

T.C.
MARMARA UNIVERSITY

INSTITUTE FOR GRADUATE STUDIES IN
PURE AND APPLIED SCIENCES

USING THE OUTPUT OF AN ERP SYSTEM
IN COMPANYWIDE
PERFORMANCE ANALYSES

By
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SUPERVISOR & COORDINATOR

Prof. Dr. Sami ERCAN

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SUBMITTED FOR PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF MASTER OF SCIENCE
IN
ENGINEERING MANAGEMENT

Istanbul – 1999

T.C. YÜKSEKÖĞRETİM KURULU
DOKÜMAN YAYIN MERKEZİ

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Ayşe Bayındır

II. ABSTRACT

In 1990's, two dominant themes of corporate technology have been data warehousing and ERP (Enterprise Resource Planning). Many of the companies deployed an ERP system and they have recognized the value of integrating process and technologies. Afterwards, they have also recognized that since ERP systems store operational and day-to-day transactions, these systems can only give answers to operational questions.

In today's business, operational answers mean a reactive approach in the competitive environment. In order to be a proactive company, companies should also give more sophisticated and strategic decisions. Turning operational business data into strategic business information is a very difficult challenge.

Performance measurement is one of the strategic tools that is very important in deployment of a certain company objective. In the beginning of this thesis, performance measurement tools and techniques is discussed and three measures are chosen for applications. These measures are used in the applications of using the output of an ERP system in companywide performance analyses. The objective of this thesis is giving details of both ERP and data warehousing systems and incorporating a data warehouse into an ERP system.

OneWorld ERP solution, OneWorld Demo data and Cognos data warehousing suite is used in this thesis. The applications given in this thesis can be used in real case customer data by simply changing some of the query and filter conditions.

III. ÖZET

Bir şirketin doğru stratejik kararlar vermesindeki en değerli kaynağı şirketin zaten elinde olan verileridir. Bununla birlikte, bu verilerin stratejik bilgilere dönüştürülmesindeki güçlükler şirketlerin karşı karşıya oldukları en zor durumlardan biridir. Mevcut verilerin kullanılmaması, değerlendirilememesi ve stratejik karar alımında kullanılmaması sözkonusudur.

Uzunca bir süredir firmaların büyük bir kısmı ya bir ERP (Enterprise Resource Planning – Kurumsal Kaynak Planlaması) sistemini bünyesine uyarlamış ve kullanmaktadır ya da uyarılma süreci içerisinde. ERP sistemleri sektöre bağlı olmaksızın, herhangi bir kuruluşun tüm kaynaklarının (malzeme, para, insan, ekipman,..vb) takip edilmesi ve planlaması için hazırlanmış kurumsal yazılımlardır. ERP sistemlerinin genellikle en az dört ana modülü bulunmaktadır; finans, dağıtım/lojistik, üretim ve insan kaynakları. Tüm bu modüllerde firma içinde yapılan tüm kaynak hareketlerinin işlemleri girilir ve raporlanır. ERP sistemlerinin en büyük özelliği firma içindeki tüm işlemleri tek bir çatı altında toplaması ve tüm modüllerin birbiriyle tam entegre olmasıdır. ERP sistemlerini kullanan firmalar, kullanılan bilgi sisteminin tam entegre olmasının organizasyona sağladığı faydaları artık anlamışlardır. Böylece ERP sistemleri tüm firmalar için artık bir lüks değil bir ihtiyaç haline gelmiştir.

ERP sistemlerinin işlem temelli olması, stratejik karar alınması sırasında verilerin değerlendirilmesini ve sofistike raporlar alınmasını kısıtlamaktadır. Firmaların bu ihtiyaçlarını veri ambarı sistemleri çözmektedir. Veri ambarlarının amacı eldeki tüm verilerin karar vermede kullanılmak amacıyla tek bir çatı altında toplanmasıdır. ERP ile birlikte bir veri ambarı sisteminin de kullanılması son günlerde iyice yaygınlaşmış ve ERP firmaları da bu konuyla ilgilenmeye başlamışlardır. Önde gelen ERP yazılımları ya kendi veri ambarı çözümlerini geliştirmekte ve ERP ile birlikte müşterilerine sunmakta ya da veri ambarı yazılımları ile hazır entegrasyonlar sağlamaktadır.

Bu tezin konusu, şirket-içi performansın değerlendirilmesinde ERP ve veri ambarı sistemlerinin birarada kullanılmasıdır. Performans değerlemesinde kullanılacak veriler ERP sistemlerinde, bu verileri değerlendirecek araçlar ise veri ambarı sistemlerinde bulunmaktadır.

Tez içerisinde, öncelikle performans değerlendirme, ERP ve veri ambarı konularında genel bilgiler, daha sonra ise konuyla ilgili bir uygulama sunulmuştur. Performans Değerlendirme uygulaması için J.D. Edwards firmasının OneWorld adlı ERP çözümü ve Cognos firmasının veri ambarı araçları kullanılmıştır. Kullanılan örnek verileri ise OneWorld sisteminin demo verileridir. Uygulamalar gerçek müşteri verilerine de sorgu ve filtre özellikleri değiştirilmek suretiyle kolaylıkla uyarlanabilecek niteliktedir.

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VII. LIST OF ABBREVIATIONS

A1	: Revenue growth and mix performance measures
A2	: Cost reduction/productivity performance measures
A3	: Asset utilization/investment strategy performance measures
B1	: Market share performance measures
B2	: Customer retention performance measures
B3	: Customer acquisition performance measures
B4	: Customer satisfaction performance measures
B5	: Customer profitability performance measures
C1	: Innovation performance measures
C2	: Operations performance measures
C3	: Post-sale service performance measures
D1	: Employee capabilities performance measures
D2	: Information systems capabilities performance measures
D3	: Motivation, empowerment, and alignment performance measures
DSS	: Decision Support Systems
EIS	: Executive Information Systems
ER	: Entity-relationship
ERP	: Enterprise Resource Planning
EVA	: Economic Value-Added Analysis
JBOPS	: The big five of ERP vendors (J.D. Edwards, BAAN, Oracle, PeopleSoft, SAP)
KIP	: Key Performance Indicators
MOLAP	: Multidimensional Online Analytical Processing
MRP	: Material Requirements Planning
MRP-II	: Manufacturing Resource Planning

OLAP : Online Analytical Processing
PMQ : Performance Measurement Questionnaire
RDBMS : Relational Database Management System
ROI : Return on Investment
ROLAP : Relational Online Analytical Processing
RSA : Royal Society of Arts, Manufacturers and Commerce
SMART : Strategic Measurement Analysis and Reporting Technique
SQL : Standard Query Language



1. INTRODUCTION

During the past several years, many companies have streamlined their operational systems by deploying an ERP (Enterprise Resource Planning) system. These systems include modules for each transactional operation in an organization; finance, human resources, manufacturing, logistics, distribution, customer service,..etc. By using an ERP application, companies improved their information systems and they recognized the value of integrating process and technologies.

Making successful decisions requires data analysis. Although most of the big organizations deployed an ERP system and they have their operational data, turning this data into strategic business information can be a very difficult challenge. That is why massive amounts of data may be underused for decision making. Since ERP systems are transaction-based, reports and queries of these systems are also transactional. In today's business, because of competitive environment organizations need more sophisticated analysis to analyze their transactional data. Because of this fact all ERP vendors are surrounding their applications with a data warehouse module.

Performance measurement is one of the strategic tools that should be handled in an organization. After the establishment of company strategy and objectives, performance measures for each department can be decided on by considering these objectives.

The objective of this thesis is giving details of performing performance management by using ERP and data warehouse tools and technologies. Performance measurement criteria and possible ways of performance analysis in an organization will be discussed. Afterwards, how to use the output of an ERP system in strategic decision making related to performance will be mentioned. How to incorporate data warehouses into an ERP system will also be mentioned.

OneWorld, ERP solution of one of the leading ERP vendors -J.D. Edwards- and Cognos Suite, data warehousing solution suite of COGNOS will be described as an ERP and data warehouse tool combination for enterprisewide performance management. By using OneWorld ERP solution and Cognos data warehousing suite three performance measurement applications will be defined. Objective of this thesis is giving the ways of performance measurement in an ERP solution and also defining applications that can be used in customers with a little change in query definitions.

2. PERFORMANCE MANAGEMENT

2.1. Performance Management Concepts

Purpose of the *performance management* is managing internal business flows in order to improve efficiency and to achieve company objectives. It is the process of measuring key performance indicators that drive enterprises. In order to make strategic decisions and achieve both strategic and tactical objectives, critical information about business drivers is necessary. Key performance indicators (KIP) are the individual measurements that are used to indicate performance. They include lag and lead indicators:

- Lag indicators – Common, industry-specific performance measures. They are actually results of enterprise performance.
- Lead indicators – Unique, company-specific performance measures that drive performance.

Companies measure their performance by paying attention to their lead and lag key performance indicators. Key Performance Indicators should give information about what has happened and also what will happen; because companies need to be proactive instead of reactive.

At the hearth of the performance management process, there is an information system that enables the closed loop deployment and feedback system. The information system, i.e. the Performance Measurement System, to be effective in achieving its objectives, should take an account of the Strategic and Environmental factors relating to the business as well as consider the structure of the organization, its processes, functions and their relationships.⁷

Therefore, performance management should not employ performance measures that conflict with strategic goals and objectives and isolate non-value activities.⁸ Sub-optimization of certain business areas within an enterprise happens because of old-fashioned, cost accounting based, isolated, performance measures that are not integrated to whole business flow.

⁷, Please refer to page 76 for List of References.

Today, performance measurement has become very topical.¹² The reasons behind of this fact are:

- The changing nature of the world
- Increasing competition
- Specific improvement initiatives
- National and international quality awards
- Changing organisational roles
- Changing external demands
- Power of informational technology

According to RSA (Royal Society of Arts, Manufacturers and Commerce):

“To achieve sustainable business success in the demanding world marketplace, a company must ... use relevant performance measures.” (RSA,1994)

Company strategy, that is derived from organisation’s vision and mission statements, is the most important point of the performance measurement process. The strategy determines what is to be measured. Measures – in other words, key performance indicators (KPIs) - are used to determine progress towards achieving the strategic aims.¹³

2.2. Executive's Tool Kit

According to Peter F. Drucker², enterprises are paid to create wealth, not control costs. But that obvious fact is not reflected in traditional performance measurements. Performance measurement requires four sets of diagnostic tools:

- Foundation information,
- Productivity information,
- Competence information, and
- Information about the allocation of scarce resources.

These four diagnostic measures give information about current business, by examining the past data.

Foundation Information:

Most analysis in corporations is concentrated in the finance department. Finance has the best overall view of the business. It gets the consolidated numbers from all operations. Financial analysis captures all costs, all revenues, and all performance against expectation.

Foundation information is basically traditional financial statements and analysis, such as:

- Balance sheet
- Income statement
- Cash flow analysis
- Financial ratios
- Profitability analysis.

Problem about traditional practice of financial analysis is that: Most of the analysis in corporations is concentrated in the finance department, operational analysis is not considered as an overall analysis.

- Can we continue to create value? (innovation and learning perspective)

These performance measures identify the parameters that the company considers most important for the competitive success. That is, only through the ability to launch new products, create more value for customers, and improve operating efficiencies continually can a company penetrate new markets and increase revenues and margins-in short, grow and thereby increase shareholder value.

- How do we look to shareholders? (financial perspective)

Traditional management accounting based performance measures like operating income and return-on-investment are included in this category. These historical performance measures indicate whether the company's strategy implementation, and execution are contributing to bottom-line improvement.

By looking from these four perspectives, executives can track not only historical key performance indicators but also internal, external and future key performance indicators. While giving senior managers information from four different perspectives, the balanced scorecard minimizes the information overload by limiting the number of measures used. It forces managers to focus on the handful of measures that are most critical. It proposes an enterprise-wide approach to measure performance.

According to a recent paper ⁷, the performance management process is the process by which the company manages its performance in line with its corporate and functional strategies and objectives. The objective of this process is to provide a proactive closed loop control system, where the corporate and functional strategies are deployed to all business processes, activities, tasks and personnel and feedback is obtained through the performance measurement system to enable appropriate management decisions.

Productivity Information:

Economic value-added analysis (EVA) and benchmarking provide the diagnostic tool to measure total-factor productivity and to manage it. Economic value-added analysis (EVA) measures the productivity of all factors of production by measuring the value added over all costs. On the other hand; benchmarking, one of the recent tools used to obtain productivity information, means comparing one's performance with the best performance in the industry or with the best anywhere in the business.

Competence Information:

That analysis allows for the early recognition of opportunities. The first step is to keep careful track of one's own and one's competitors performances, looking especially for unexpected successes and unexpected poor performance in areas where one should have done well.

Innovative performance is the most valuable competitive performance measure. Core competencies are different for every organization; but every organization should have one common core competence: innovation. And every organization needs a way to record and measure its innovative performance.

Resource-Allocation Information:

The last area in which diagnostic information is needed to manage the current business for wealth creation is the allocation of scarce resources: capital and performing people.

Companies typically measure their proposed capital appropriations by only one or two of the following measures: return on investment (ROI), payback period, cash flow, or discounted present value. To understand a proposed investment, a company needs to look at all four.

2.3. Balanced Scorecard

In today's business, executives want to use not only the traditional financial performance measures but also a balanced presentation of measures that allow them to view the company from several perspectives.¹ They want a balanced presentation of both financial and operational measures. In order to achieve strategic objectives, financial and operational measures should be balanced. It is obvious that none of the performance measures can provide clear performance management results by itself. Furthermore, traditional financial-based performance measurement systems can give misleading signals for competency and ever-changing structure of enterprises. The traditional performance measures just describe financial history and encourage reactive management style, while providing little insight into future trends. While focusing on a balanced presentation, a right performance management system should not only tell how an enterprise has performed, but also give indications as to how it will perform.

Limitations of traditional performance measures are:

- They are based on traditional management accounting systems.
- They are past oriented, lagging.
- They are not strategy oriented.
- They are inflexible.
- They are expensive.
- They mean standardization and missing continuous improvement.
- They do not consider customer requirements.

By taking a "balanced" view across a range of performance measures, or with the use of the balanced scorecard concept; the success of an organisation can be best assessed.

Performance management is the quantitative assessment of an activity's progress toward achieving a particular goal or objective. Although traditional financial performance measures still remain useful, they have limitations in ever changing and competitive today's business.

Balanced Scorecard is the most popular performance management system, which proposes balancing measures of business performance in terms of different perspectives:

- Financial perspective;
- Customer perspective;
- Internal business perspective and
- Innovation and learning perspective.

By integrating 'management by objective' into enterprise analysis, balanced scorecard converted organization's mission statement and strategy into quantifiable measures. Balanced Scorecard includes financial measures that use past data and give results of actions that are already taken. And it complements those financial measures with operational measures of the activities that drive future financial performance.

The balanced scorecard allows managers to look at the business from several perspectives and it provides answers to four basic questions ⁴:

- How do customers see us? (customers perspective)

Market share and customer satisfaction is the examples of customer-oriented performance measures. Customer's concerns tend to fall into four categories: time, quality, performance and cost. In order to look at the business from customer perspective and put the balanced scorecard to work, customer-oriented objectives and measures should be prepared. The customer perspective identifies the target customer and market segments for each business unit.

- What must we excel at? (internal perspective)

The internal measures for the balanced scorecard should stem from the business processes that have the greatest impact on customer satisfaction-factors that affect cycle time, quality, employee skills, and productivity, for example. Companies should also attempt to identify and measure their company's core competencies, the critical technologies needed to ensure continued market leadership. Companies should decide what processes and competencies they must excel at and specify measures for each. Product design, development and operations management drive the success of the product line. Internal performance measurement gives the capability of identifying the harvested or discarded product lines or products.

2.4. SMART

SMART¹⁵ (Strategic Measurement Analysis and Reporting Technique) model shows a four-level hierarchy of measures and objectives. At each step there are measures and these measures are used within an hierarchy. The steps of SMART pyramid are:

1. Corporate vision and strategy,
2. Objectives for each business unit,
3. Tangible operating objectives and priorities,
4. Operational measures.

2.5. PMQ

PMQ (Performance Measurement Questionnaire) is developed for controlling the improvements in performance measures. By this questionnaire, everyone in the organization proposes performance measures for themselves and others. It may be a step in performance management to identify the performance measures. However, it is not a performance measurement system.

2.6. Comparison of Performance Management Approaches

¹⁵ The strength of SMART is the integration of strategy, objectives and measures. However it is unable to identify any KPI. The weakness of PMQ is that; it does not provide continuous improvement in performance measures.

Both Balanced Scorecard⁴ and Executive's Tool Kit² introduced additional measures for operational and competence perspectives. The biggest difference between these two techniques is strategy emphasis of Balanced Scorecard and past data emphasis of Executive's Toolkit. Since strategies and objectives of every organization are different from each other even in the same sector; in order to use a balanced scorecard system in a company, first of all strategies and objectives should be identified. In this master thesis, performance measures will be defined but after deciding on the strategic objectives, companies should select the related financial and operational performance measures. It is important to make a balanced presentation of performance with these measures.

The main weakness of balanced scorecard is that it is designed for senior managers. Therefore it is not applicable at the factory level.

In order to reach company objectives, objectives and their strategies should be clearly set up. After setting up strategies, related measures and standards of these measures should be identified. For the balanced presentation of these measures, measures of each department will be classified according to their perspective.

2.7. Performance Measures of a Typical Organization

According to Robert S. Kaplan and David P. Norton¹, categories of measures for each perspective are defined below. Codes are given for graphical purposes:

A. Financial Perspective:

1. (A1) Revenue growth and mix
2. (A2) Cost reduction/productivity improvement
3. (A3) Asset utilization/investment strategy

B. Customer Perspective:

1. (B1) Market share
2. (B2) Customer retention
3. (B3) Customer acquisition
4. (B4) Customer satisfaction
5. (B4) Customer profitability

C. Internal-Business Process Perspective:

1. (C1) Innovation
2. (C2) Operations
3. (C3) Post-sale service

D. Learning and Growth Perspective:

1. (D1) Employee capabilities
2. (D2) Information systems capabilities
3. (D3) Motivation, empowerment, and alignment

Performance measures will be classified according to departments. In an organization, there are eight major functional departments and each department has its own key performance indicators and measures that drive profitability:

- Finance
- Sales and Marketing
- Purchasing
- Production
- Distribution
- Customer Service
- Human Resources
- Information Technology

While a manufacturing organization has at most these eight departments, other organizations may have a combination of them. The proposed approach assumes a manufacturing organization and gives the widest identification of possible performance measures. Each of these organizational functions is interested in a particular subset of the possible types of analysis. Each function has its separate needs, but many needs are cross-functional.

Perspectives for each measurement are given in parentheses as codes that are defined in the previous section.

2.7.1. Performance Measures of Finance Department

Objectives and measures can differ at each stage of product life cycle. Whereas in the growth stage percentage of revenue growth rates is important, in the maturity stage traditional financial measurements are more meaningful. Finance department has the best overall view of the business and it gets the consolidated numbers from all operations.

Traditional financial performance measures used in the finance department are:

1. Balance Sheet
2. Income Statement
3. Financial Ratios
4. Cash Flow Analysis
5. Profitability Analysis

Balance Sheet, is to show the financial situation of a business entity at a specific date. Balance sheet statement consists of two columns: one column for assets and another column for liabilities and owner's equity. Details of the columns are standard and the recorded value of the assets always equals the recorded value of the liabilities plus owner's equity. It is a report of resources owned and debts owed at a particular point in time. ((A3) Asset utilization/investment strategy)

Income Statement, is often considered as more important than balance sheet by accountants and financial statement readers. It reports the results of business activities for a period of time. Report shows revenues and expenses: Revenues measure the inflow of new assets to the business from the earnings process; expenses measure the outflow of assets. Net income or net loss represents an increase or a decrease in assets and owner's equity. ((A1) Revenue growth and mix)

Financial Ratios, are used to examine a company's liquidity, profitability, activity and debt to equity proportion. Ratios can give misleading and conflicting signals; in order to use the ratios in the right way, more than one ratio is needed to assess the financial statements. Financial ratios can be classified according to their concerns and their analytical techniques. There are four types of financial ratios, each measures a different aspect of company's performance: profitability ratios, activity ratios, liquidity ratios and overall (debt and equity) ratios. Four analytical techniques that are used in financial ratios are percentage changes, trend percentages, component

percentages and ratios. After gathering the ratio information, it should be compared with a standard. This standard can be either the past performance of this company or the performance of other companies in the same industry. ((A3) Asset utilization/investment strategy)

Cash Flow Analysis, gives information about a company's cash receipts and cash payments for a period of time and explains the change in cash for the same period. Cash inflows are treated as revenues of the period; cash outflows are treated as expenses of the period. It provides a liquidity measure. By combining accrual based financial statements (balance sheet and income statement) and cash flow statement, companies can measure liquidity and determine sales-to-cash cycle time. ((A3) Asset utilization/investment strategy)

Profitability Analysis, is designed in order to track expenses in the operational or business unit level. It means comparing actual and plan values and gathering variance information for each business unit. Business unit can be described as the lowest level of company where its revenues and expenses are tracked. So, after acquiring the company level income statement information, company needs also the information for expenses and variances for its every business unit; plants, branches, work centers... etc. ((A2) Cost reduction/productivity improvement, (C1) Innovation)

2.7.2. Performance Measures of Sales and Marketing Department

Sales performance measurement can be classified as follows: Sales analysis, sales profitability analysis and sales plan-actual comparative analysis. Marketing performance measurement with profitability perspective means measuring the increase of the proportion of high-profit customers. Therefore profitability of the customers and the effectiveness of marketing campaigns should be measured.

1. *Sales Analysis*: Classic sales performance measurement performed in sales analysis means quantitative measurement of a Sales Order Management system. It includes measures like number of sales orders, value of sales orders, quantity ordered, quantity sold, sales amount, number of discounts, discount percentage, discount amount, commission percentage, commission amount, average sales price, number of returns, return amount, return quantity. ((B4) Customer satisfaction, (C2) Operations, (B1) Market share, (C1) Innovation)
2. *Sales Profitability Analysis*: It measures gross and net profit amounts and their percentages. ((C2) Operations, (C1) Innovation)
3. *Sales Plan and Actual Comparative Analysis*: It includes comparison of actual sales with sales forecast and sales probability information. ((C2) Operations, (C1) Innovation)
4. *Customer Profitability Analysis*: In order to measure the increase in customer profitability, profit margin of the customers should be measured. ((B4) Customer profitability)
5. *Marketing Effectiveness Analysis*: Response percentage of campaigns according to their media types and their cost gives the information about the marketing campaign effectiveness. ((B2) Customer retention, (B3) Customer acquisition, (C1) Innovation)

2.7.3. Performance Measures of Purchasing Department

Performance measurement in the purchasing department includes two measures:

1. *Inventory Turnover Analysis*: As well as knowing inventory quantity and location information; managers also need inventory turnover information. ((C2) Operations)
2. *Supplier Performance Analysis*: Timeliness and quality performance of the suppliers should also be tracked by purchasing department. ((C2) Operations)

2.7.4. Performance Measures of Production Department

Productivity and cost are the most common measures of manufacturing performance.⁶ Then they are compared with standards, historical performance data and competitive information. Productivity⁵ is the efficiency with which outputs are produced- the ratio of output to input. It includes capacity utilization information. Production performance measures include:

1. *Capacity Utilization Analysis*: Measuring capacity utilization in a timely and quantitative manner and comparing these rates with standards or past data is the way of capacity utilization performance measurement. ((C2) Operations)
2. *Standard Product Cost and Quality Analysis*: It means measuring actual labor, machine and material costs and comparing these amounts to planned costs. The difference between actual and planned product cost may be because of rework, reject, and scrap quantities or change orders. By giving the information about cost variances, it should also give the information about the reasons of these variances. Quality control information of a product, product line or plant can be seen within this performance measure. ((A2) Cost reduction/productivity improvement, (C2) Operations, (C1) Innovation)
3. *Cause of Poor Quality Analysis*: Cause of poor quality information can be gathered by counting the number of quality problems and their reasons. Time lost with this problem, its solution and cost give the cost-effective information. ((C2) Operations)
4. *Production Planning Analysis*: Production order timeliness, and planner past due orders can be gathered with work order due date and closing date information. ((C2) Operations)

2.7.5. Performance Measures of Distribution Department

Carrier Performance Analysis is the way to measure the distribution performance of a company. As well as giving information about the number of trips, cost of each trip and trip quantity, trip distance, weight, carrier performance should also give information about the number of on time trips and percentage of those. ((B4) Customer satisfaction, (C2) Operations)

2.7.6. Performance Measures of Customer Services Department

Measuring the performance regarding the relationship between company and its customers after the sales activity includes:

1. *Delivery Performance Analysis*: On time delivery performance of the company should be in terms of delivered amounts, quantities and number of order lines, and should give information about the average of delivery gap days. ((B4) Customer satisfaction, (C) Operations)
2. *Cost of Service Analysis*: Number of complaints, returns, claims and their amounts give information about cost of post sales activities and services. ((C3) Post-sale service)
3. *Post-sales Activities Analysis*: Response time to complaints and claims, their priority and severity gives information about quality and customer dissatisfaction. ((C3) Post-sale service)

2.7.7. Performance Measures of Human Resources Department

Performance measurement in a human resources department should include employee turnover information and employee skill improvement information.

1. *Human Resources Administration*: It means employee turnover analysis, salary and other expenses, promotions. ((D3) Motivation, empowerment, and alignment)
2. *Work Force Planning*: Employees, current and targeted skill levels of them give human resources planning information. ((D1) Employee capabilities)

2.7.8. Performance Measures of Information Technology Department

IT department performance is its capability to give accurate and timely information to every decision-maker. ((D2) Information systems capabilities)



2.8. Impact of Product Life Cycle on Performance Measures

As seen from the above, each department in an organization has its own objective and own measures.

For Balanced Scorecard purposes¹, only the measures that are selected by performance measurement building project team should be used by a company. Selected measures should be meaningful for company strategy and objectives. For instance, if a company has a quality improvement objective, performance measures that reflect quality for each department should be included.

It is also important to note that, as products move through their life cycle, different performance measures will be appropriate for each stage.⁶ Financial objectives and strategies can be considerably different for each stage of the product life cycle. Product life cycle consists of four stages and provides important insights for the decision-makers:

1. **Introduction:** It is the first stage in product life. In this stage the firm tries to promote demand for its newly introduced product. Therefore, customer needs and responsiveness to these needs, innovation, and flexibility are important.
2. **Growth:** In this stage the critical task is to maximize the company's market share. New customers join the early users and with this increase in sales, company begins to earn profits on the new product. Rapid sales increases, design standardization makes it more important to increase capacity, too. Measures that relate to capacity, backlogs, stockouts and lost sales become critical. Profitability financial perspective becomes more usable.
3. **Maturity:** In the maturity stage, increase in sales continues, then it begins to decrease after the saturation level. In a competitive environment and with the increase in the availability of the product, further expansion becomes difficult. Costs and productivity of labor and capital become more critical.
4. **Decline:** In the decline stage of the product life cycle, sales continue to fall.

If the manufacturing performance measures are inappropriate to a product's stage in the life cycle, performance measurement will give misleading signals.⁶

3. ERP SYSTEMS and PERFORMANCE MANAGEMENT

3.1. Overview of ERP

Inventory control was the only focus of manufacturing systems in the 1960's and most of the software packages were designed for inventory management. In the 1970's the focus shifted to MRP (Material Requirement Planning) systems which translated the Master Schedule built for the end items into time-phased net requirements for the sub-assemblies, components and raw materials planning and procurement.

MRP (Material Requirement Planning): The management and scheduling of materials and the processes that are utilized to produce products.

In the 1980's MRP-II (Manufacturing Resource Planning) concept evolved which was an extension of MRP. In the early 1990's, MRP-II was further extended to cover areas like Engineering, Finance, Human Resources, Projects Management,..etc, all transactional activities within any business enterprise. ERP system encompasses virtually all business functions within the organization, integrating financial and administrative management, manufacturing, materials, logistics, distribution, planning, quality control, ..etc. A seamless integration is essential to provide visibility and consistency across the enterprise by using an ERP solution.

ERP (Enterprise Resource Planning) system is a software solution that addresses the enterprise needs taking the process view of an organization to meet the organizational goals tightly integrating all functions of an enterprise. By using an ERP system across the enterprise, business processes are automated and all data is shared.

In addition to system requirements, ERP addresses technology aspects like client/server distributed architecture, RDBMS, object oriented programming etc.

ERP (Enterprise Resource Planning): The management and scheduling of all resources and processes that are utilized to produce products. ERP is a new term for the extension of MRPs scope and depth:

- It facilitates company-wide integrated information management systems covering all functional areas.
- It performs core corporate activities and increases customer service augmenting corporate image.

A large and rapidly growing number of organizations have ERP systems as their core operational system. The strength of ERP is in inputting, maintaining, and reporting on day-to-day operational data. Although each ERP system has different characteristics and modularity, they consist of at least four core modules. These modules are finance, logistics/distribution, manufacturing, and human resources. Companies that deploy ERP applications recognize the value of integrating process and technologies.

3.2. Performance Management in ERPs

Since ERP systems have been tuned to maximize daily transactional activities and to improve the efficiency and integration of internal operations, there is a lack of capability for analyzing the transactional data. All of the ERP systems have their own transactional reports and queries but companies that have implemented an ERP system want new tools to perform more sophisticated analysis than simply running standard reports against the data.

Although ERP systems have all the inputs of operational performance measurement data, performance management is not considered by all ERP vendors. The big five of ERP vendors (JBOPS: J.D. Edwards, Baan, Oracle, PeopleSoft, and SAP) have built performance measurement tools, after creating partnerships with business intelligence vendors such as Cognos and Business Objects for EIS/DSS(Executive Information Systems/ Decision Support Systems) applications. Some of them preferred to develop their own data warehousing tool, others provide a foundation of standards and interfaces to support most third-party data warehousing and data mart solutions. ERP vendors realized that many of their customers are building their own data warehouses to analyze ERP data and they decided on supplying a packaged data warehousing solution that is integrated with their ERP system.

Most of the companies today realizing that data warehouses sourced from a suite of ERP applications and other external data sources provide the complete decision support environment they require.

4. DATA WAREHOUSING CONCEPTS

4.1 What is a data warehouse?

The concept of the data warehouse appeared in the early 1990s. Because of the complexity of the decisions, tracking the process across departments and functions, the way information is stored, manipulated and presented should have incredible amount of flexibility. Data warehouses are developed with the need of enterprises to redesign how their information system is organized. Data Warehousing is the process of integrating enterprisewide corporate data into a single repository. It is a set of integrated data intended for line managers and decision makers, to access information and facilitate decision making. It collects data from production databases and transforms it, records the history, enables the user to analyze it using different types of tools. It includes information concerning all areas of business in the enterprise. Its size is therefore significant, from several dozen gigabytes to several terabytes of data.

A data warehouse is usually built on a relational database in an open system such as Unix or Windows NT.

4.2 Major Components of a Data Warehouse

There are five basic components of a data warehouse; data modeling, metadata, data transformation tools, core warehouse and data marts, and end-user access tools.

- *Data Modeling*: In order to design the warehouse and ensure that all the data is available and consistent, data modeling tools are used. Data analysts understand the business data and design the data that will be most useful in managing the organization. Entity-relationship (ER) diagrams have traditionally been an essential part of the overall planning and maintenance of an organization's information resources, but recently new techniques of data modeling (star schema and snowflake) have been introduced to support data warehouse design.
- *Metadata*: It is the 'data about data' and contains the location and description of warehouse system components; names, definition, structure, and content of the data warehouse,..etc, which are necessary for users and developers. It is used for building, maintaining, managing and using the data warehouse.

- *Data Transformation*: It means extracting and transporting the data from the source databases to the data warehouse.
- *Core Warehouse and Data Marts*: Warehouse or functional and theme-based subsets of data warehouse.
- *End-User Access Tools*: They are reporting tools, query tools, EIS/DSS(Executive Information Systems/Decision Support Systems) tools, OLAP(Online Analytical Processing) tools and data mining tools. Query tools enable querying a relational database using SQL(Structured Query Language). *Data mining* allows businesses to go into their data -all of their data- and extract significant, previously unknown pieces of information from large databases and then use that information to make important business decisions. It is the process of providing an automated presentation of patterns, rules or functions to a knowledgeable user for review and examination.



4.3. OLAP Tools

OLAP tools allow users to perform quick and effective analysis on large amounts of data. They are designed for managers and analysts in large companies and organizations who need rapid multi-user access to consolidated enterprise performance data that can be rapidly viewed from multiple dimensions, regardless of the complexity of the query.

OLAP reports can be regular status reports, but they are especially effective for key performance indicator (KPI) reporting, business performance measurement reporting, and scorecard reporting.

OLAP tools aggregate data along common business subjects or dimensions and then let the users navigate through the hierarchies and dimensions with mouse click. Users can drill down, across, or up levels in each dimension or pivot. OLAP reports are generated from data cubes. Since each cube contains a wide variety of dimensions and measures, a vast number of reports can be built from the information in the cube.

OLAP tools are based on the concepts of multidimensional databases and allow a super-user to analyze the data using elaborate, multidimensional and complex views. OLAP tools are typically used for product performance and profitability analyses, effectiveness of sales program or a marketing campaign analyses, sales forecasting and capacity planning. OLAP tools are classified in three groups: ROLAP, MOLAP and Hybrid. Querying relational data is called relational online analytical processing (ROLAP). Because the manipulated data is stored in multidimensional form using an engine adapted for this type of access, the technology used by these systems is called multidimensional online analytical processing (MOLAP). Hybrid means using both MOLAP and ROLAP techniques for analyzing the data.

4.4. Performance Management with Data Warehouses

As many companies have implemented data warehouses, most of them also performing performance measurement since the data warehouses provide the corporate information necessary for a balanced scorecard analysis.¹³

The first step of performance measurement by using these tools is identifying the sources of performance data. However, even though performance data has been captured, it does not mean that it is usable by a performance measurement application. That information may have to be re-captured (re-entered) into the performance measurement application. In order to make this movement easier, implementing a performance measurement application that is integrated to the source applications: such as ERP. By using this integration and a scheduler, automatic data retrieval may also be possible.

After data has been identified and re-captured, it is time to perform performance measurement. It has the following steps:¹³

- set performance targets;
- normalize scores to agreed scales;
- establish the relative importance of and weightings for, KPIs;
- identify the time periods within which performance data will be summarised and presented;
- establish a process for the provision of commentary for users of the scorecard.

5. AN APPLICATION OF DATA WAREHOUSING AND ERP APPROACH FOR PERFORMANCE MANAGEMENT

In this thesis three different business measurements will be given as an application of analysis. J.D. Edwards OneWorld ERP Software Solution and COGNOS Business Intelligence Suite will be used in these applications as an integrated ERP and Datawarehouse solution for business performance management. Cognos is used to map and extract data from J.D. Edwards tables to Cognos tables and OneWorld Demo Standalone Data will be used to view the analysis.

In this thesis OneWorld demo data is used but in a real case of a customer, these applications can also be used by changing query and filter conditions. The given applications are frameworks that will be used in the future ERP and data warehousing implementations.

These applications that will be defined in the following sections are:

- Profitability Performance
- Customer Delivery Performance
- Supplier Delivery Performance

Some of the key data warehousing terms used in these applications are defined as follows:

Dimension	It represents a specific perspective of the data included in the analysis.
Multi-dimensional Data Analysis	Simultaneous use of multiple data dimensions is referred to as multi-dimensional data analysis.
Measure	Key Performance Indicator (KPI).
Cube	A multidimensional data structure for data warehouses that organizes data into arrays.
View	Queries made by end-user access tools.

The steps of each of these performance measurements are as follows: At first all the tables used in analyses and all the chosen fields of these tables will be listed. Then, dimensions and measures of each analysis will be given. Criteria is the query definition that will be used in creation of the datacube. Query Joins and Filter Conditions will give the same data in different formats. Views will also be given as the applications of end-user access tools. Each of these definitions in every performance measurement is done by a mouse-click. Since both OneWorld and Cognos are object-oriented, there is no need to write any program code.

5.1. J.D. Edwards and OneWorld

J.D. Edwards is founded in 1977 in Denver, Colorado. The company is headquartered in Denver and posted fiscal revenues of \$934 million. J.D. Edwards is one of the big five ERP vendors. It has two main solutions: WorldSoftware and OneWorld.

WorldSoftware is an AS/400 based ERP solution and implemented in more than 103 countries and 5000 companies (which means almost 17000-18000 implementation all around the world). OneWorld solution operates in multiple computing environments, including Windows NT®, UNIX® and OS/400®, and Java/HTML. Both of them have a multi-national, multi-language, multi-currency capability in a single software version.

OneWorld has four main modules; finance, logistics/distribution, manufacturing and human resources. Modules and their functionalities are listed below.

Main Modules	Modules
Finance	General Accounting Accounts Receivable Accounts Payable Fixed Assets Cost Accounting Cash Based Accounting Profit Management Activity Based Management Job Costing Financial Modeling and Budgeting
Logistics/Distribution	Inventory Management Sales Management Advanced Pricing Management Agreement Management

	<p>Procurement Management</p> <p>Warehouse Management</p> <p>Transportation Management</p> <p>Material Requirements Planning</p> <p>Customer Services Management</p> <p>Equipment Management</p> <p>Electronic Commerce</p> <p>Load and Delivery Management</p> <p>Contract Billing</p> <p>Contract Management</p> <p>Service Billing</p> <p>Subcontract Management</p> <p>Environment Management System</p> <p>Electronic Commerce</p>
<p>Manufacturing</p>	<p>Product Data Management</p> <p>Configuration Management</p> <p>Forecasting</p> <p>Shop Floor Control</p> <p>Engineering Change Management</p> <p>Work Order Management</p> <p>Equipment and Plant Maintenance Management</p> <p>Requirements Planning</p> <p>Capacity Planning</p> <p>Enterprise Facilities Planning</p> <p>Labor Management</p>

	Data Collection Manufacturing Accounting Product Costing
Human Resources	Employee Management Payroll Recruitment Management Benefits Administration Time Accounting Carrier Planning Training Planning

Table 5.1.1. Modules of OneWorld ERP Solution



5.2. Cognos

Cognos is the market leader in business intelligence software and it has a suite of applications for data warehousing purposes. Company introduced business intelligence tools in 1989 and today leads this market worldwide. Two main solutions of this company are PowerPlay and Impromptu. Impromptu extracts data from source systems. Each data column is identified and all of them are joined in an Impromptu Master Catalog. Master Catalog is used to create Impromptu Reports that are used in PowerPlay application. PowerPlay Transformer performs cube creation, imports data from Impromptu reports and creates the data cubes (PowerCubes) used for multidimensional viewing in PowerPlay.

Impromptu is an enterprise solution for interactive database reporting. It is object-oriented, easy-to-use and scalable. Creating the Information Catalog is the first step of Impromptu reporting. Catalog presents the database in a way that reflects how the business is organized. Structuring the data in this way makes it easy for users to navigate within a database and assemble reports. Creating a Impromptu Catalog is very easy and table joins are prepared automatically by itself. Users can create their reports easily by using report templates, ready-to-use page and screen formats.

PowerPlay is an open OLAP solution of Cognos. It is a software tool for multidimensional analysis of enterprise data. PowerPlay provides an easy to use user interface with a familiar Windows interface, high performance and scalability. PowerPlay uses PowerCubes to store multidimensional data sets. These cubes are created by Transformer tool of Cognos. Transformer provides graphical displays of dimensions.

According to the web site of Cognos (www.cognos.com), the data warehousing solutions provided by Cognos are as follows:

Cognos Impromptu lets report authors quickly harness data from anywhere in the organization to create standard or ad hoc reports. Distributed administration and report authoring combined with central control make Impromptu the ideal reporting solution for both client/server and Web environments. Impromptu takes the complexity out of working with information by presenting data in the context of your business—not the way the database or data warehouse is structured.

Impromptu Web Query lets people "surf" through corporate data using their Web browsers. Hyperlink navigation takes people to whatever information is of interest at any given time. Impromptu Web Query also delivers instant database query capabilities from your existing Web site.

Impromptu Web Reports delivers managed reporting over the Web—providing report consumers with quick, easy access to the latest company reports, directly from their browsers.

Cognos PowerPlay lets executives and managers analyze and report on corporate data to identify trends, track key performance indicators, and manage business performance across the organization. Because users have the ability to navigate PowerPlay charts and crosstabs directly from their Web browsers, everyone in the enterprise has access to OLAP data.

Cognos Scenario gives business analysts the ability to identify and rank the factors that have a significant impact on key business measures. It automatically uncovers the patterns and relationships that exist in business data.

Cognos 4Thought offers business planners the power to perform what-if analyses, forecasting, and effectiveness measurement that can be used to determine policies and plans of action that will steer your enterprise toward greater profitability.

Cognos DataMerchant provides secure, controlled, and metered access to relational data over the Internet, your extranet, or intranet. If you are in the business of selling data, DataMerchant lets you quickly and easily set up an e-commerce storefront on the Internet. If you share data with strategic external partners, DataMerchant offers a complete solution that quickly leads to enhanced business relationships.

5.3. Customer and Item Profitability Measurement

5.3.1. Tables

Customer and Item Profitability Measurement is done by using these tables (Table 5.3.1):

Tables	Description	Addl Info
F100901	Accounting Level of Detail Table	For account detail information.
F1602	Cost Analyzer Balances Table	For budget and actual amounts.
F0101	Address Book Master Table	For salesperson and customer name and also customer class, group and channel information which is stored in customer category codes.
F1603	Cost Analyzer View Structure Table	For account balances of each period.
F0010	Company Constants Table	For Company fiscal date pattern code.
F0006	Business Unit Master Table	For business unit category codes. Sales area details are stored in category codes.
F0005	User Defined Codes Table	For category code descriptions.
F4101	Item Master Table	For product description.
F4102	Item Branch Table	For product class, group and line information which is stored in purchasing and sales category codes.
F0008	Date Fiscal Patterns Table	For date pattern details of company.

Table 5.3.1. Tables of Customer and Item Profitability Measurement

5.3.2. Fields

Fields that are used in this analysis are listed in the following table.(Table 5.3.2)

Field	Description	Table	Addl Info	Calc	Selections
AID	Account ID	F100901			
DL01	Account Description	F100901			
CO	Company	F100901			
MCU	Business Unit	F100901			
LDOBJ3	Object Level of Detail 3	F100901			
LDOBJ4	Object Level of Detail 4	F100901			
LDOBJ5	Object Level of Detail 5	F100901			
LDOBJ6	Object Level of Detail 6	F100901			
LDOBJ7	Object Level of Detail 7	F100901			
LDOBJ8	Object Level of Detail 8	F100901			
LDOBJ9	Object Level of Detail 9	F100901			
LDSUB3	Subsidiary Level of Detail 3	F100901			
LDSUB4	Subsidiary Level of Detail 4	F100901			
LDSUB5	Subsidiary Level of Detail 5	F100901			
LDSUB6	Subsidiary Level of Detail 6	F100901			
LDSUB7	Subsidiary Level of Detail 7	F100901			
LDSUB8	Subsidiary Level of Detail 8	F100901			
LDSUB9	Subsidiary Level of Detail 9	F100901			
DESCR3	Account Description Level 3	F100901			
DESCR4	Account Description Level 4	F100901			
DESCR5	Account Description Level 5	F100901			
DESCR6	Account Description Level 6	F100901			
DESCR7	Account Description Level 7	F100901			
DESCR8	Account Description Level 8	F100901			
DESCR9	Account Description Level 9	F100901			
VWNM	View Number	F1602			
CFY	Century/Fiscal Year	F1602			
LT	Budget or Actual Ledger	F1602			BA (Budget Amounts) and AA(Actual Amounts) will be used
ABR1	Customer	F1602			Customer

ABT1	Type 1	F1602		C for customers
SBL	Salesperson (subledger)	F1602		Salesperson
SBLT	Type 4	F1602		A for address book number of salesperson
ALPH	Salesperson Name	F0101		F0101 AN8 (Where address book number is equal to SBLT)
ITM	Item Number (Short)	F1602		
NB01	Net Balance 01	F1602		
NB02	Net Balance 02	F1602		
NB03	Net Balance 03	F1602		
NB04	Net Balance 04	F1602		
NB05	Net Balance 05	F1602		
NB06	Net Balance 06	F1602		
NB07	Net Balance 07	F1602		
NB08	Net Balance 08	F1602		
NB09	Net Balance 09	F1602		
NB10	Net Balance 10	F1602		
NB11	Net Balance 11	F1602		
NB12	Net Balance 12	F1602		
NB13	Net Balance 13	F1602		
NB14	Net Balance 14	F1602		WVNM from F1602
DTPN	Date Pattern	F1603		Where company number is equal to CO field of F100901
FY	Century/Fiscal Year	F1603		
NAME	Company Description	F0010		
DFYJ	Beginning of Fiscal Year	F0010		FY from F1603
D01J	End of Period 1	F0008		DTPN from F1603
D02J	End of Period 2	F0008		
D03J	End of Period 3	F0008		
D04J	End of Period 4	F0008		
D05J	End of Period 5	F0008		
D06J	End of Period 6	F0008		
D07J	End of Period 7	F0008		
D08J	End of Period 8	F0008		
D09J	End of Period 9	F0008		
D010J	End of Period 10	F0008		

D011J	End of Period 11	F0008			
D012J	End of Period 12	F0008			
D013J	End of Period 13	F0008			
D014J	End of Period 14	F0008			
DL01	Business Unit Description	F0006			MCU from F100901
RP01	Division	F0006	BU Cat 01		MCU from F100901
	Division Description	F0005			DRSY=00, DRRT=01, DRKY=RP01
RP02	Region	F0006	BU Cat 02		Pass MCU from F100901
	Region Description	F0005			DRSY=00, DRRT=01, DRKY=RP02
RP04	Area	F0006	BU Cat 04		Pass MCU from F100901
	Area Description	F0005			DRSY=00, DRRT=01, DRKY=RP04
RP14	Country	F0006	BU Cat 14		Pass MCU from F100901
	Country Description	F0005			DRSY=00, DRRT=01, DRKY=RP014
RP11	Territory	F0006	BU Cat 11		Pass MCU from F100901
	Territory Description	F0005			DRSY=00, DRRT=01, DRKY=RP11
ALPH	Customer Name	F0101			
AC10	Customer Group	F0101	A/B Cat 10		
DL01	Customer Group Description	F0005			DRSY=01, DRRT=05, DRKY=AC10
AC09	Customer Class	F0101	A/B Cat 09		
DL01	Customer Class Description	F0005			DRSY=01, DRRT=06, DRKY=AC09
AC08	Customer Distribution Channel	F0101	A/B Cat 08		

DL01	Distribution Channel Description	F0005			DRSY=01, DRRT=08, DRKY=AC08
DSC1	Product Description	F4101			
PRP4	Product Group	F4102	Purch Cat 4		
DL01	Product Group Description	F0005			DRSY=41, DRRT=P4, DRKY=SRP3
SRP4	Product Line	F4102	Sales Cat 4		
DL01	Product Line Description	F0005			DRSY=41, DRRT=S4, DRKY=SRP4
SRP5	Product Class	F4102	Sales Cat 5		
DL01	Product Class Description	F0005			DRSY=41, DRRT=S5, DRKY=SRP5

Table 5.3.2. Fields of Customer and Item Profitability Measurement

5.3.3. Dimensions

The cube utilizes eight major dimensions; Organization, Product, Customer, Company, Account, Salesperson, Subsidiary and Time (Period Date). Each dimension has various levels associated with it, and are shown below (Table 5.3.3):

Dimension	Level of Detail	Detail Description	Additional Information
Organization	1	Sales Region	Sales data can be analyzed geographically with this dimension. Data is broken down into various geographical categories that are defined in the Business Unit Master File (F0006) and their descriptions are given with the User Defined Codes table F0005.
	2	Country	
	3	Sales Territory	
	4	Sales Area	
	5	Sales Division	
	6	Business Unit	
Product	1	Product Group	With this dimension data can be analysed according to product detail. The lowest possible level of drill-down in this dimension is the product number. Product description of the item will be used, too.
	2	Product Class	
	3	Product Line	
	4	Product	
Customer	1	Customer Group	With this dimension sales data can be viewed according to the customer group, class, channel or number.
	2	Customer Class	
	3	Sales Channel	
	4	Customer	

Account	1	Company	In J.D. Edwards solutions there is a nine levels hierarchy in chart of accounts. This account level information is stored in the table F100901, which is populated by the F0901 account information. Each level represents the account structure for each major account group, and will contain balances for each level that contains an account id (for example Level 3=Revenue(5000), Level 4=Sales(5005),Level 5= Store Sales(5010), Level 6=Departmental Sales(5020),etc.
	2	Business Unit	
	3	Object Account	
	4	Account	
	5	Account	
	6	Account	
	7	Account	
Company	1	Company	The Company dimension contains only the Company name of each company selected by the query.
Date	1	Year	The Date dimension provides a time drill-down for the fiscal year, quarter and month, based upon the Period Date contained in the Fiscal Dates File (F0008) for each 1602 query.
	2	Quarter	
	3	Month	
Salesperson	1	Salesperson	The salesperson dimension contains only the salesperson code (and name) which is contained on the 1602 table.
Subsidiary	1	Subsidiary	The subsidiary dimension contains the 1602 subsidiary attribute.

Table 5.3.3. Dimensions of Customer and Item Profitability Measurement

5.3.4. Measures

Measures of Customer and Item Profitability are shown in the following table. (Table 5.3.4)

Measure	Description
Actual Period Amount	The actual period net balance for each month
Budget Period Amount	The budget period net balance for each month
Period Actual Open Balance	The calculated actual opening balance for each month
Period Actual Close Balance	The calculated actual closing balance for each month
Period Plan Open Balance	The calculated budget open balance for each month
Period Plan Close Balance	The calculated budget close balance for each month

Table 5.3.4. Measures of Customer and Item Profitability Measurement



5.3.5. Criteria (Impromptu Query Definition)

The table below (Table 5.3.5) outlines the criteria required to create the calculated elements used within this cube. Because of the object-oriented architecture of Impromptu, it is an easy task to define the following rules. All of the columns of the PowerCube are listed in this table. At the last part of the query definition there is multiplications of amounts with (-1) according to their account type. In the J.D. Edwards database, amounts in some account types (for example : revenue(R), other income(OI)) are stored as negative values.

	F100901."FRAID" as c1, COLUMN,0,Account ID
	F100901."FRDL01" as c2, COLUMN,1,Account Description
	F0006."MCRP02" as c3, COLUMN,2,Region
	F0006."MCRP14" as c4, COLUMN,3,Country
	F0006."MCRP11" as c5, COLUMN,4,Territory
	F0006."MCRP04" as c6, COLUMN,5,Area
	F0006."MCRP01" as c7, COLUMN,6,Division
	F100901."FRMCU" as c8, COLUMN,7,Business Unit
	F100901."FRCO" as c9, COLUMN,8,Company
	F1602."CBSUB" as c10, COLUMN,9,Subsidiary
	F100901."FRACCTY" as c11, COLUMN,10,GLG Group Type
	(concat(F100901."FRLDOBJ3",F100901."FRLDSUB3")) as c12, COLUMN,11,ObjectSub
Level 3	
	F100901."FRDESC3" as c13, COLUMN,12,Object 3 Description
	(concat(F100901."FRLDOBJ4",F100901."FRLDSUB4")) as c14, COLUMN,13,ObjectSub
Level 4	
	F100901."FRDESC4" as c15, COLUMN,14,Object 4 Description
	(concat(F100901."FRLDOBJ5",F100901."FRLDSUB5")) as c16, COLUMN,15,ObjectSub
Level 5	
	F100901."FRDESC5" as c17, COLUMN,16,Object 5 Description

(concat(F100901."FRLDOBJ6",F100901."FRLDSUB6")) as c18, COLUMN,17,ObjectSub

Level 6

F100901."FRDESC6" as c19, COLUMN,18,Object 6 Description

(concat(F100901."FRLDOBJ7",F100901."FRLDSUB7")) as c20, COLUMN,19,ObjectSub

Level 7

F100901."FRDESC7" as c21, COLUMN,20,Object 7 Description

(concat(F100901."FRLDOBJ8",F100901."FRLDSUB8")) as c22, COLUMN,21,ObjectSub

Level 8

F100901."FRDESC8" as c23, COLUMN,22,Object 8 Description

(concat(F100901."FRLDOBJ9",F100901."FRLDSUB9")) as c24, COLUMN,23,ObjectSub

Level 9

F100901."FRDESC9" as c25, COLUMN,24,Object 9 Description

F1602."CBVWNM" as c26, COLUMN,25,View Number

F1602."CBCFY" as c27, COLUMN,26,Century Fiscal Year

F1602."CBLT" as c28, COLUMN,27,Ledger Type

F0101."ABALPH" as c29, COLUMN,28,Customer Name

F1602."CBABR1" as c30, COLUMN,29,Manager Code 1(Customer)

F1602."CBABF100901" as c31, COLUMN,30,Manager Type 1

F1602."CBSBL" as c32, COLUMN,31,SubLedger

F1602."CBSBLT" as c33, COLUMN,32,Subledger Type

F0101."ABALPH" as c34, COLUMN,33,Subledger Description

F0101."ABAC10" as c35, COLUMN,34,Customer Group

F0101."ABAC09" as c36, COLUMN,35,Customer Class

F0101."ABAC08" as c37, COLUMN,36,Distribution Channel

F4102."IBPRP4" as c38, COLUMN,37,Product Group

F4102."IBSRP4" as c39, COLUMN,38,Product Line

F4102."IBSRP5" as c40, COLUMN,39,Product Class

F1602."CBITM" as c41, COLUMN,40,Item Number

F0008."CDD01J" as c42, COLUMN,41,Fiscal Period

CASE WHEN ((F100901."FRACCTY" = 'R') or (F100901."FRACCTY" = 'OI')) THEN
(F1602."CBNB01" * (- 1)) ELSE (F1602."CBNB01") END as c43, COLUMN,42,Actual Period
Amount

CASE WHEN ((F100901."FRACCTY" = 'R') or (F100901."FRACCTY" = 'OI')) THEN
(F1602."CBNB02" * (- 1)) ELSE (F1602."CBNB02") END as c44, COLUMN,43,Actual Period
Amount

CASE WHEN ((F100901."FRACCTY" = 'R') or (F100901."FRACCTY" = 'OI')) THEN
(F1602."CBNB03" * (- 1)) ELSE (F1602."CBNB03") END as c45, COLUMN,44,Actual Period
Amount

CASE WHEN ((F100901."FRACCTY" = 'R') or (F100901."FRACCTY" = 'OI')) THEN
(F1602."CBNB04" * (- 1)) ELSE (F1602."CBNB04") END as c46, COLUMN,45,Actual Period
Amount

CASE WHEN ((F100901."FRACCTY" = 'R') or (F100901."FRACCTY" = 'OI')) THEN
(F1602."CBNB05" * (- 1)) ELSE (F1602."CBNB05") END as c47, COLUMN,46,Actual Period
Amount

CASE WHEN ((F100901."FRACCTY" = 'R') or (F100901."FRACCTY" = 'OI')) THEN
(F1602."CBNB06" * (- 1)) ELSE (F1602."CBNB06") END as c48, COLUMN,47,Actual Period
Amount

CASE WHEN ((F100901."FRACCTY" = 'R') or (F100901."FRACCTY" = 'OI')) THEN
(F1602."CBNB07" * (- 1)) ELSE (F1602."CBNB07") END as c49, COLUMN,48,Actual Period
Amount

CASE WHEN ((F100901."FRACCTY" = 'R') or (F100901."FRACCTY" = 'OI')) THEN
(F1602."CBNB08" * (- 1)) ELSE (F1602."CBNB08") END as c50, COLUMN,49,Actual Period
Amount

CASE WHEN ((F100901."FRACCTY" = 'R') or (F100901."FRACCTY" = 'OI')) THEN
(F1602."CBNB09" * (- 1)) ELSE (F1602."CBNB09") END as c51, COLUMN,50,Actual Period
Amount

CASE WHEN ((F100901."FRACCTY" = 'R') or (F100901."FRACCTY" = 'OI')) THEN
(F1602."CBNB10" * (- 1)) ELSE (F1602."CBNB10") END as c52, COLUMN,51,Actual Period
Amount

CASE WHEN ((F100901."FRACCTY" = 'R') or (F100901."FRACCTY" = 'OI')) THEN
(F1602."CBNB11" * (- 1)) ELSE (F1602."CBNB11") END as c53, COLUMN,52,Actual Period
Amount

```
CASE WHEN ((F100901."FRACCTY" = 'R') or (F100901."FRACCTY" = 'O')) THEN
((F1602."CBNB12" + F1602."CBNB13" + F1602."CBNB14") * (- 1)) ELSE (F1602."CBNB12" +
F1602."CBNB13" + F1602."CBNB14") END as c54 COLUMN,53,Actual Period Amount
```

Table 5.3.5. Impromptu Query Definitions of Customer and Item Profitability Measurement



5.3.6. QUERY JOINS and SQL

```
from "F1603" T8, "F0008" T7, (((("F100901" T1 left outer join "F0006" T2 on (T1."FRCO" =
T2."MCCO") and (T1."FRMCU" = T2."MCMCU")) left outer join "F1602" T3 on T1."FRAID" =
T3."CBAID") left outer join "F0101" T4 on (od_left(T3."CBABR1",6)) =
(reverse(truncate(reverse((ascii(T4."ABAN8")))))) left outer join "F0101" T5 on
(substring(T3."CBSBL" from char_length(T3."CBSBL") - 4 + 1 for 4)) =
(reverse(truncate(reverse((ascii(T5."ABAN8")))))) left outer join "F4102" T6 on (T3."CBITM" =
T6."IBITM") and (T3."CBMCU" = T6."IBMCU"))

where ((T3."CBVWNM" = T8."CVVWNM") and ((substring((ascii(T3."CBCFY")) from 4 for 1)) =
(ascii(T8."CVFY")))) and ((T8."CVFY" = T7."CDFY") and (T8."CVDTPN" = T7."CDDTPN"))

and (((((((((T1."FRACCTY" = 'R') or (T1."FRACCTY" = 'YTDRE')) or (T1."FRACCTY" = 'COGS'))
or (T1."FRACCTY" = 'E')) or (T1."FRACCTY" = 'OI')) or (T1."FRACCTY" = 'OE')) and
((T1."FRCO" = '00001') or (T1."FRCO" = '00200')) and (T3."CBVWNM" = 5) and (T3."CBLT" =
'AA'))
```

Table 5.3.6. Query Joins of Customer and Item Profitability Measurement

This query joins the selected tables according to the fields; company, business unit, account number, item number, fiscal year, account type. Company 00001, company 00200, fiscal year 2005 and actual amounts ledger AA are used in this analysis.

5.3.7. Filter Conditions

The following filter conditions shown in Table 5.3.7 are used to select and retrieve data for this cube according to demo data:

Filter	Criteria
View Number	Equal to "5" (which means year 2005)
Company Number	Equal to "0001" or "00200"
Ledger Type	Equal to "AA" or "BA" (actual amounts ledger and budget amounts ledger are used for comparison)
GLG Group Type	Equal to "R" or "YTDRE" or "COGS" or "E" or "OI" or "OE"

Table 5.3.7. Filters of Customer and Item Profitability Measurement

5.3.8. PowerPlay Reporter Views

Following table (Table 5.3.8) shows example PowerPlay views that can be created by using Profit Analysis PowerCube. These example views can be seen in Appendix A.

View Name	Description	File Name
Profit And Loss Cross tabular analysis.	Net Income calculation from gross revenue minus expenses	FINProfLsCrosTab
Profit And Loss Customer Sales Bar Chart	Provides a graphical display of the Customer Sales by Product	FINProfLsCustSales
Profit and Loss Customer Net Income Bar Chart	Provides a graphical display of Customer Net Income by Product within the Organization	FINProfLsCustNetInc
Profit and Loss Revenue by Salesperson Bar Chart	Provides a graphical display of gross revenue at the Salesperson drill-down level by Product	FINProfLsRevbySalsp
Profit and Loss Product Net Income Bar Chart	Provides a graphical display of Net Income by Product within the Organization	FINProfLsProdNetInc

Profit and Loss Product Sales Bar Chart	Provides a graphical display of the Sales by Product	FINProfLsProdSales
--	---	--------------------

Table 5.3.8. Example Views of Customer and Item Profitability Measurement



5.4. Customer Delivery Performance

Delivery performance measurements include an analysis of on-time, early, and late shipments. This information can be viewed by customer, ship-to location, distribution channel, customer class, and customer group, product group, product line, product class, and product. Delivery performance may also be viewed by geographic entities such as region, area and territory. Customer delivery performance measurements may also be viewed by time dimensions of month, quarter, and year.

5.4.1. Tables

The Delivery Performance Analysis Cube utilizes the following table(s) to generate the data for its extraction (Table 5.4.1):

Table	Description
F4211DT	Sales Order Detail Date Tracking File
F0101	Address Book Master
F0005	User Defined Codes
F4101	Item Master
F4102	Item Branch File
F0006	Business Unit Master

Table 5.4.1. Tables of Customer Delivery Performance Analysis

5.4.2. Fields

Customer Delivery Performance PowerCube includes following fields (Table 5.4.2).

Field	Description	Table	Addl Info	Calc	Key / Formula
KCOO	Order (Key) Sales Company	F4211DT			Used only as a key to other files
DOCO	Order Number	F4211DT			
DCTO	Order Type	F4211DT			
DL01	Order Type Description	F0005			DRSY=00, DRRT=DT, DRKY=DCTO
TRDJ	Order Date	F4211DT			
AN8	Customer Number (Sold-to)	F4211DT			
ALPH	Customer Name	F0101			Pass F4211DT AN8 to F0101 AN8
AC10	Customer Group	F0101	A/B Cat 10		
DL01	Customer Group Description	F0005			DRSY=01, DRRT=10, DRKY=AC10
AC09	Customer Class	F0101	A/B Cat 09		
DL01	Customer Class Description	F0005			DRSY=01, DRRT=09, DRKY=AC09
AC08	Customer Distribution Channel	F0101	A/B Cat 08		
DL01	Distribution Channel Description	F0005			DRSY=01, DRRT=08, DRKY=AC08
SHAN	Ship-to Number	F4211DT			
ALPH	Ship-to Name	F0101			Pass F4211DT SHAN to F0101 AN8
LNID	Line Number	F4211DT			
CMC1	Salesperson Number	F4211DT			
ALPH	Salesperson Name	F0101			Pass F4211DT CMC1 to F0101 AN8
VR01	Contract (Customer PO Number)	F4211DT			
ITM	Product (short)	F4211DT			
LITM	Product Name (second)	F4211DT			
AITM	Product Name (third)	F4211DT			

DSC1	Product Description	F4101			Pass F4211DT ITM to F4101
UOM1	Product Primary UOM	F4211DT			
DL01	Product Primary UOM Description	F0005			DRSY=00,DRRT=UM,DRKY=UOM1
PRP4	Product Group	F4102	Pur Cat 4		Pass F4211DT ITM, MCU to F4102
DL01	Product Group Description	F0005			DRSY=41,DRRT=P4,DRKY=PRP4
SRP4	Product Line	F4102	Sales Cat 4		Pass F4211DT ITM, MCU to F4102
DL01	Product Line Description	F0005			DRSY=41,DRRT=S4,DRKY=SRP4
SRP5	Product Class	F4102	Sales Cat 5		Pass F4211DT ITM, MCU to F4102
DL01	Product Class Description	F0005			DRSY=41,DRRT=S5,DRKY=SRP5
MCU	Shipping Branch Plant	F4211DT			
DL01	Branch Plant Description	F0006			Pass F4211DT MCU to F0006
CO	Shipping Company	F0006			Pass F4211DT MCU to F0006
NAME	Company Description	F0010			Pass F0006 CO to F0010
RP01	Division	F0006	CC Cat 01		
DL01	Division Name	F0005			DRSY=00, DRRT=01, DRKY=RP01
RP02	Region	F0006	CC Cat 02		
DL01	Region Description	F0005			DRSY=00, DRRT=02, DRKY=RP02
RP04	Area	F0006	CC Cat 04		
DL01	Area Description	F0005			DRSY=00, DRRT=04, DRKY=RP04
RP11	Territory	F0006	CC Cat 11		
DL01	Territory Description	F0005			DRSY=00, DRRT=11, DRKY=RP11
RP14	Country	F0006	CC Cat 14		
DL01	Country Description	F0005			DRSY=00, DRRT=14, DRKY=RP14
STKT	Stocking Type	F4102			Pass F4211DT ITM, MCU
DL01	Stocking Type	F0005			DRSY=41,DRRT=I,DRKY=STKT

	Description				
ABCI	ABC Class (on-hand investment)	F4102			Pass F4211DT ITM, MCU
PQOR	Order Quantity (primary)	F4211DT			
AEXP	Order Amount (domestic)	F4211DT			
DRQJ	Requested Delivery Date	F4211DT			Current Requested Date
RSDJ	Promised Delivery Date	F4211DT			Current Promised Date
SOQS	Shipped Quantity (primary)	F4211DT			
SHAE	Shipped Amount (domestic)	F4211DT			
ADDJ	Actual Shipment Date	F4211DT			
SOCN	Quantity Canceled (primary)	F4211DT			
	Quantity Canceled Percent			CALC	Sum Quantity Canceled / Sum all Qty
CNAE	Amount Canceled (domestic)	F4211DT			
	Amount Canceled Percent			CALC	Sum Amount Canceled / Sum all Amount
CNDJ	Canceled Date	F4211DT			
DLDT	Actual Delivery Date	F4211DT			
DAQO	Quantity On-Time (primary)	F4211DT			
	Quantity On-Time Percent			CALC	Sum Quantity On-Time/ Sum all Qty
DAQE	Quantity Early (primary)	F4211DT			
	Quantity Early Percent			CALC	Sum Quantity Early/ Sum all Qty
DAQL	Quantity Late (primary)	F4211DT			
	Quantity Late Percent			CALC	Sum Quantity Late/ Sum all Qty
DAAO	Amount On-Time (domestic)	F4211DT			
	Amount On-Time Percent			CALC	Sum Amount On-Time/ Sum all Amount
DAAE	Amount Early (domestic)	F4211DT			
	Amount Early Percent			CALC	Sum Amount Early/ Sum all Amount

DAAL	Amount Late (domestic)	F4211DT			
	Amount Late Percent			CALC	Sum Amount Late / Sum all Amount
RAQO	Product Deliveries On-Time	F4211DT			Sum Counter
	Deliveries On-Time Percent			CALC	$(\text{Sum } 74 / (\text{Sum } 74 + \text{Sum } 76 + \text{Sum } 78 + \text{Sum } 80)) * 100$
RAQE	Product Deliveries Early	F4211DT			Sum Counter
	Deliveries Early Percent			CALC	$(\text{Sum } 76 / (\text{Sum } 74 + \text{Sum } 76 + \text{Sum } 78 + \text{Sum } 80)) * 100$
RAQL	Product Deliveries Late	F4211DT			Sum Counter
	Deliveries Late Percent			CALC	$(\text{Sum } 78 / (\text{Sum } 74 + \text{Sum } 76 + \text{Sum } 78 + \text{Sum } 80)) * 100$
RAQC	Product Deliveries Canceled	F4211DT			Sum Counter
	Deliveries Canceled Percent			CALC	$(\text{Sum } 80 / (\text{Sum } 74 + \text{Sum } 76 + \text{Sum } 78 + \text{Sum } 80)) * 100$

Table 5.4.2. Fields of Customer Delivery Performance Analysis

5.4.3. Dimensions

The following dimension map represents the multi-dimensional view of the *Delivery Performance Analysis Cube*. The cube will utilize five major dimensions; Branch, Product, Customer, Company, and Time (Promised Delivery Date). Each dimension has various levels associated with it, and are shown in Table 5.4.3:

Dimension	Level of Detail	Detail	Detail Description
Branch	1	Region	Branch dimension allows the data to be broken down into geographical categories that are defined in the Business Unit Master File (F0006). Their descriptions are defined in the User Defined Codes Table (F0005). The Shipping Branch information is obtained from the Sales Order Detail Date Tracking File (F4211DT).
	2	Country	
	3	Territory	
	4	Area	
	5	Division	
	6	Shipping Branch	
Product	1	Product Group	Product dimension provides the user the ability to view all delivery analysis according to the product hierarchy: Product Group, product class, product line or product.
	2	Product Class	
	3	Product Line	
	4	Product	
Customer	1	Customer Group	Customer dimension provides a customer drill-down capability that is similar to the product dimension.
	2	Customer Class	
	3	Distribution Channel	
	4	Customer	
	5	Ship-to	
Company	1	Company	The Company dimension contains only the Company name of each company selected in the query.

Date	1	Year	Date dimension provides a time drill-down for the fiscal year, quarter and month.
	2	Quarter	
	3	Date	

Table 5.4.3. Dimensions of Customer Delivery Performance Analysis



5.4.4. Measures

Measure	Description
Order Quantity	
Order Amount	
Shipped Quantity	
Shipped Amount	
Quantity Canceled	
Amount Canceled	
Quantity On-Time	
Quantity Early	
Quantity Late	
Amount Early	
Amount Late	
Amount On-Time	
Number of Deliveries	Num. Deliveries Early + Num. Deliveries Late + Num. Deliveries On-Time + Num. Deliveries Cancelled
Number of Deliveries Early	
Number of Deliveries Late	
Number of Deliveries On-Time	
Number of Deliveries Cancelled	
Percent Quantity Cancelled	Quantity Cancelled / Order Quantity
Percent Amount Cancelled	Amount Cancelled / Order Amount
Percent Quantity Early	Quantity Early / Shipped Quantity
Percent Quantity Late	Quantity Late / Shipped Quantity
Percent Quantity On-Time	Quantity On-Time / Shipped Quantity
Percent Amount Early	Amount Early / Shipped Amount
Percent Amount Late	Amount Late / Shipped Amount
Percent Amount On-Time	Amount On-Time / Shipped Amount
Percent Deliveries On-Time	Number of Deliveries On-Time / Number of Deliveries
Percent Deliveries Late	Number of Deliveries Late / Number of Deliveries
Percent Deliveries Early	Number of Deliveries Early / Number of Deliveries
Percent Deliveries Cancelled	Number of Deliveries Cancelled / Number of Deliveries

Table 5.4.4. Measures of Customer Delivery Performance Analysis

5.4.5. Criteria (Impromptu Query Definition)

Table 5.4.5 outlines the criteria required to create the calculated elements used within this cube.

Order Number	F4211DT.DTDOCO	DOUBLE	8	15	0
Order Line#	F4211DT.DTLNID	DOUBLE	8	15	0
Order Type	F4211DT.DTDCTO	CHAR	2	0	0
Order Company	F4211DT.DTKCOO	CHAR	5	0	0
Shipping Branch	F4211DT.DTMCU	CHAR	12	0	0
Customer	F4211DT.DTAN8	DOUBLE	8	15	0
Ship-To	F4211DT.DTSHAN	DOUBLE	8	15	0
Product	F4211DT.DTITM	DOUBLE	8	15	0
Order Date	F4211DT.DTTRDJ	DATE TIME	8	0	0
Order Qty (Primary)	F4211DT.DTPQOR	DOUBLE	8	15	0
Order Amount (Domestic)	F4211DT.DTAEXP	DOUBLE	8	15	0
Requested Delivery Date	F4211DT.DTDRQJ	DATE TIME	8	0	0
Prom Delivery Date	F4211DT.DTRSDJ	DATE TIME	8	0	0
Actual Ship Date	F4211DT.DTADDJ	DATE TIME	8	0	0
Shipped Qty (Primary)	F4211DT.DTSOQS	DOUBLE	8	15	0
Ship Amount (Domestic)	F4211DT.DTSHAE	DOUBLE	8	15	0
Canceled Date	F4211DT.DTCNDJ	DATE TIME	8	0	0
Qty Cancelled (Primary)	F4211DT.DTSOCN	DOUBLE	8	15	0
Amount Cancelled (Domestic)	F4211DT.DTCNAE	DOUBLE	8	15	0
Actual Delivery Date	F4211DT.DTDLDT	DATE TIME	8	0	0
Qty On-Time (Primary)	F4211DT.DTDAQO	DOUBLE	8	15	0
Qty Early (Primary)	F4211DT.DTDAQE	DOUBLE	8	15	0
Qty Late (Primary)	F4211DT.DTDAQL	DOUBLE	8	15	0

Amount On-Time (Domestic)	F4211DT.DTDAAO	DOUBLE	8	15	0
Amount Early (Domestic)	F4211DT.DTDAAE	DOUBLE	8	15	0
Amount Late (Domestic)	F4211DT.DTDAAL	DOUBLE	8	15	0
Product Deliveries On-Time	F4211DT.DTRAQO	DOUBLE	8	15	0
Product Deliveries Early	F4211DT.DTRAQE	DOUBLE	8	15	0
Product Deliveries Late	F4211DT.DTRAQL	DOUBLE	8	15	0
Product Deliveries Cancelled	F4211DT.DTRAQC	DOUBLE	8	15	0
Shipping Branch-Product	Calculated	VAR CHAR	289	0	0
Ship-To Name	F0101.ABALPH	CHAR	40	0	0
Customer Name	F0101.ABALPH	CHAR	40	0	0
Customer Group	F0101.ABAC10	CHAR	3	0	0
Customer Class	F0101.ABAC09	CHAR	3	0	0
Customer Dist Channel	F0101.ABAC08	CHAR	3	0	0
Customer Group Desc	F0005.DRDL01	CHAR	30	0	0
Customer Class Desc	F0005.DRDL01	CHAR	30	0	0
Customer Dist. Channel Desc	F0005.DRDL01	CHAR	30	0	0
Product Group	F4102.IBPRP4	CHAR	3	0	0
Product Line	F4102.IBSRP4	CHAR	3	0	0
Product Class	F4102.IBSRP5	CHAR	3	0	0
Branch Name	F0006.MCDL01	CHAR	30	0	0
Shipping Region	F0006.MCRP02	CHAR	3	0	0
Shipping Territory	F0006.MCRP11	CHAR	3	0	0
Shipping Area	F0006.MCRP04	CHAR	3	0	0
Shipping Division	F0006.MCRP01	CHAR	3	0	0
Shipping Country	F0006.MCRP14	CHAR	3	0	0

Table 5.4.5. Criteria of Customer Delivery Performance Analysis

5.4.6. QUERY JOINS and SQL

```
select T1.'DTDOCO', T1.'DTLNID', T1.'DTDCTO', T1.'DTKCOO', T1.'DTMCU', T1.'DTAN8',
T1.'DTSHAN', T1.'DTITM', T1.'DTTRDJ', T1.'DTPQOR', T1.'DTAEXP', T1.'DTDRQJ',
T1.'DTRSDJ', T1.'DTADDJ', T1.'DTSOQS', T1.'DTSHAE', T1.'DTCNDJ', T1.'DTSOCN',
T1.'DTCNAE', T1.'DTDLDL', T1.'DTDAQO', T1.'DTDAQE', T1.'DTDAQL', T1.'DTDAAO',
T1.'DTDAAE', T1.'DTDAAL', T1.'DTRAQO', T1.'DTRAQE', T1.'DTRAQL', T1.'DTRAQC', {fn
CONCAT(T1.'DTMCU', ' - ')}, T2.'ABALPH', T3.'ABALPH', T3.'ABAC10', T3.'ABAC09',
T3.'ABAC08', T4.'DRDL01', T5.'DRDL01', T6.'DRDL01', T7.'IBPRP4', T7.'IBSRP4',
T7.'IBSRP5', T8.'MCDL01', T8.'MCRP02', T8.'MCRP11', T8.'MCRP04', T8.'MCRP01',
T8.'MCRP14'

from 'F4211DT' T1, 'F0101' T2, 'F0101' T3, 'F0005' T4, 'F0005' T5, 'F0005' T6, 'F4102' T7,
'F0006' T8

where T1.'DTSHAN' = T2.'ABAN8' and T1.'DTAN8' = T3.'ABAN8' and {fn LTRIM(T4.'DRKY')}
= T3.'ABAC10' and {fn LTRIM(T3.'ABAC09')} = {fn LTRIM(T5.'DRKY')} and T3.'ABAC08' =
{fn LTRIM(T6.'DRKY')} and T7.'IBITM' = T1.'DTITM' and T7.'IBMCU' = T1.'DTMCU' and
T1.'DTMCU' = T8.'MCMCU' and NOT T1.'DTRSDJ' is null and T4.'DRSY' = '01' and
T4.'DRRT' = '10' and T5.'DRSY' = '01' and T5.'DRRT' = '09' and T6.'DRSY' = '01' and
T6.'DRRT' = '08'
```

Table 5.4.6. Query Definitions of Customer Delivery Performance Analysis

5.4.7. Filter Conditions

The following filter conditions are used to select and retrieve data for this cube:

Filter	Description
Promise Delivery Date	Is NOT MISSING

Table 5.4.7. Filter Conditions of Customer Delivery Performance Analysis

5.4.8. PowerPlay Views

Following table (Table 5.8) shows example PowerPlay views that can be created by using Customer Delivery Performance PowerCube. These example views can be seen in Appendix B.

View Name	Description	File Name
Delivery Performance Cross tabular analysis	Analyzes Product Order Amounts by Customer within the Company Dimension	DelivPerfCrossTab
Delivery Performance On Time Performance Analysis Bar Chart	Provides a graphical display of the On-time, Early, and late delivery percentages against certain product lines by Branch.	DelivPerfOnTime

Table 5.4.8. Example Views of Customer Delivery Performance Analysis

5.5. Supplier Delivery Performance

This application is based on the F43121. Delivery performance measurements include an analysis of on-time, early, late time measurements, quality measurements of accepted and rejected receipts and product cost variances measured against standard item cost. Delivery performance measurements can be viewed by supplier, supplier group, supplier class, product, product line, buyer, planner, and receiving branch/plant. Supplier delivery performance measurements may also be viewed by time dimensions of month, quarter, and year.

5.5.1. Tables

The *Supplier Performance Analysis Cube* utilizes the following tables to generate the data for its extract (Table 5.5.1):

Table	Description
F43121	Purchase Order Receiver File
F0101	Address Book Master
F0005	User Defined Codes
F4101	Item Master
F4102	Item Branch File
F0006	Business Unit Master
F4311	Purchase Order Detail File
F43099	Receipt Routing Ledger File
F4105	Item Cost File

Table 5.4.1. Tables of Supplier Delivery Performance Analysis

5.5.2. Fields

Field	Description	Table	Match Type	Addl Info	Calc	Key / Formula
			MATC			
KCOO	Order (Key) Company	F43121	1			Used only as a key to other files
DOCO	Order Number	F43121	1			
DCTO	Order Type	F43121	1			
DL01	Order Type Description	F0005				DRSY=00, DRRT=DT,DRKY=DCTO
TRDJ	Order Date	F4311				Pass F43121 KCOO,DOCO,DCTO
AN8	Supplier Number	F43121	1			
ALPH	Supplier Name	F0101				Pass AN8 from F43121
AC05	Supplier Group	F0101		A/B Cat 05		
DL01	Supplier Group Description	F0005				DRSY=01,DRRT=05, DRKY=AC05
AC06	Supplier Class	F0101		A/B Cat 06		
DL01	Supplier Class Description	F0005				DRSY=01,DRRT=06, DRKY=AC06
LNID	Line Number	F43121	1			
ITM	Product (short)	F43121	1			
LITM	Product Name (second)	F43121	1			
AITM	Product Name (third)	F43121	1			
DSC1	Product Description	F4101				Pass F43121 ITM to F4101
UOM1	Product Primary UOM	F4101				
DL01	Product Primary UOM Description	F0005				DRSY=00,DRRT=UM,DRKY= =UOM1
PRP4	Product Group	F4102		Pur Cat 4		Pass F4211DT ITM, MCU to F4102
DL01	Product Group Description	F0005				DRSY=41,DRRT=P4,DRKY= PRP4

SRP5	Product Class	F4102		Sales Cat 5		Pass F4211DT ITM, MCU to F4102
DL01	Product Class Description	F0005				DRSY=41,DRRT=S5,DRKY= SRP5
SRP4	Product Line	F4102		Sales Cat 4		Pass F4211DT ITM, MCU to F4102
DL01	Product Line Description	F0005				DRSY=41,DRRT=S4,DRKY= SRP4
MCU	Receiving Branch Plant	F43121	1			
DL01	Branch Plant Description	F0006				
CO	Receiving Company	F43121	1			Company displayed for analysis
NAME	Company Description	F0010				Key on CO
ANBY	Buyer	F4311				Pass F43121 KCOO,DOCO,DCTO,LNID
ALPH	Buyer Name	F0101				Pass F4311 ANBY to F0101 AN8
ANPL	Planner	F4102				
ALPH	Planner Name	F0101				Pass ANPL to AN8
STKT	Stocking Type	F4102				
DL01	Stocking Type Description	F0005				DRSY=41,DRRT=I,DRKY=S TKT
ABCI	ABC Class (on-hand investment)	F4102				
UORG	Order Quantity (transaction)	F4311				Pass F43121 KCOO,DOCO,DCTO,LNID
UOM	Order Quantity UOM (transaction)	F4311				
PQOR	Order Quantity (primary)	F4311				
UOM1	Order Quantity UOM (primary)	F4311				
AEXP	Order Amount (domestic)	F4311				
UREC	Receipt Quantity (transaction)	F43121	1			
UOM .	Receipt UOM (transaction)	F43121	1			

	Receipt Quantity (primary)				CALC	41 * (38 / 36)
UOM1	Receipt UOM (primary)	F4311				Same as 39
AREC	Receipt Amount (domestic)	F43121	1			
RCDJ	Actual Receipt Date	F43121	1			
PDDJ	Promised Receipt Date	F43121	1			
UPTD	Paid Quantity (transaction)	F43121	2			
UOM	Paid UOM (transaction)	F43121	2			
	Paid Quantity (primary)				CALC	48 * (38 / 36)
UOM1	Paid Quantity UOM (primary)	F4311				Same as 39
UNCS	Primary Unit Standard Cost	F4105		Ledg= 07		Key on ITM, MCU,
	Extended Standard Cost				CALC	50 * 52
APTD	Extended Invoice Amount	F43121	2			
	Primary Unit Invoice Amount				CALC	54 / 50
	Purchase Price Variance(primary)				CALC	55 - 52
	PPV Percent				CALC	(56 / 52) * 100
	Extended PPV (primary)				CALC	56 * 50
	Quantity Accepted (primary)	F43121	1		CALC	(QTYs+QTYW+QTYA) * (38 / 36)
	Percentage Accepted				CALC	(59 / 43) * 100
	Quantity Rejected (primary)	F43121	1		CALC	(QTYJ +QTYC+QTYR) * (38 / 36)
	Percentage Rejected				CALC	(61 / 43) * 100
RCD	Reject Reason	F43099				
	Quantity Early (primary)				CALC	If 46 < 47 : 43 for individual receipt
	Quantity Early Percent				CALC	Sum 64 / Total all receipt primary quantity
	Early Receipt Count				CALC	If 46<47 : add 1 (counter)
	Early Receipt Count				CALC	(Sum 66 / (Sum 66 + Sum 72

	Percent					+ Sum 78)) * 100
	Amount Early (domestic)				CALC	If 46<47 : 45
	Amount Early Percent				CALC	Sum 68 / Total all receipt domestic amount
	Quantity On-Time (primary)				CALC	If 46 = 47 :43 for individual receipt
	Quantity On-time Percent				CALC	Sum 70 / Total all receipt primary quantity
	On-Time Receipt Count				CALC	If 46=47 : add 1 (counter)
	On-time Receipt Count Percent				CALC	(Sum 72 / (Sum 66 +Sum 72 +Sum 78)) * 100
	Amount On-time (domestic)				CALC	If 46=47 :45
	Amount On-time Percent				CALC	Sum 74 / Total all receipt domestic amount
	Quantity Late (primary)				CALC	46 > 47 : 43 for individual receipt
	Quantity Late Percent				CALC	Sum 72 / Total all receipt primary quantity
	Late Receipt Count				CALC	If 46>47: add 1 (counter)
	Late Receipt Count Percent				CALC	(Sum 78 / (Sum 66 + Sum 72 + Sum 78)) * 100
	Amount Late (domestic)				CALC	If 46>47 :45
	Amount Late Percent				CALC	Sum 80 / Total all receipt domestic amount

Table 5.5.2. Fields of Supplier Delivery Performance Analysis

5.5.3 Dimensions

The following dimension map represents the multi-dimensional view of the *Supplier Performance Analysis Cube*. The cube will utilize seven major dimensions; Supplier, Product, Buyer, Planner, Company, and Time (Promised Supplier Date). Each dimension has various levels associated with it, and are shown below:

Dimension	Level of Detail	Description	Additional Information
Supplier	1	Supplier Group	The supplier dimension allows the data to be broken down into various purchasing categories that are defined in the Purchase Order Receiver File (F43121). The Supplier Group and Supplier Class are obtained from the Address Book Master, joined to the F43121 table by Supplier Number, which is the lowest drill-down level in this dimension.
	2	Supplier Class	
	3	Supplier	
Product	1	Product Group	The Product dimension provides the user with the ability to view all measures in the cube at a very high level (Product Group) or at the lower levels such as Product Class or Product Line, and are obtained from the Item Branch File (F4102). The lowest possible level of drill-down in this dimension is the Product itself (Item Number from F43121), which will contain the product description of the item.
	2	Product Class	
	3	ProductLine	
	4	Product	
Buyer	1	Buyer	The buyer dimension provides the user with a single level drill-down capability to the actual Buyer in the Purchase Order Receiver file (F4311).
Company	1	Receiving Company	The Company dimension contains only the Receiving Company name of each receiving company selected by the query from the Purchase Order Receiver file (F43121).
	2	Receiving Branch	

Date	1	Year	The Date dimension provides a time drill-down for the fiscal year, quarter and month, based upon the Promised Receipt Date contained in the Purchase Order Detail file (F4311) query.
	2	Quarter	
	3	Month	
Planner	1	Planner	The Planner dimension provides a drill-down for the Planner located in the Item Branch file (F4102) and the associated planner name extracted from the Address Book Master (F0101).
Reject Reason	1	Reject Reason	The Reject reason code is extracted from the Receipt Routing Ledger File (F43099).

Table 5.5.3. Dimensions of Supplier Delivery Performance Analysis



5.5.4. Measures

Measure	Description
Receipt Quantity (Primary)	
Receipt Quantity Accepted (Primary)	
Receipt Quantity Rejected (Primary)	
Receipt Quantity (Transaction)	
Receipt Amount (Domestic)	
PO Amount (Domestic)	
PO Quantity (Primary)	
PO Quantity (Transaction)	
Receipt Quantity Early (Primary)	
Receipt Quantity On-Time (Primary)	
Receipt Quantity Late (Primary)	
Receipt Amount Early (Primary)	
Receipt Amount On-Time (Primary)	
Receipt Amount Late (Primary)	
Early Receipt Count	
On-Time Receipt Count	
Late Receipt Count	
Total Receipt Count	Quantity Cancelled / Order Quantity
Extended Invoice Amount	Amount Cancelled / Order Amount
PPV Over Standard Cost	Quantity Early / Shipped Quantity
PPV Under Standard Cost	Quantity Late / Shipped Quantity
Percent Accepted	Receipt Quantity Accepted (Primary) / Receipt Quantity (Primary)
Percent Rejected	Receipt Quantity Rejected(Primary) / Receipt Quantity (Primary)
Percent Quantity Early	Receipt Quantity Early (Primary) / Receipt Quantity (Primary)
Percent Count Early	Early Receipt Count / Total Receipt Count
Percent Amount Early	Receipt Amount Early (Domestic) / Receipt Amount (Domestic)

Percent Quantity On-Time	$\text{Receipt Quantity On-Time (Primary)} / \text{Receipt Quantity (Primary)}$
Percent Count On-Time	$\text{On-Time Receipt Count} / \text{Total Receipt Count}$
Percent Amount On-Time	$\text{Receipt Amount On-Time (Domestic)} / \text{Receipt Amount (Domestic)}$
Percent Quantity Late	$\text{Receipt Quantity Late (Primary)} / \text{Receipt Quantity (Primary)}$
Percent Count Late	$\text{Late Receipt Count} / \text{Total Receipt Count}$
Percent Amount Late	$\text{Receipt Amount Late (Domestic)} / \text{Receipt Amount (Domestic)}$

Table 5.5.4. Measures of Supplier Delivery Performance Analysis



5.5.5. Criteria (Impromptu Query Definition)

The table below outlines the criteria required to create the calculated elements used within this cube.

PO Company	F43121.PRKCOO	CHAR	5	0	0
PO Number	F43121.PRDOCO	DOUBLE	8	15	0
PO Type	F43121.PRDUCTO	CHAR	2	0	0
Suffix	F43121.PRSFXO	CHAR	3	0	0
PO Line#	F43121.PRLNID	DOUBLE	8	15	0
Receiving Company	F43121.PRCO	CHAR	5	0	0
Receiving Branch	F43121.PRMCU	CHAR	12	0	0
Promised Receipt Date	F4311.PDPDDJ	DATE TIME	8	0	0
Product Group	F4102.IBPRP4	CHAR	3	0	0
Product Line	F4102.IBSRP4	CHAR	3	0	0
Product Class	F4102.IBSRP5	CHAR	3	0	0
Product	F43121.PRITM	DOUBLE	8	15	0
Branch-Product	VAR	CHAR	289	0	0
PO Qty (Trans)	F4311.PDUORG	DOUBLE	8	15	0
PO Amount (Domestic)	F4311.PDAEXP	DOUBLE	8	15	0
PO Qty (Primary)	F4311.PDPQOR	DOUBLE	8	15	0
Supplier	F43121.PRAN8	DOUBLE	8	15	0
Supplier Name	F0101.	CHAR	40	0	0
Supplier Group		CHAR	3	0	0
Supplier Class		CHAR	3	0	0
Buyer	F4311.PDANBY	DOUBLE	8	15	0
Actual Receipt Date		DATE TIME	8	0	0
Receipt Qty (Trans)		DOUBLE	8	15	0
Receipt Amount (Domestic)		DOUBLE	8	15	0
Receipt Qty (Primary)		DOUBLE	8	15	0

Receipt Qty Early (Primary)	DOUBLE	8	16	0
Receipt Qty On-Time (Primary)	DOUBLE	8	16	0
Receipt Qty Late (Primary)	DOUBLE	8	16	0
Receipt Amount Early (Domestic)	DOUBLE	8	16	0
Receipt Amount On-Time (Domestic)	DOUBLE	8	16	0
Receipt Amount Late (Domestic)	DOUBLE	8	16	0
Early Receipt Count	INTEGER	4	0	0
On-Time Receipt Count	INTEGER	4	0	0
Late Receipt Count	INTEGER	4	0	0
Receipt Qty Accepted (Primary)	DOUBLE	8	15	0
Receipt Qty Rejected (Primary)	DOUBLE	8	15	0
Planner	DOUBLE	8	15	0
Reject Reason	CHAR	3	0	

Table 5.5.5. Criteria of Supplier Delivery Performance Analysis

5.5.6. QUERY JOINS and SQL

```
select  T1."PRKCOO" as c1, COLUMN,0,PO Company
        T1."PRDOCO" as c2, COLUMN,1,PO Number
        T1."PRDCTO" as c3, COLUMN,2,PO Type
        T1."PRSF XO" as c4, COLUMN,3,Suffix
        T1."PRLNID" as c5, COLUMN,4,PO Line#
        T1."PRCO" as c6, COLUMN,5,Receiving Company
        T2."PRMCU" as c7, COLUMN,6,Receiving Branch
        T3."PDPDDJ" as c8, COLUMN,7,Promised Receipt Date
        T4."IBPRP4" as c9, COLUMN,8,Product Group
        T4."IBSRP4" as c10, COLUMN,9,Product Line
        T4."IBSRP5" as c11, COLUMN,10,Product Class
        T1."PRITM" as c12, COLUMN,11,Product
        (T3."PDMCU" || ' - ' || (ascii(T3."PDITM"))) as c13, COLUMN,12,Branch-Product
        T3."PDUORG" as c14, COLUMN,13,PO Qty (Trans)
        T3."PDAEXP" as c15, COLUMN,14,PO Amount (Domestic)
        T3."PDPQOR" as c16, COLUMN,15,PO Qty (Primary)
        T1."PRAN8" as c17, COLUMN,16,Supplier
        T5."ABALPH" as c18, COLUMN,17,Supplier Name
        T5."ABAC05" as c19, COLUMN,18,Supplier Group
        T5."ABAC06" as c20, COLUMN,19,Supplier Class
        T3."PDANBY" as c21, COLUMN,20,Buyer
        T2."PRRCDJ" as c22, COLUMN,21,Actual Receipt Date
        T2."PRUREC" as c23, COLUMN,22,Receipt Qty (Trans)
        T2."PRAREC" as c24, COLUMN,23,Receipt Amount (Domestic)
        (T2."PRUREC" * T3."PDPQOR" / T3."PDUORG") as c25, COLUMN,24,Receipt Qty
(PPrimary)
```

(CASE WHEN (T2."PRRCDJ" < T2."PRPDDJ") THEN ((T2."PRUREC" * T3."PDPQOR" / T3."PDUORG")) ELSE null END) as c26, COLUMN,25,Receipt Qty Early (Primary)

(CASE WHEN (T2."PRRCDJ" = T2."PRPDDJ") THEN ((T2."PRUREC" * T3."PDPQOR" / T3."PDUORG")) ELSE null END) as c27, COLUMN,26,Receipt Qty On-Time (Primary)

(CASE WHEN (T2."PRRCDJ" > T2."PRPDDJ") THEN ((T2."PRUREC" * T3."PDPQOR" / T3."PDUORG")) ELSE null END) as c28, COLUMN,27,Receipt Qty Late (Primary)

(CASE WHEN (T2."PRRCDJ" < T2."PRPDDJ") THEN (T2."PRAREC") ELSE null END) as c29, COLUMN,28,Receipt Amount Early (Domestic)

(CASE WHEN (T2."PRRCDJ" = T2."PRPDDJ") THEN (T2."PRAREC") ELSE null END) as c30, COLUMN,29,Receipt Amount On-Time (Domestic)

(CASE WHEN (T2."PRRCDJ" > T2."PRPDDJ") THEN (T2."PRAREC") ELSE null END) as c31, COLUMN,30,Receipt Amount Late (Domestic)

(CASE WHEN (T2."PRRCDJ" < T2."PRPDDJ") THEN (1) ELSE null END) as c32, COLUMN,31,Early Receipt Count

(CASE WHEN (T2."PRRCDJ" = T2."PRPDDJ") THEN (1) ELSE null END) as c33, COLUMN,32,On-Time Receipt Count

(CASE WHEN (T2."PRRCDJ" > T2."PRPDDJ") THEN (1) ELSE null END) as c34, COLUMN,33,Late Receipt Count

((T2."PRQTYS" + T2."PRQTYW" + T2."PRQTYA") * T3."PDPQOR" / T3."PDUORG") as c35, COLUMN,34,Receipt Qty Accepted (Primary)

((T2."PRQTYJ" + T2."PRQTYC" + T2."PRQTYR") * T3."PDPQOR" / T3."PDUORG") as c36, COLUMN,35,Receipt Qty Rejected (Primary)

T4."IBANPL" as c37, COLUMN,36,Planner

T6."PORCD" as c38 COLUMN,37,Reject Reason

from "F4311" T3, "F43121" T1, "F43121" T2, "F4102" T4, "F0101" T5, "F43099" T6

where (((((T3."PDKCOO" = T1."PRKCOO") and (T3."PDDOCO" = T1."PRDOCO")) and (T3."PDDCTO" = T1."PRDCTO")) and (T3."PDSFXO" = T1."PRSFEXO")) and (T3."PDLNID" = T1."PRLNID")) and (((((T3."PDKCOO" = T2."PRKCOO") and (T3."PDDOCO" = T2."PRDOCO")) and (T3."PDDCTO" = T2."PRDCTO")) and (T3."PDSFXO" = T2."PRSFEXO")) and (T3."PDLNID" = T2."PRLNID")) and ((T3."PDMCU" = T4."IBMCU") and (T3."PDITM" = T4."IBITM")) and

(T5."ABAN8" = T3."PDAN8") and (((T1."PRKCOO" = T6."POKCOO") and (T1."PRDOCO" = T6."PODOCO")) and (T1."PRDCTO" = T6."PODCTO")) and (T1."PRSF XO" = T6."POSFXO")) and (((T1."PRKCOO" = '00001') or (T1."PRKCOO" = '00200')) and (T2."PRMATC" = '1'))

Table 5.5.6. Query Definitions of Supplier Delivery Performance Analysis



5.5.7. Filter Conditions

Filter	Description
PO Company	Equal "00001" or "00200"

5.5.7. Filter Conditions of Supplier Delivery Performance Analysis

5.5.8. PowerPlay Views

Following table (Table 5.5.8) shows example PowerPlay views that can be created by using Supplier Performance PowerCube. These example views can be seen in Appendix C.

View Name	Description	File Name
Supplier Performance Cross tabular analysis	Analyzes the percentage of on-time, early and late shipments.	SuppPerfEarlyLate
Supplier Performance Purchase Price Variance	Provides a graphical display of the monetary price variances over standard cost	SuppPerfPPVBars
Supplier Performance Rejects	Provides graphical analysis of reject percentage by product	SuppPerfRejectBars

5.5.8. Example views of Supplier Delivery Performance Analysis

6. CONCLUSION

In today's business, companies have many decisions to make and as these decisions are made better, companies become more successful and profitable.

Many companies have implemented or started to implement an ERP (Enterprise Resource Planning) system as their core operational system. ERP systems include all transactional operations in a company and these systems are tuned to maximize daily transactional activities.

Since transactional systems are designed for entry, manipulation and maintenance of operational data; examining large volumes of read-only data to provide essential information for decision making is not an easy task. At most companies, most of the operational data never gets looked at.

Data warehouses allow users to use unused data and derive the ultimate value from it. Data warehouses and ERPs can be used together in order to enhance company's decision making performance and optimize the investment in ERP solution. Data warehouses pull data out of various operational systems, including ERP applications, and put them in a dedicated database to facilitate reporting and analysis activities.

In today's quickly changing and competitive market, combining the strengths of ERP solutions with data warehousing solutions is a fundamental need. Some of the ERP vendors are beginning to offer analytic applications, such as business performance management, balanced scorecards, and profitability analysis applications.

To succeed in the new information economy, companies need a strategic vision for how they want to serve their customers and suppliers. They then need to work with vendors and consultants to build bridges between ERP applications and data warehouses, as well as new Web and E-Commerce applications.

In this thesis, ERP and data warehouse technology are analyzed and enterprisewide performance management with these tools is studied on. After defining the concepts of performance management, ERP and data warehousing, three applications are given by using OneWorld ERP solution of J.D. Edwards and Cognos Suite data warehousing solutions of Cognos.

J.D. Edwards customers will be able to use these applications used their companies by simply changing query definitions and filter conditions. These applications give customers the ability to access summarized business information in both spreadsheet and graphical formats. Furthermore customers are able to analyze their business information from multiple views or dimensions by using these applications.



7. LIST OF REFERENCES

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Appendix A

1. Profit and Loss Cross Tabular Analysis (FINProfLsCrosTab)

PowerPlay - [FINProfLsCrosTab.ppr of FINPROFLOSSDEM2 (Reporter)]

File Edit View Explore Calculate Format Tools Window Help

Organization Company Subsidiary SalesPerson Product Customer Account Fiscal Date Actual Period Amount

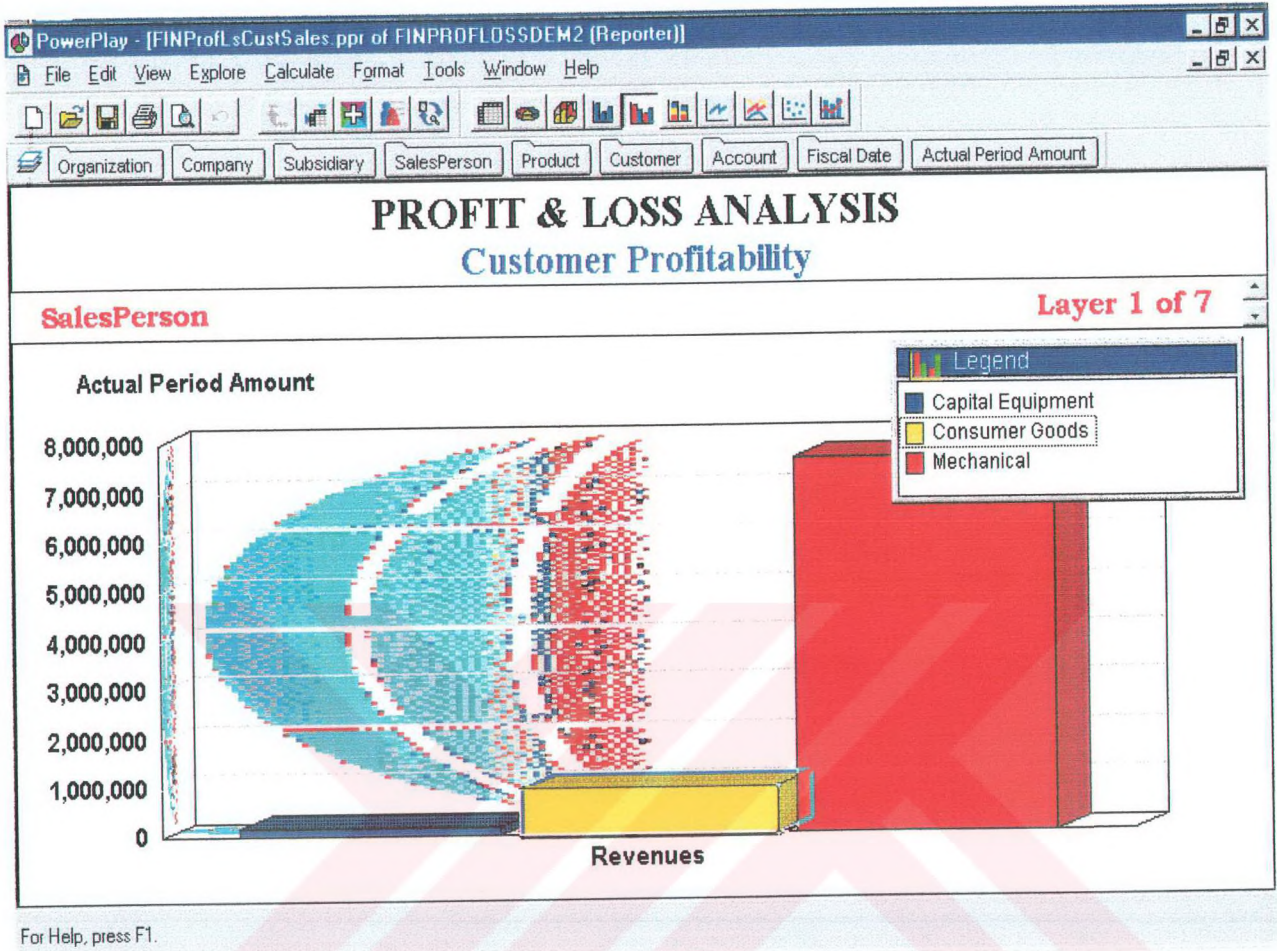
PROFIT & LOSS ANALYSIS

Organization - Product - Customer Profitability

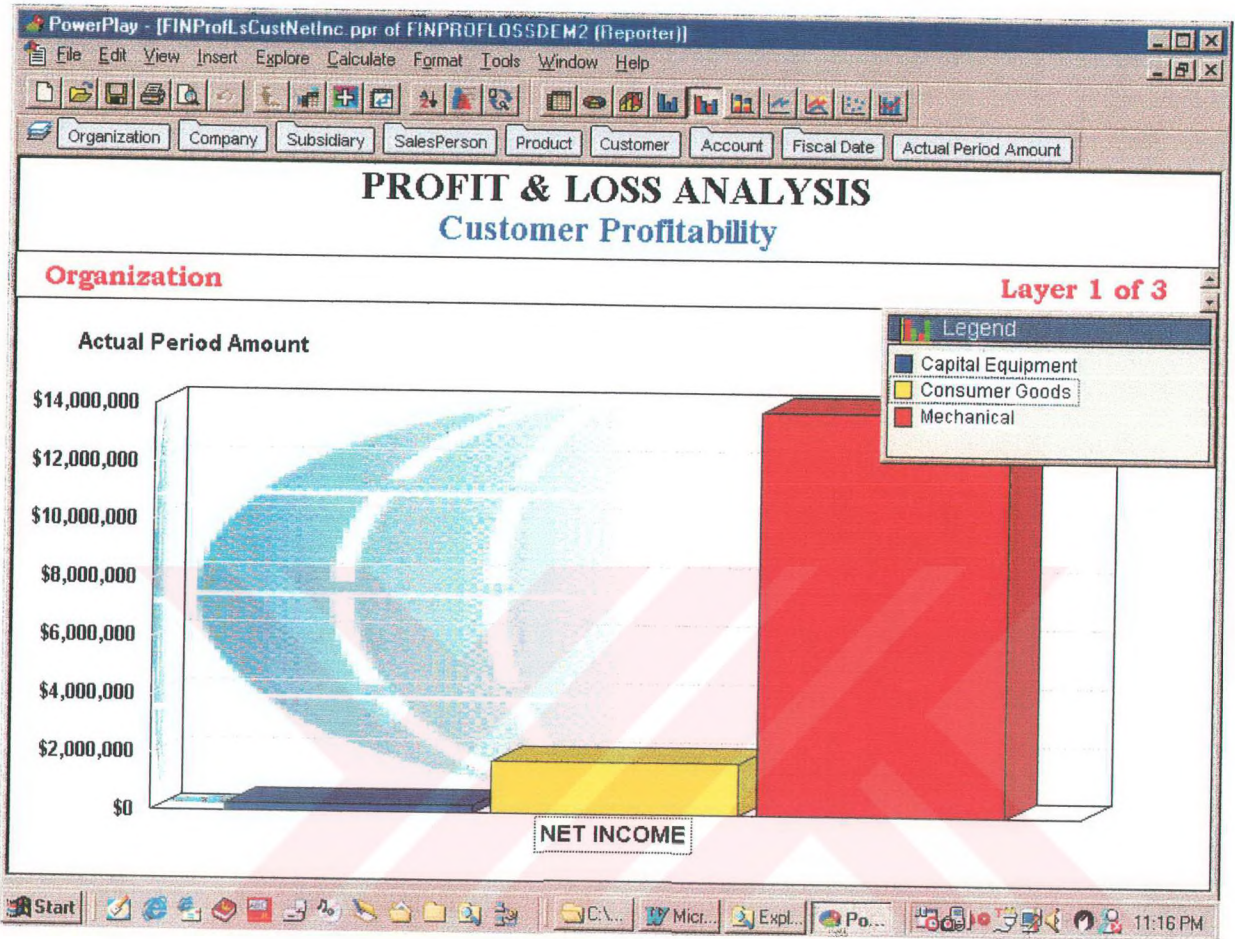
Product	Layer 1 of 4					
	2004	2004 Q 1	2004 Q 2	2004 Q 3	2004 Q 4	2005
Sales	4,522,613	798,905	1,455,328	446,655	1,821,725	12,103
Direct Costs	3,010,773	518,500	965,400	290,000	1,236,873	9,412
General and Administrative	497,762	91,064	168,208	49,898	188,592	378
Other Income and Expense	230,839	38,310	62,809	19,243	110,477	147
NET INCOME	783,239	151,031	258,911	87,514	285,783	2,166

Other Income and Expense

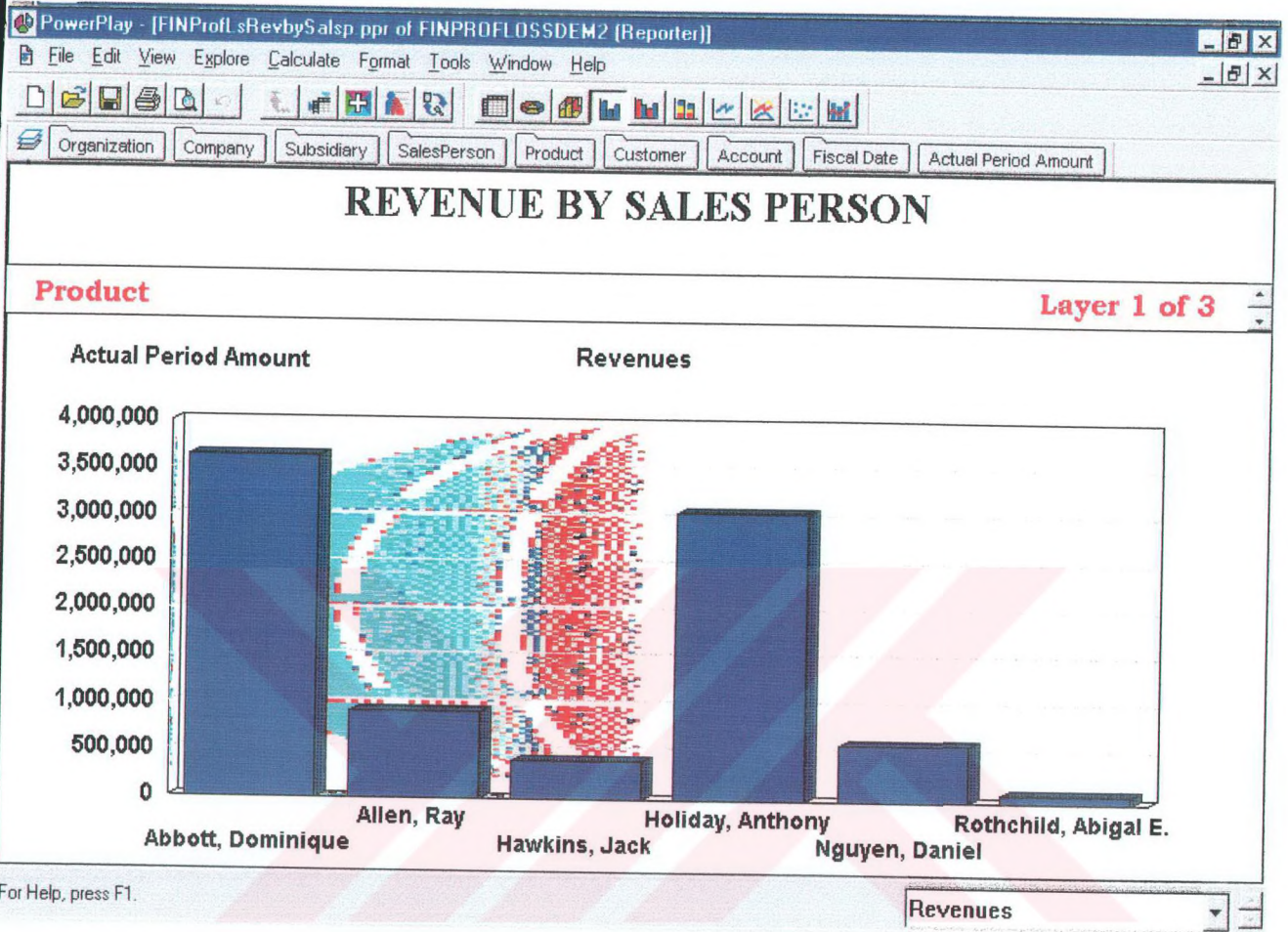
2. Profit and Loss Customer Sales Bar Chart. (FINProfLsCustSales)



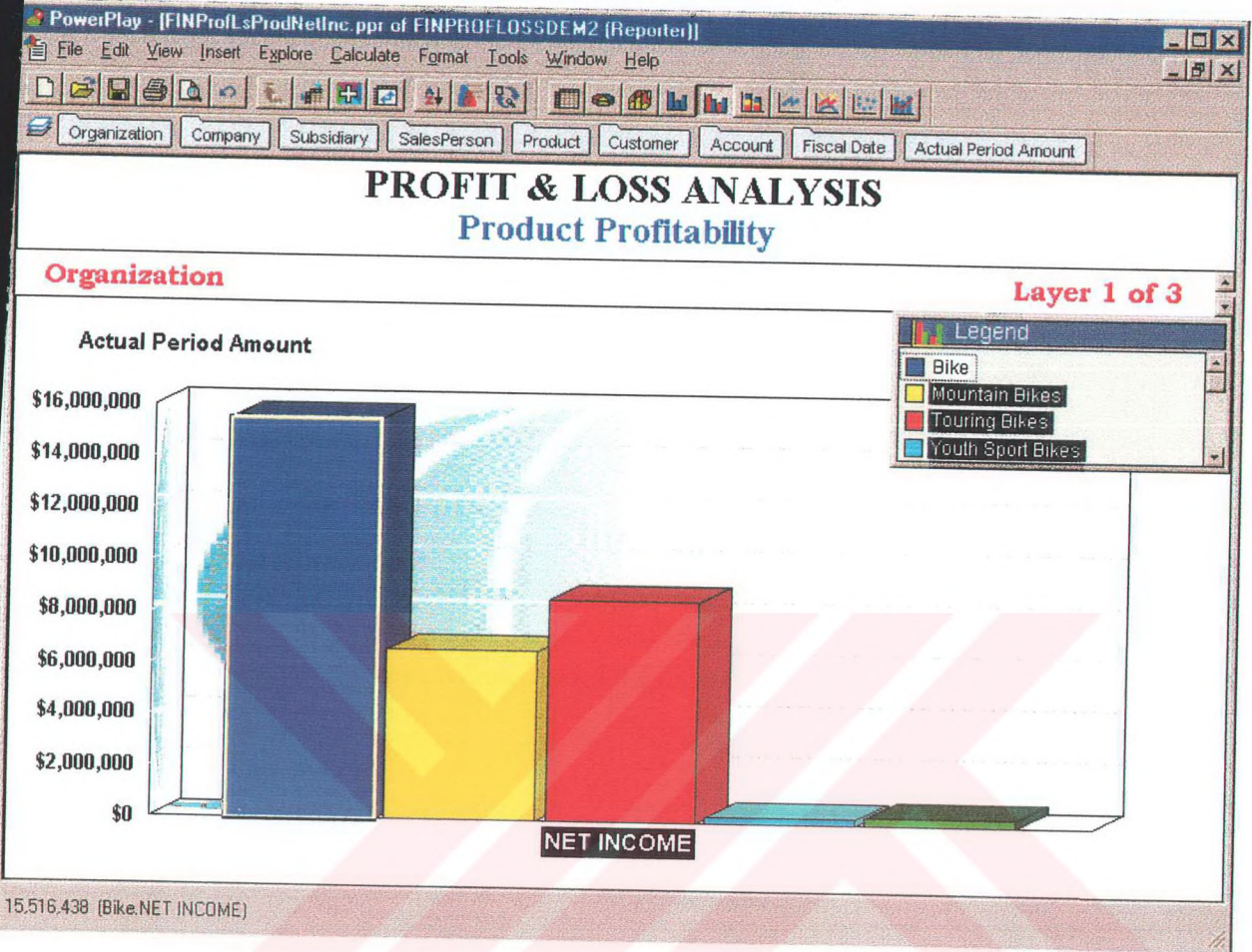
3. Profit and Loss Customer Net Income Bar Chart. (FINProfLsCustNetInc)



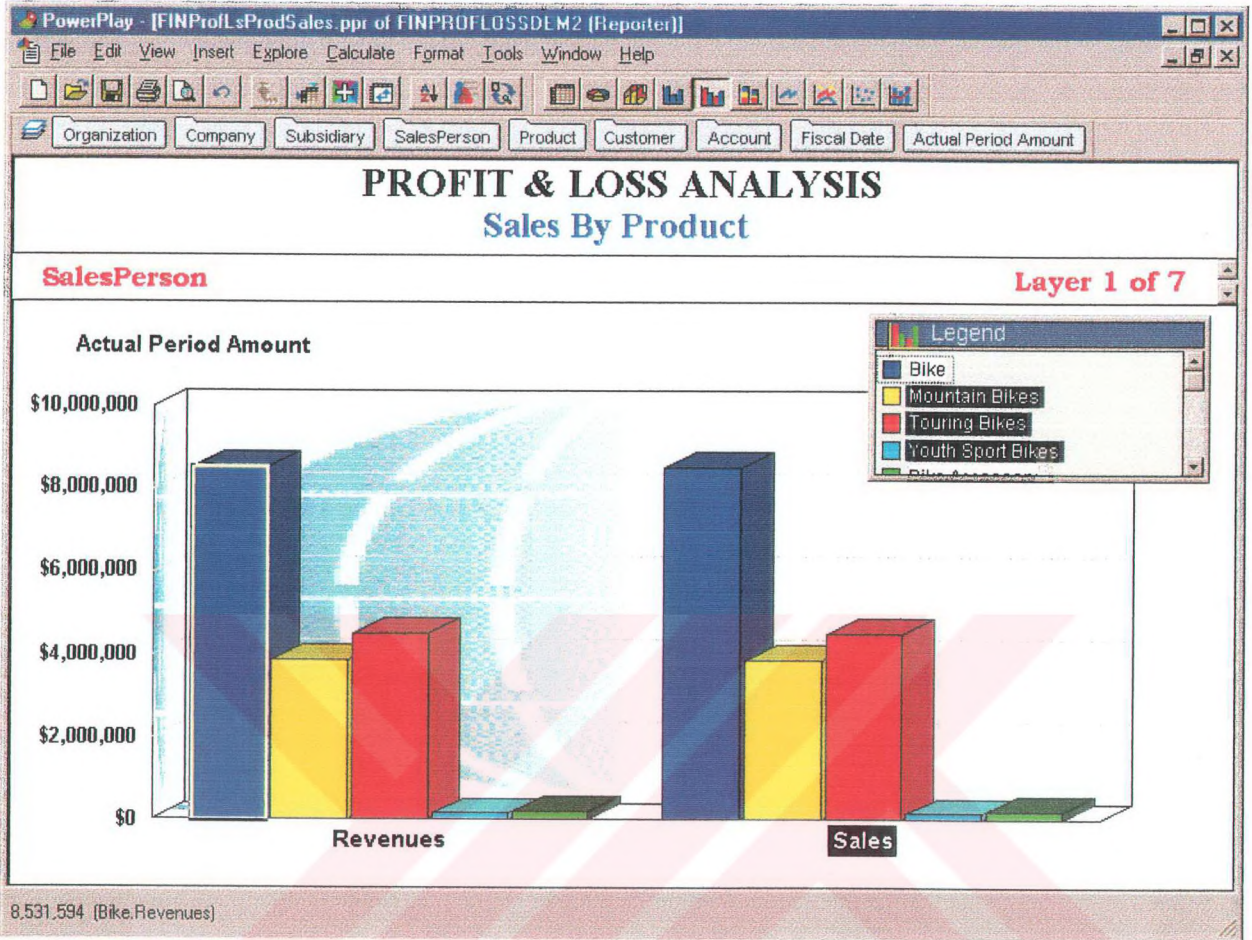
4. Profit and Loss Revenue by Salesperson Bar Chart. (FINProfLsRevbySalsp)



5. Profit and Loss Product Net Income Bar Chart. (FINProfLsProdNetInc)



6. Profit and Loss Product Sales Bar Chart. (FINProfLsProdSales)



Appendix B

1. Delivery Performance Cross Tabular Analysis. (DelivPerfCrossTab)

PowerPlay - [DelivPerfCrossTab.ppt of DELIVERY (Reporter)]

File Edit View Explore Calculate Format Tools Window Help

Branch Product Customer Company Date Order Amount (Domestic)

DELIVERY PERFORMANCE ANALYSIS

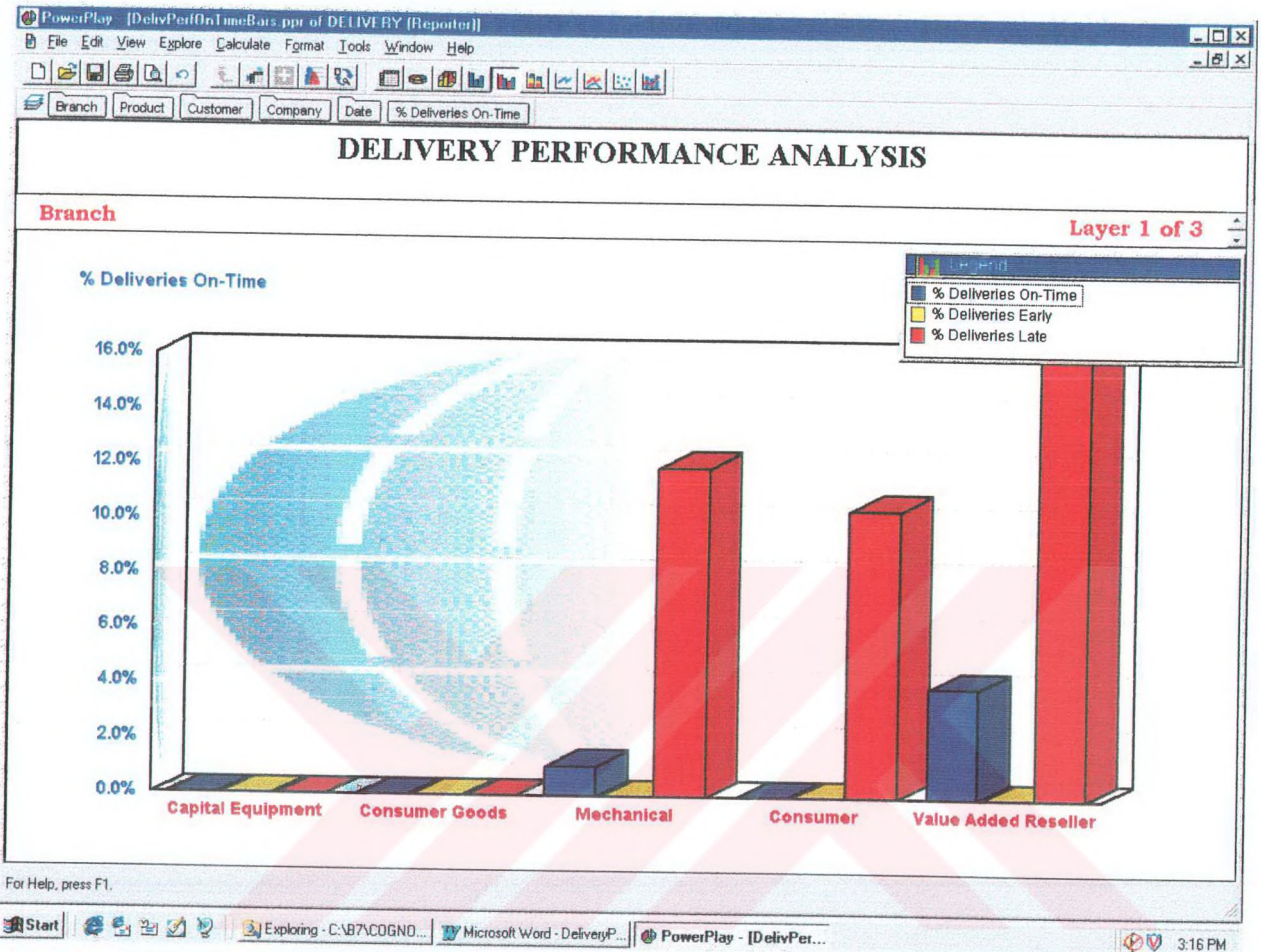
Layer 1 of 3

Company	Product	Bike Accessory	Finished Goods	Subassembly	Bike	Finished Goods
Customer	22,560,160	491,893	406,246	85,647	22,068,267	22,068,267
Capital Equipment	354,140	1,400	0	1,400	352,740	352,740
Value Added Reseller	354,140	1,400	0	1,400	352,740	352,740
Indirect Distribution Channel	354,140	1,400	0	1,400	352,740	352,740
Consumer Goods	2,910,412	90,412	40,308	50,104	2,820,000	2,820,000
Consumer	2,910,412	90,412	40,308	50,104	2,820,000	2,820,000
Direct Distribution Channel	2,910,412	90,412	40,308	50,104	2,820,000	2,820,000
Mechanical	19,295,608	400,081	365,938	34,143	18,895,527	18,895,527
Consumer	2,359,008	115,731	81,588	34,143	2,243,277	2,243,277
Direct Distribution Channel	2,359,008	115,731	81,588	34,143	2,243,277	2,243,277
Value Added Reseller	16,936,600	284,350	284,350	0	16,652,250	16,652,250
Indirect Distribution Channel	16,936,600	284,350	284,350	0	16,652,250	16,652,250

Value Added Reseller

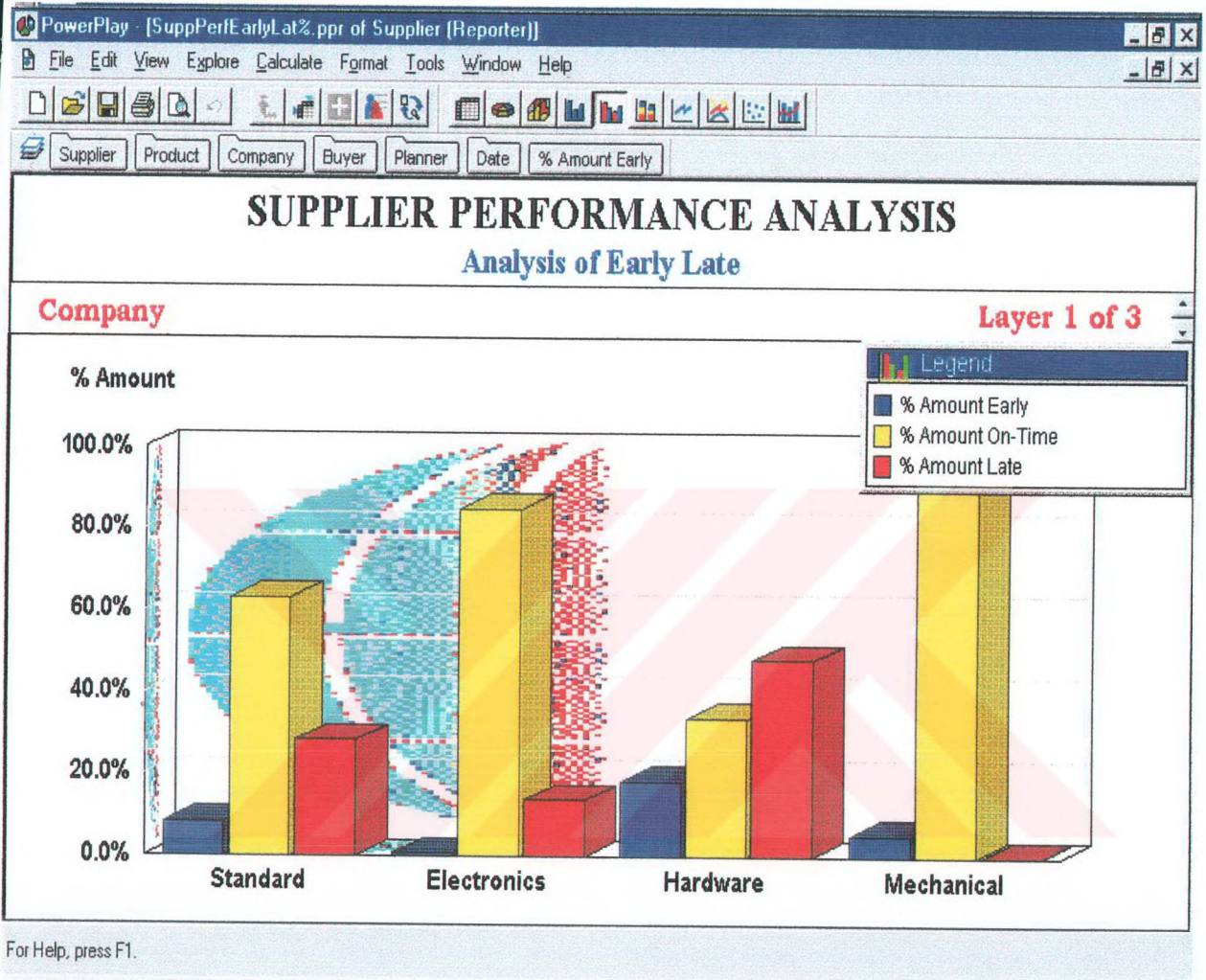
Start | Exploring - C:\B7\COGND... | Microsoft Word - DeliveryP... | PowerPlay - [DelivPerf... | 3:03 PM

2. Delivery Performance On Time Performance Analysis Bar Chart. (DelivPerfOnTime)

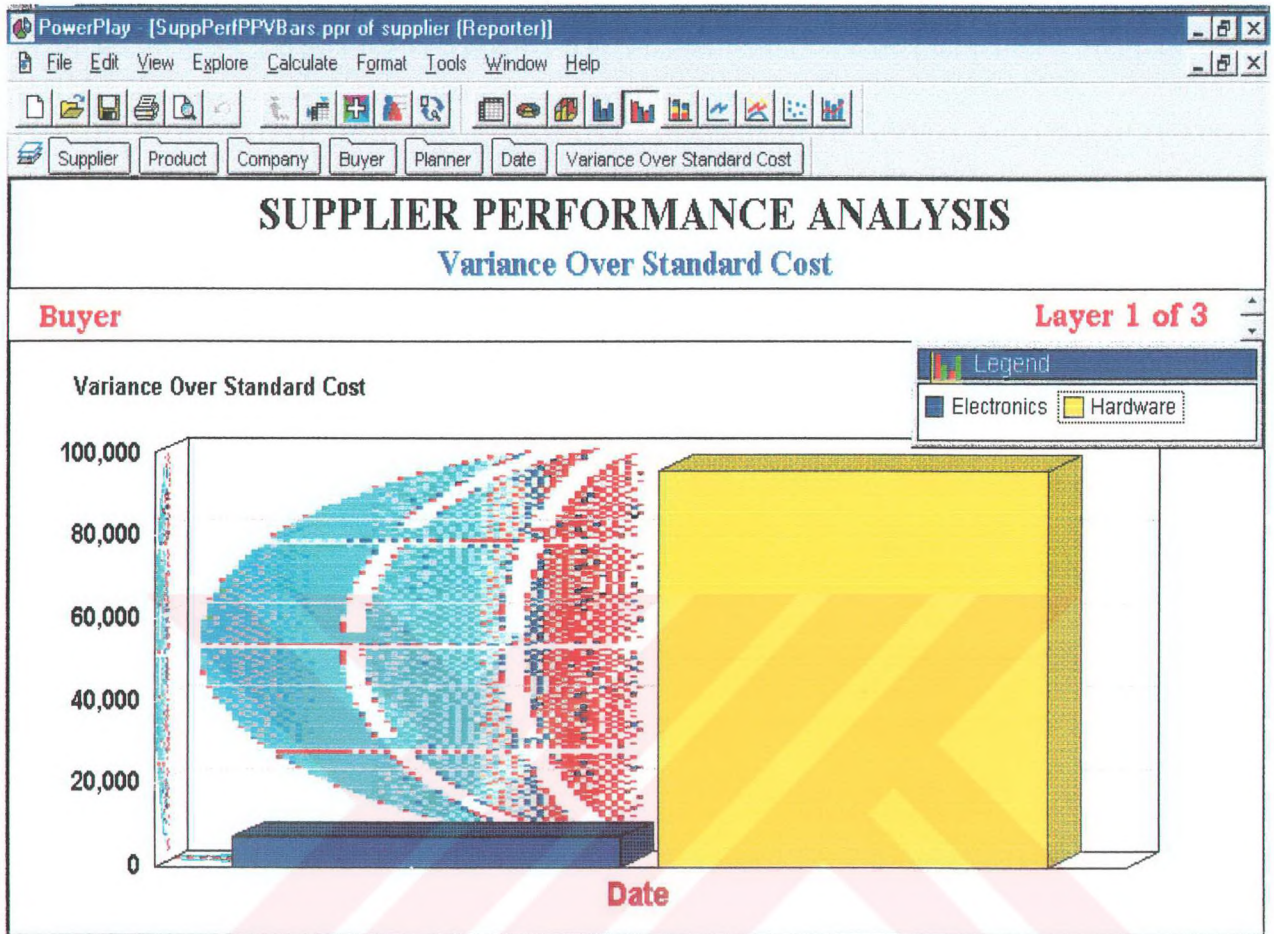


Appendix C

1. Supplier Performance Cross Tabular Analysis. (SuppPerrfEarlyLate)

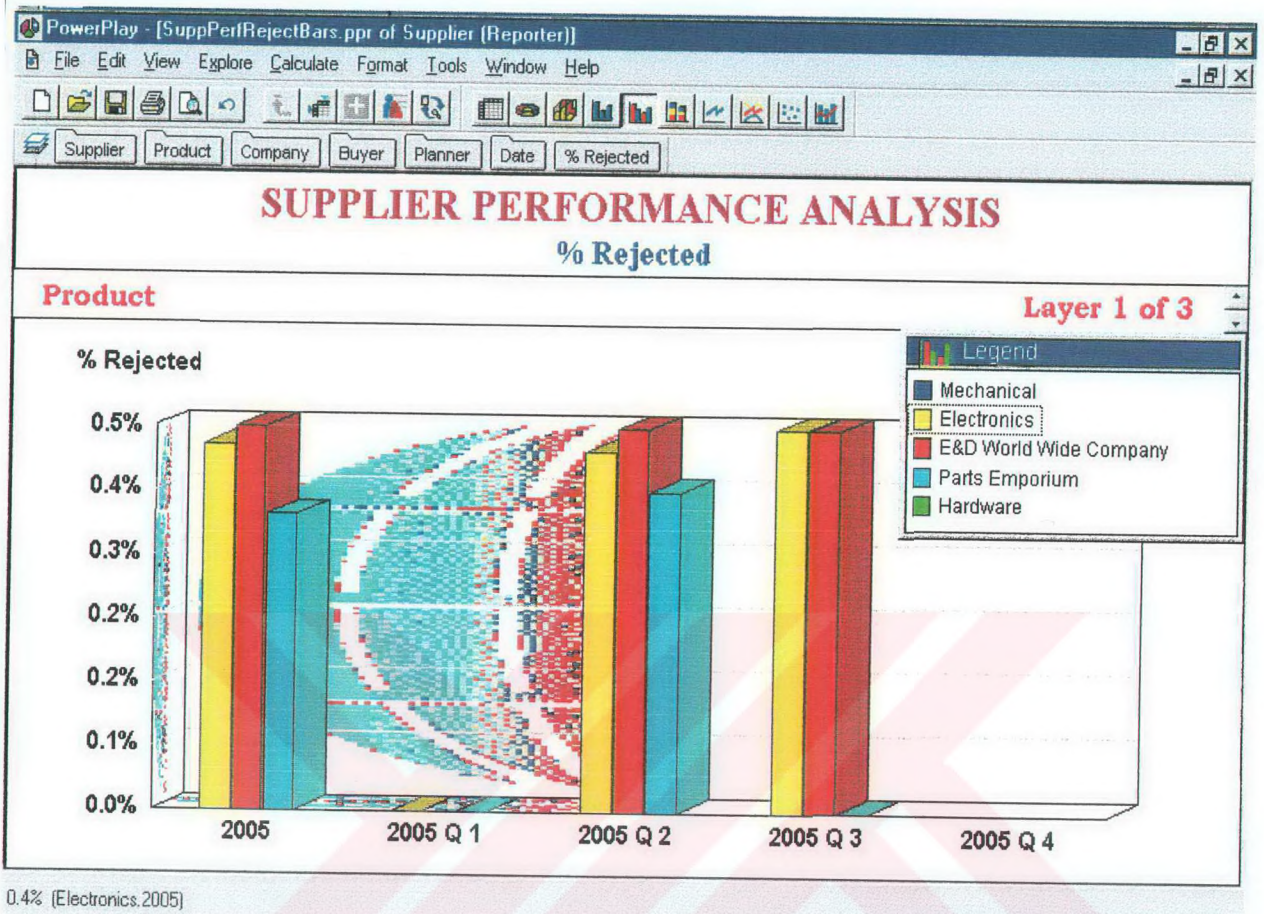


2. Supplier Performance Purchase Price Variance. (SuppPerfPPVBars)



For Help, press F1.

3. Supplier Performance Rejects. (SuppPerfRejectBars)



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