report as of July 20, 2012							
Part Number	**Description**	**Vendor**	**Quantity**	**Due Date**	**Where Used**	**Comment /Action**	**Work Order #**
7-4376	Motor, controller	MKS	12	07/16/12	58-845-0	Expedite Vendor, Alert Production	1072
12-2841	Housing	BTENGI	4	07/18/12	58-845-0	Expedite Vendor, Alert Production	1072
5-1201	Oil Seal Collar	Magmac	10	07/23/12	80-2255-0		2025
0-199	Cover seal lower	Plastech	4	07/27/12	80-2255-0		2025
7-1298	Circuit Board Controller	MKS	12	07/27/12	58-845-0		1072
5-787	BRG1.0X.50X1.50	Fafnir	36	08/08/12	2322-0		3302
2-6182	Valve	Hurley	6	08/12/12	2322-0		3302
5-1200	Thrust washer	KC	50	08/26/12	21-2202C-0		4359
0-291	Solenoid Valve	Detail	12	08/28/12	57-845-0		4890
5-5922	Shaft	Marcam	8	09/05/12	58-845-0		1095
For illustation only - not actual data							

6. Conclusion

The DAM Corp. has experienced a measurable success in its manufacturing operations since the implementation of a new Infor Visual ERP system, recently installed. The integration of Quick Book Financials with the financial module of Visual ERP has been a challenge. This has required customization, added cost and complexity. The operations and supply chain side of the house has used Visual ERP with little or no customization, with significant improvement and broad acceptance.

Another challenge that has confronted the company in the past pertained to the warranty claims. Its products are normally warranted for 1 year. Too often, due to past mistakes, the company has received a unit back under warranty more than once. This is costly. The President and CFO of DAM has coined the term PETS for Personal Expenses to Shareholders to emphasize that warranty claims affect profit sharing for all employees. Thus, the firm doesn't want any PETS.

Everything DAM has done is not only to satisfy its customers with the highest quality product and to have a healthy ROI, but to think in terms of continued improvement that would guarantee firm's long range goals of growth and sustainability. A valuable asset of the company that promises sustainability is its talented and empowered workforce.

The balance of this decade for DAM will be a challenge. The company is moving away from being a small firm that operated under chaos for years to a corporation that is in control and on its way to success. All evidence examined in this study, subsequent to the implementation of Infor Visual ERP, strongly indicates that DAM continues on its successful journey in pursuit of its goals and objectives. The impact of the new system is visible across all functions and departments.

As in any software tool, the users are the key to its day to day successful utilization. The company is well placed in that respect. In sum, any organization that has the right tools, a talented and trained workforce, a market that needs to be served, excellent customers and suppliers will grow with sustainability.

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