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EFFECTIVE SUPPLY CHAIN MANAGEMENT THROUGH SAP**KURUGANTY SEETHA RAM BABU****RESEARCH SCHOLAR****JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY****HYDERABAD****A. V. SATYANARAYANA RAO****PROFESSOR EMERITUS****DEPARTMENT OF BUSINESS MANAGEMENT****OSMANIA UNIVERSITY****HYDERABAD****ABSTRACT**

Organizations work under tremendous pressure with both internal and external environments to acquire the global competitive position. In the constantly changing business environment, organization needs to respond quickly to the continuous challenges that they face from the competitors through changes in strategies. Integration and implementation of Information Technology derive benefit through process transformation which helps and ensures organizations to have the capacity and capability to continuously create greater business value. In today's highly competitive global economy, leading enterprises are increasingly using Systems, Applications and Products in Data Processing (SAP) with Supply Chain Management (SCM) to reduce operations costs, enhance competitiveness and increase market share by transforming fundamental business processes and achieving measurable business value. Systems, Applications and Products in Data Processing (SAP) is an automated integrated system and provides real time information available to Supply Chain Management (SCM) for quick and proactive decision making and no duplication of manual efforts. Business value realization is an all-encompassing activity that involves process, people and technology.

KEYWORDS

Installations, Market Share, SAP, SCM.

INTRODUCTION

rocess transformation helps global organizations to achieve measurable business value from every process like procurement, sales, order management, distribution, shipping, billing, from inventory management to procurement to planning and forecasting, manufacturing, maintenance, human capital management and finance. Process Transformation services enable by leveraging best practice functionality inherently available with SAP and its integration with SCM. Business transformation utilizes industry-specific business process models, benchmarks and best practices for process optimization and innovation.

Supply Chain Management (SCM) deals with the flow of products as well as information between different supply chain members' organizations. SCM handles diverse activities like purchasing, quality control, demand and supply planning, material and inventory control, production planning, scheduling, control and still many more, but all under the same network with two main objectives: timeliness and quality, so that the organizations can avail correct and valid information easily and at the earliest in their premises (Mishra, R.K., 2004).

LITERATURE REVIEW

Supply chain management (SCM) is the oversight of materials, information and finances as they move in a process from supplier to manufacturer to wholesaler to retailer and finally to a consumer. SCM involves coordination and integration of these flows both within and among companies. According to (Simchi-Levi et al. 2000), SCM is a set of approaches utilized to effectively integrate suppliers, manufacturers, warehouses and stores, so that merchandise is produced and distributed at the right quantities to the right locations and at the right time, in order to minimize system wide cost while satisfying service level requirements. Since suppliers are located all over the world, it is essential to integrate the activities both inside and outside of an organization "SCM is defined as the systematic, strategic coordination of the traditional business functions and the tactics across the business functions within a particular company and across businesses within the supply chain, for the purpose of improving the long-term performance of the individual companies and the supply chain as a whole" (Ballou, 2004). A supply chain is not confined to a chain of businesses with one-to-one, business-to-business relationships, but a network of multiple businesses and relationships that offers between one to many and many to many integration. SCM deals with total business process excellence and represents a new way of managing the business and relationships with other members of the supply chain (Lambert and Cooper 2000). An increase or decrease in the number of the suppliers and customers will alter the dimension of the SCM, becomes narrower if company make a strategic call for selective customer or supply base reduction and enlarges with outsourcing and functional spin offs (Hokey Min and Gengui Zhou, 2002). Huge global competition makes organizations to innovate the existing processes to sustain in the marketplace through implementation of technology that adds value to the final product. SCM systems provide for its adopters, an integration of key business processes from end user through original suppliers that provides products, services and information that add value for customers and other stakeholders (Lambert and Cooper 2000).

SCM helps to maintain a tight control in the process of fluctuating demands of the customer needs by coordinated planning and flow of material and information among supply chain partners which can mitigate the "bullwhip effect" (Lee et al. 1997). Meeting the demands and needs of the customer is the main focus of any current business for sustenance and "You need a strategy for managing all the resources that go toward meeting customer demand. A big piece of planning is developing a set of metrics to monitor the supply chain so that it is efficient, costs less and delivers high quality and value to customers" (Ben Worthen 2006). Technology helps in maximizing the value of investments, continuously improve processes and drive innovation, SCM systems are most likely to provide tangible business value when well targeted, well timed, well managed and accompanied with complementary investments and actions (Barua and Mukhopadhyay, 2000). SCM is based on the integration of all activities that add value to customers starting from product design to delivery. With the advent of internet the process has become much easier for organizations to overcome the ever-increasing complexity of the systems driving buyer-supplier relationships. (Graham and Hardaker 2000) highlight the role of the Internet in building commercially viable supply chains in order to meet the challenges of virtual enterprises. SCM integrates supply and demand which results in equilibrium for price and quantity. SCM systems use finite capacity planning algorithms that do not require iterative adjustments to the master schedule (Raman and Singh 1998), and real-time planning capabilities allow firm to react quickly to supply and demand changes.

IMPORTANCE OF STUDY

Supply Chain Management is a new source of Competitive advantage which encompasses various integrated activities into a seamless process that manufacture a product to satisfy customers. To remain competitive, companies must seek new solutions to important SCM issues such as modal analysis, supply chain

management, load planning, route planning and distribution network design. Companies must face corporate challenges that impact SCM such as reengineering globalization and outsourcing.

PROBLEM STATEMENT

It is important for companies to get products to their customers quickly? Faster product availability is key to increasing sales, (R. Michael Donovan) advocates "There's a substantial profit advantage for the extra time that you are in the market and your competitor is not" and "If you can be there first, you are likely to get more orders and more market share." The ability to deliver a product faster can make or break a sale. If two alternatives appear to be equal and one is immediately available and the other will be available later, obviously the one that is available readily is bound to be grabbed by the customers, hence SCM has an important role to play in moving goods more quickly at competitive price to its customer destination.

OBJECTIVES

1. SCM Flow
2. SAP SCM Model
3. SAP SCM Benefits

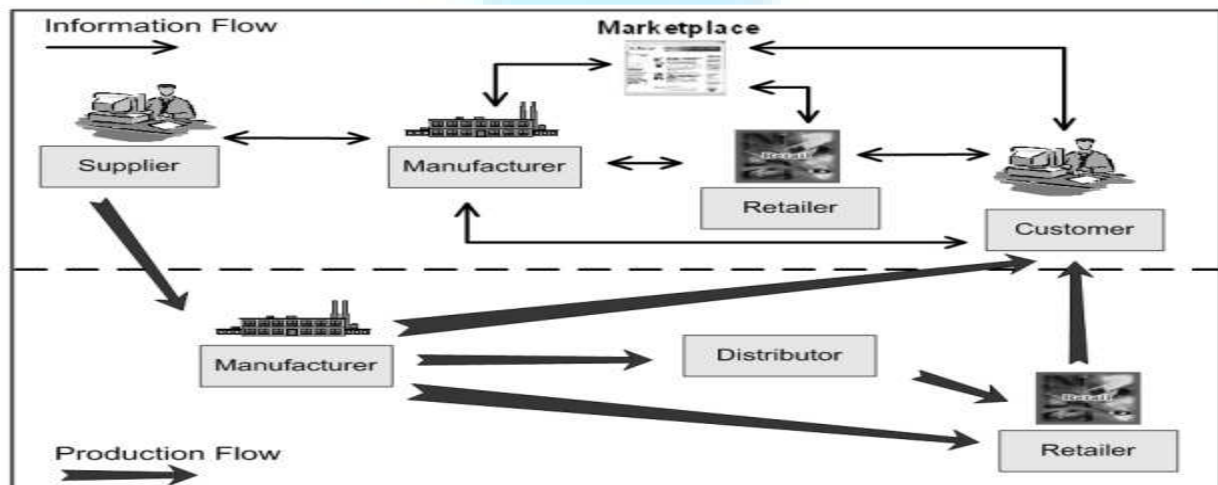
RESEARCH METHODOLOGY

Study of the paper focus on the implementations of SAP SCM by the organizations global wide and the revenue generation thus resulted from its implementation and its current market share. Secondary data is used from various sources to analyze the usage of SAP SCM and its market share.

SCM

SCM is a new way of managing the business and its related relationships. The ultimate goal of an effective SCM is to reduce inventory. According to (Ballou 2007), "Supply Chain Management as a concept and practice encompasses the planning and management of all activities involved in sourcing and procurement, conversion and all logistics management activities". Technological innovation and prevailing competition has led to improvements and implementation of SCM with a focus on complete automated integrated application software SAP. (Wei et al. 2007) presented a comprehensive SCM project selection framework, employing three phases and ten steps. The three phases are strategy analysis phase, the system analysis phase and the group decision-making evaluating phase. Moreover, (Kotzab et al. 2006) developed another model for SCM implementation, containing four major factors: (1) Implementation of SCM within organization, (2) SCM activities, (3) internal SCM-conditions and (4) joint SCM-condition. Herein, the internal and joint SCM-conditions are considered antecedents for SCM activities, which then directly affect an organization's degree of SCM implementation.

FIGURE – 1: SUPPLY CHAIN MANAGEMENT FLOW



SAP

SAP R/3 belongs to the family of enterprise resource planning systems. An ERP system has several distinctive characteristics (Norris et. al., 1998). SAP, the company developing and marketing R/3, is based in Walldorf, Germany. SAP stands for "Systems, Applications and Products in Data Processing." SAP R/3 is a popular system due to its functionality and flexibility and its ability to be customized to suit an organization also contributes to its complexity (Best, Peter, 2000). SAP R/3 popularity among medium to large organizations has been due to several measurable characteristics (Ernst & Young). The functionality of R/3 modules is claimed to be suitable for most organizations, being based on "global best practice", however extensive configuration is still required to customize R/3 to the organization (V Naresh kumar and Pavan kumar, 2012).

Core SAP programs are written in C and application software is written in ABAP/4 (Advanced Business Programming Language). All development objects are stored in the R/3 Repository. Development objects are assigned to programmers with a development class. Old versions of objects are retained for reconstruction if required. R/3 landscape consists of Development, Quality and production boxes and SAP uses a Change and Transport System (CTS) to control the transfer of changes in developed objects from development to quality and finally to production (Metzger & Roehrs 2000).

SAP AND SCM

SAP R/3 has been widely implemented to create value-oriented supply chains that enable a high level of integration, improve communication within internal and external business networks, and enhance the decision making process. (Al- Mashari and Zairi, 2000) discussed the SAP R3 implementation case for reengineering supply chain and highlight the importance of IT infrastructure for the successful implementation of SAP R3 for the reengineering supply chain.

SAP Supply Chain Management (SAP SCM) is used to improve and optimize the supply chain by enabling automated decision making, providing improved analytical tools to users and sharing information with internal system customers and external business partners. SAP SCM application features collaboration, planning, execution and coordination of the entire supply chain. SAP SCM empowers companies to adapt their supply chain processes to a dynamic competitive environment that results in improved user productivity and changes business processes faster.

FIGURE – 2: SAP SUPPLY CHAIN MANAGEMENT

Demand and Supply Chain Planning	Demand Planning and Forecasting	Safety Stock Planning	Supply Network Planning	Distribution Planning	Service Parts Planning
Procurement	Strategic Sourcing		Purchase Order Processing		Invoicing
Manufacturing	Production Planning and Detailed Scheduling		Manufacturing Visibility and Execution		MRP Based Detailed Planning
Warehousing	Inbound Processing	Outbound Processing	Cross Docking	Warehousing and Storage	Physical Inventory
Order Fulfillment	Sales Order Processing		Billing		Service Parts Fulfillment
Supply Chain Visibility	Strategic Supply Chain Design	Supply Chain Analytics		Supply Chain Risk Management	Sales and Operation Planning
Supply Network Collaboration	Supplier Collaboration		Customer Collaboration		Outsourced Manufacturing

Source SAP AG

SAP SCM can operate at higher levels of responsiveness in financial and operational efficiency and help the organizations meet the challenges posed by constantly changing market environment. SAP SCM responsive network capabilities provides an integrated, end-to-end feedback loop that links planning through execution, as a result, partners can sense changes, profitably respond and adapt to new situations with speed and accuracy in real time.

SAP SCM maintains balance between the push and pull requirements needed to successfully network in dynamic business environment. It helps managing, demanding, forecasting and calendar-driven events, thus gives the power to visualize realistic plans up-front and the flexibility to change quickly to unexpected events and emerging opportunities as they occur. SAP SCM helps organization and synchronization of suppliers and manufacturers at global scenario thus enables to achieve maximum quality at low cost while serving a globally dispersed customer base.

SAP SCM support planning and execution capabilities for managing enterprise operations and provide visibility and collaboration technology for extending the operations beyond the corporate boundaries. It results in measurable improvement through cost reductions, increase in service level and productivity gains ultimately leading to higher profit. SAP SCM increases revenue through improved in-stock performance, enhanced customer satisfaction, enhanced margins, reduce order cycle times, reduce response times and reduced operating costs thus freeing up of the working capital. SAP SCM transforms traditional supply chains from linear, sequential steps into a responsive supply network in which communities of customer centric, demand-driven companies share knowledge intelligently, adapt to changing market conditions and respond proactively to shorter, less predictable life cycles.

SAP SCM COMPONENTS

DEMAND AND SUPPLY PLANNING

DEMAND PLANNING AND FORECASTING: Use state-of-the-art forecasting algorithms for product life-cycle planning and trade promotion planning.

SAFETY STOCK PLANNING: Meet desired customer service levels while maintaining a minimum amount of safety stock.

SUPPLY NETWORK PLANNING: Simulate and implement comprehensive tactical planning and sourcing decisions based on a single, globally consistent model.

DISTRIBUTION PLANNING: Determine the best short-term strategy to meet demand and to replenish stocking locations.

SERVICE-PARTS PLANNING: Use the latest forecasting, inventory planning and distribution models to improve service levels while reducing inventory costs.

PROCUREMENT

STRATEGIC SOURCING: Identify and evaluate potential vendors based on historical performance and other data. Create long-term plans for sourcing that take into account the company's financial and marketing strategies.

PURCHASE ORDER PROCESSING: Manage the purchasing process for direct materials, indirect materials and services. Convert demand into purchase orders or delivery schedules for a scheduling agreement.

INVOICING: Receive, enter and check vendor invoices for correctness. Use automatic workflow to ensure proper invoice circulation and automatic blocking for payments that exceed set limits.

MANUFACTURING

PRODUCTION PLANNING AND DETAILED SCHEDULING: Generate optimized schedules for machine, labor and overall capacity utilization. Address problems of unequal allocation of constrained materials and capacity, due-date commitments and sequencing of incoming orders without disrupting existing plans.

MANUFACTURING VISIBILITY, EXECUTION AND COLLABORATION: Meet and deliver on production plans by managing production processes and the deployment of the workforce and resources on the shop floor. Document, monitor and dispatch inventory across the production life cycle. Share information with partners to coordinate production and increase visibility and responsiveness on the shop floor.

MATERIAL REQUIREMENTS PLANNING-BASED DETAILED SCHEDULING: Create feasible production plans across different production locations to fulfill demand to the schedule and to the standard expected by the customer. Use the advantages of production planning and detailed scheduling for scheduling, simulation and alert monitoring to optimize order sequences that can be released for production.

WAREHOUSING

INBOUND PROCESSING AND RECEIPT CONFIRMATION: Receive and process externally procured goods into the warehouse with a single RF scan. Capture detailed and overview information using RF identification (RFID)-enabled tools.

OUTBOUND PROCESSING: Use a combination of RF, voice recognition or RFID technology to manage all the steps of goods issue, including distribution and proof-of-delivery activities.

CROSS-DOCKING: Direct inbound goods from receipt to issue without interim storage. Use cross-docking, planned and opportunistic to minimize duplicate goods movements within the warehouse, optimize the flow of goods from inbound to outbound processing and shorten routes within the warehouse.

WAREHOUSING AND STORAGE MANAGEMENT: Optimize internal movement and storage of goods within a warehouse. Utilize task interleaving to decrease travel and improve efficiencies.

PHYSICAL INVENTORY: Plan and execute a physical inventory or velocity-based dynamic-cycle counts.

ORDER FULFILLMENT

SALES ORDER PROCESSING: Fulfill a range of contracts or purchase orders by delivering a specific product configuration and quantity or by providing a service at a specific time.

BILLING: Manage the entire billing process, from the creation and cancellation of invoices through the transfer of billing information to the accounting department.

SERVICE-PARTS ORDER FULFILLMENT: Expand visibility into the entire service-parts supply chain, providing the ability to respond rapidly to customer and internal orders from the most appropriate locations.

SUPPLY CHAIN VISIBILITY

STRATEGIC SUPPLY CHAIN DESIGN: Perform strategic and tactical business planning. Test scenarios to determine how to address changes in the market, in the business or in customer demand.

SUPPLY CHAIN ANALYTICS: Improve visibility across the extended supply chain. Define, select and monitor key performance indicators (KPIs) for a comprehensive view of performance. Use predefined KPIs based on the supply chain operations reference (SCOR) model.

SUPPLY CHAIN RISK MANAGEMENT: Identify measure, manage and monitor risks. Define risk impact and risk mitigation strategy and develop process and scenario alternatives. Assign the effort of mitigation strategy.

SALES AND OPERATIONS PLANNING: Align company's financial goals, marketing efforts and inventory targets in one consolidated plan. Gain access to relevant data, including aggregated, role-specific information about time, organization, product, geography and units of measure.

SUPPLY NETWORK COLLABORATION

SUPPLIER COLLABORATION: Connect to and collaborate with suppliers by providing them easy and seamless access to supply chain information, which facilitates ability to synchronize supply with demand.

CUSTOMER COLLABORATION: Collaborate with customers by providing them broad functionality for replenishment, including min/max-based vendor-managed inventory.

OUTSOURCED MANUFACTURING: Connect to and collaborate with contract manufacturers by providing them easy and seamless access to supply chain information that extends visibility and collaborative processes to their manufacturing processes.

SAP SCM POTENTIAL BENEFITS

- IMPROVED SAP SCM STAFF AND TASK PRODUCTIVITY:** Since the processes are predefined through customization and configuration, master data is centralized and the SCM staff is well versed with the business processes, the business transactions are secured. SAP SCM Helps in proportional increase in the volume distribution in the rural and niche markets through organization structure and supply partners thus ensures task productivity.
- INCREASED INVENTORY TURNS/REDUCED DAYS IN INVENTORY:** Customers and large institution buyers sometimes directly negotiate and create bulk and repeated orders with the manufacturing company helps the procurement of products at lower costs. This is possible because of large order quantities thus increases the inventory turnover ratio. SAP SCM provides opportunity for customers to place orders online.
- REDUCED DAYS SALES OUTSTANDING:** SAP SCM helps the SCM staff in identifying the sales outstanding through the automation procedures like alert, workflows, online PO Creations. SCM also handles the JIT procedures through supply chain partners thus reduces the sales outstanding.
- REDUCED INVENTORY SCRAP:** JIT inventory and efficient supply chain partners help in reduced inventory scrap, no excess inventory at any time.
- IMPROVED NET FIXED ASSET UTILIZATION, AVOIDING NET FIXED ASSET ADDITIONS:** SAP SCM helps organizations to plan the optimal and continuous utilization of production processes through demand forecasting.
- REDUCED COST OF GOODS SOLD:** Customer loyalty and satisfaction is high, brand reins and the cost of the good is obtained at a highly competitive price through SAP SCM partner channels, so the advertisements or any additional cost involved in marketing is reduced, thus enhances company margins.
- IMPROVED STRATEGIC SOURCING:** Since the SAP SCM integration helps the supporting partners on a long term plan, hence the situation would ensure win-win.
- IMPROVED PURCHASE ORDER, INVOICE AND PAYMENT PRODUCTIVITY:** System Creates the Purchase orders automatically by workflows or through access to the vendor ordering system. Receipt and check of vendor invoices for correctness. Use automatic workflow to ensure proper invoice circulation and automatic blocking for payments that exceed set limits. SAP Checks for GR document for stock and IR documents for payment and cancels through a automatic process, thus avoids duplication of payments.
- REDUCED MAVERICK SPENDING:** Since SAP handles budget and actual, it helps in tight control over the expenditure, this is possible through the concept of cost center. Historical data is also used for evaluation and control. Performance of supply chain partners is important as they all work for common objectives of better customer support.
- IMPROVED PRODUCTION EXCEPTION HANDLING:** Recalling a product is unusual in India because of the fragmented nature of distributed network hence newer technologies such as RFID would be used in keeping track of products along the entire chain that would limit counterfeit products to enter the market. Since the SAP SCM is tightly integrated with the Inventory, vendors, accounting and production planning, system takes care of authorizations and other processing related issues efficiently.
- REDUCED ACCOUNTS RECEIVABLE, BAD DEBT WRITE-DOWNS AND DISPUTES:** SAP SCM provides healthy and stiff competition in the market thus forces the retailers not to take advantage of prolonged credit period and simultaneously work for less discounts. Efficient reporting procedures benefits the account receivables part of organizations
- REDUCED TRANSPORTATION DUTIES AND TAXES AND INCREASE REBATES INCENTIVES:** The emergence of substitutes normally takes a toll on company sales, as prices will come down drastically and customers will benefit with reduced transportation duties and entitled for rebates and incentives.
- REDUCED TRANSPORTATION ERROR COSTS:** Companies are using innovative transportation systems like cold chain management systems for retaining the quality of the product during shipment thus reducing the transportation loses. SAP handles shipments, containers, insurance, picking and packing through automated programs.
- IMPROVED CUSTOMER RETENTION AND INCREASE CUSTOMER LOYALTY:** SAP SCM Provides a weapon for companies to change in policies based on environmental factors thus positions itself in higher trade margins. It helps in bypassing the multiple distribution layers to reach customers directly through channel partners at highly competitive prices. Hence SAP SCM helps organizations to retain customer's trust and loyalty.
- CONSOLIDATED CURRENT SCM SOLUTIONS:** SAP SCM helps all in one solutions

SAP SCM ANALYSIS

TABLE-1 DATA FOR SAP SCM INSTALLATIONS

Year	2009	2012	2013
SAP SCM Installations	14500	20300	20000

FIGURE-3 SAP SCM INSTALLATIONS

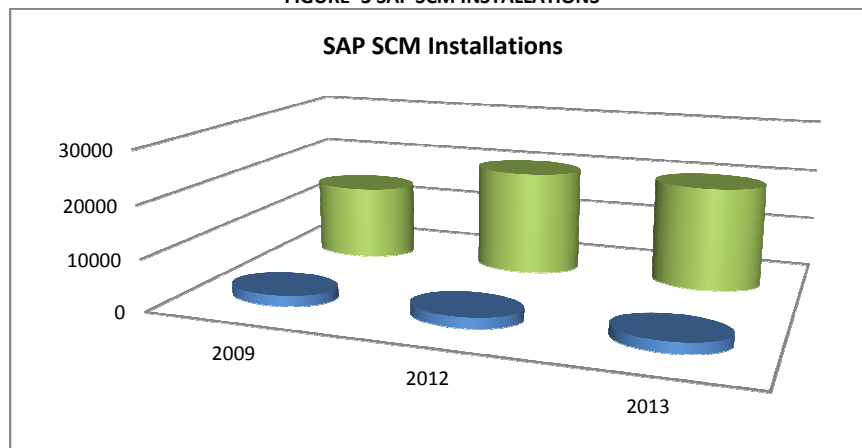


TABLE-2 REVENUE GENERATED IN USD MILLIONS OF SAP SCM INSTALLATIONS IN EUROPE

Year	Revenue Millions USD
2005	1020
2006	1050
2007	1080
2008	1100
2009	1150
2010	1200
2011	1400

FIGURE-4 TURNOVER IN USD OF SAP SCM EUROPE INSTALLATIONS

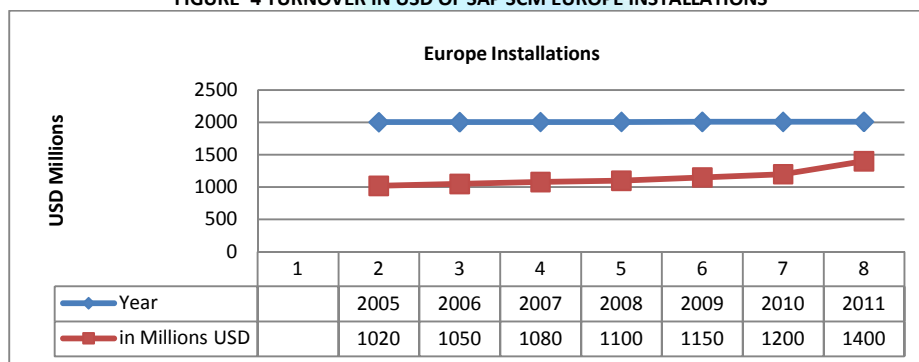


TABLE-2 REVENUE GENERATED IN USD MILLIONS OF SAP SCM INSTALLATIONS GLOBE WIDE

Year	Revenue Billions USD
2001	4.5
2002	5.2
2003	7.7
2004	9.0
2005	9.3
2006	11.87
2007	13.2
2008	15
2011	17.3
2012	15.5

FIGURE - 5: TURNOVER IN USD OF SAP SCM GLOBE INSTALLATIONS

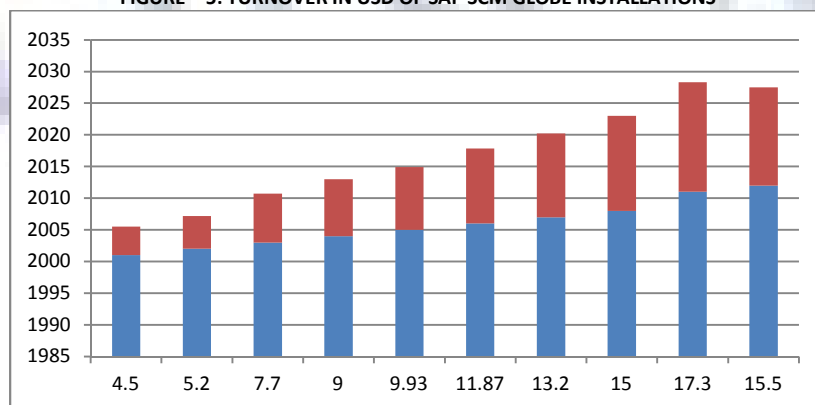
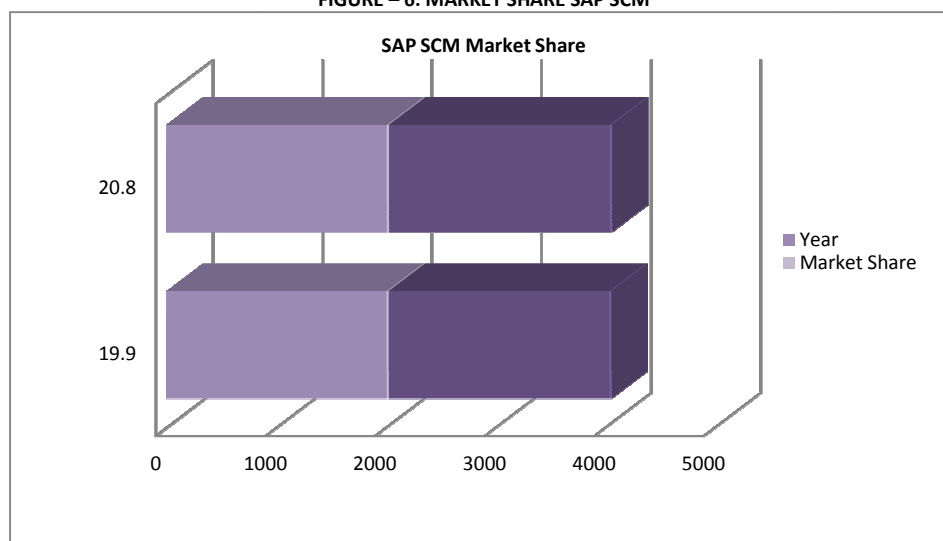


FIGURE –6: MARKET SHARE SAP SCM

Year	2011	2012
Market Share	19.9	20.8

FIGURE – 6: MARKET SHARE SAP SCM



Source SAP AG

CONCLUSION

Today's organizations need technological solutions that can improve business processes, streamline IT landscapes and transform organizational and governance structures. Many companies have realized the advantages of using powerful tools like SAP R/3, especially when the operations of the organizations are geographically distributed. Global competitions have made organizations to invest in SCM implementation to derive competitive advantage. Since the organization long term survival focuses to the efficient inventory control and optimization, SAP SCM and Inventory are tightly integrated so that the transformation of the business to the realization of revenue value can be derived with the implementation of the right technology, skilled and optimal usage of right human resources and making the efficient design and utilization of the processes.

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