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2007

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## Recommended Citation

Kloeden, Phillip, "ERP systems facilitating XBRL reporting and regulatory compliance" (2007). Accessed from

https://repository.rit.edu/article/1628

**ERP SYSTEMS FACILITATING**

**XBRL REPORTING AND**

**REGULATORY COMPLIANCE**

**Phillip A. Kloeden**

# EXECUTIVE SUMMARY

Today, the global economic environment requires that information is readily available across the supply chain (SC) and value chain and that the information is available in a cost-effective manner. The information must be accurate, credible, timely, cost-efficient, reliable, traceable, pertinent, and possess data transparency. The information must be available to members within a particular organization, its vendors and customers, and outside governmental and regulatory agencies. All associated stakeholders and stockholders are entitled to the availability of trustworthy financial information to aid them in decision making, therefore, the controls regarding the data are critical for the compilation of the data. The Securities and Exchange Commission (SEC) reviews the financial report data a company submits on a yearly basis and this aids in the validity and credibility of the data, so that the ultimate end-user, who is the stockholder has the afforded protection from deception which is mandated and provided by the government.

A problem exists with the retrieval and manipulation of financial data at this point in time and this problem results in the inefficient use of labor and capital by the global workforce. Time and money is wasted in the pursuit of accurate, timely, credible, and traceable financial information. Various parties throughout the value chain are repeating the same processes to compile the financial data and Extensible Business Reporting Language (XBRL) offers a solution to this problem. By coding the financial information in a financial report with XBRL tags, the information is now available for all interested parties to utilize for regulatory and decision making processes. The SEC is interested in receiving the data in XBRL format and there is software and application companies which are providing the packages which allow an organization and individual to construct, utilize, and manipulate the tagged data. The financial data comes from a corporation or organization and then is processed and made available to outside parties in a vertical fashion. The parties are traditionally outside entities such as the SEC and other governmental groups, investor groups and individuals, and other corporate entities. The critical factor is that the financial information utilized and tagged in XBRL must represent the organizations financial position properly.

Viewing the corporation and the SC in a horizontal fashion is important so that we can understand the integration of business processes and data within an organization and between its vendors and customers. An Enterprise Resource Planning (ERP) system, such as SAP, allows for this integration to occur and for the information to be shared and traced for all associated operations and transactions. The SAP system houses all of its data in a master data file or location and then the associated modules access data from this central location. The reduction in

repetitive data processing reduces the potential for errors, reduces labor costs for repeated data input operations, and aids in the accuracy of the data. An audit trail is created regarding the inputs of all transactional and operational data, which allows for traceability and adherence to stated internal control processes. Also, compliance with the Sarbanes-Oxley Act of 2002, Generally Accepted Accounting Principles (GAAP), and Generally Accepted Accounting Standards (GAAS) is better able to be achieved with use of an ERP system, such as SAP. SAP makes ones ability to change data inputs without leaving an audit trail difficult. Therefore, the ability to commit fraudulent and deceptive accounting and business practices is greatly reduced.

SAP also provides a Web services platform, NetWeaver, which allows for more efficient e-commerce activities and allows for better customer interactions. Radio Frequency Identification (RFID) tag usage is encouraged with SAP and the data available in these tags is easily utilized with the proper SAP component. There is a supply chain management (SCM) component to SAP and this allows for members in the SC and value chain to be integrated with the organizations which utilize the SAP system. The full potential of an ERP system, such as SAP, allows for the complete integration of all vendors and customers in the SC and value chain. It is important to realize that ERP systems are expensive and require taking on project risks and extended project timelines, but there is an alternative which removes the discrimination of small businesses based on their small purses. The alternative is the use of an application service provider (ASP) which will rent one the usage of an ERP system. Now, all members of the business community have access to the benefits of a fully integrated ERP system without the associated prohibitive costs of the complete system.

The horizontal integration of information systems across the SC and value chain allow for the critical component of accurate, credible, timely, cost-efficient, reliable, traceable, pertinent, and transparent financial data. An ERP allows for this compilation of data from a master source and then the data can be rendered in XBRL format for vertical usage by outside parties, such as the SEC and company stockholders. An ERP system adds legitimacy and credibility to the financial data and the XBRL tagged data can be trusted by the associated end-users. The problem of repetitive data extraction by numerous parties is removed and the associated labor and cost savings are recognized. The likelihood of accounting misrepresentations and outright deceptive accounting practices are reduced and the protection of the investor community is better achieved. An ERP system, such as SAP, is a perfect complement to XBRL formatted financial reporting and SAP actually has an XBRL reporting component built into its system which allows for instance documents to be generated which represent the financial data in XBRL format.

**ABSTRACT**

One of the driving forces which allows for the manipulation and transfer of data throughout the ERP and SC systems and the internet is Extensible Markup Language (XML). ERP systems are now ready to accept data in XML format and SAP systems are now ready to generate reports utilizing XBRL. These XBRL instance documents will assist in providing clean and accurate financial data which has better regulatory compliance and can be more easily shared with the SEC. The associated cost savings of utilizing XBRL tagged financial data will be substantial and the ability to share the data very easily with all related and associated parties will revolutionize the financial reporting process. The use of an ERP system, such as SAP, which facilitates the use of XBRL coding, provides the necessary foundation for the level of compliance which the Sarbanes-Oxley Act of 2002 and the SEC now requires.

A brief overview of ERP systems will be examined with an emphasis on SAP. ERP systems are currently revolutionizing the way corporations conduct business and the manner in which information is collected, processed, analyzed, stored, and shared. There is more transparency, accuracy, credibility, reliability, and usability of business transactional and process data, which leads to cost savings and better regulatory and business processes compliance.

The advent of the internet, data transferability, and the resultant development of e-commerce is another driving factor in the evolution of modern business processes and methods. The SAP package has included and introduced its own Web services platform and is marketing this component as NetWeaver. Companies, third-party vendors and customers can now share data and conduct business transactions with real-time information. Consequently, this integration allows for a better and more efficient SC.

A short discussion of RFID tag usage and their complementary aspects in regard to SAP R/3 software will be addressed and how the flow of information provided by these tags will only facilitate with data integrity, transferability, manipulation, and usability. This information which will be captured in the ERP system central database will only allow for enhancement of the SC and promote more accurate and efficient SCM techniques.

Based on the high costs of ERP systems and their lengthy project time frames, a short discussion of an ASP as an alternative is necessary. Not only is this a new

segment of services that is part of the business process, but now small companies can partake in the benefits of an ERP system while not taking on all the associated risks and costs of such a system.  Small businesses won't be excluded from the evolving business system which is based on a more fully integrated business model with real-time data flows.

**INTRODUCTION**

My research pertains to Enterprise Resource Planning (ERP) systems and how they are revolutionizing the way companies are conducting business on both national and global levels. The lack of systems integration, acceptance of information deprivation, prominence of divisional and personal benchmarking goals, adversarial supplier relations, and a lack of standardized business processes and operations have all helped to transform many corporations into a group of non-cohesive businesses lacking data transparency and accuracy; thus promoting and enforcing the inefficient use of labor, capital, and scarce resources and failing at the corporate duty and goal of profit maximization.

ERP systems, such as SAP, have the capacity to and provide the opportunity for companies, both small and large, to transform themselves into an integrated and cohesive business unit capable of reaping the benefits of data transparency and data accuracy, thus allowing for the efficient use of scarce resources and the associated rewards of profit maximization. ERP systems are using Extensible Markup Language (XML) to integrate systems between suppliers and customers for easy data transfer (Monk & Wagner, 2006, p. 211). The use of Extensible Business Reporting Language (XBRL), which is an open specification standard that uses XML-based data tags to describe financial statements for public and private companies, is currently being promoted as the world standard for financial reporting. XML and XBRL are comprised of tags which define the data contained within them. XML is the new programming language of the internet and XBRL is the new language of financial reporting.

ERP systems are now ready to accept data in XML format (Monk & Wagner, 2006, p. 207). Companies are now capable of transferring data over the internet from their respective websites directly into the ERP system of a participating company within the supply chain (SC). SAP supports the loading, administration, and mapping of various XBRL taxonomies to SAP solutions. The incorporation of XML and XBRL into SAP is now a reality and SAP supports the conversion of financial data from data warehouses into XBRL instance documents.

SAP has invested a lot of time, money, and resources into facilitating the ability of its software users to engage in e-commerce activities via the use of Web services. SAP has introduced its own Web services platform and marketed it as NetWeaver, which includes 5 modules that support business transactions over the internet through the sharing of data. Another advancing technology which SAP is currently adding as a complementary component of an SAP system is Radio Frequency Identification (RFID) technology. RFID tags contain information about a product and this information can be accessed and transmitted electronically so that real-time data is available without manual intervention. Currently, SAP's R/3 software is RFID ready

and it provides tools which can easily link RFIDs to the back-office processing systems of a company's marketing, manufacturing, shipping, and accounting departments.

The usage of SAP and the associated data derived from the RFID tags will allow a company to help manage its supply chain processes. The real-time information regarding supply, consumption, and inventory levels for a product that is available will help provide the necessary information needed for planning. The adverse phenomenon, known as the bullwhip effect, which is a large fluctuation in demand throughout the supply chain, caused by a small change in demand of a product that becomes amplified by the traditional supply chain processes will be potentially alleviated through the use of RFID technology (Monk & Wagner, 2006, p. 209). The use of SAP, RFID technology, and NetWeaver will allow for more efficient control of the supply chain, resulting in optimized supply chain management (SCM) techniques.

A final topic of discussion is the utilization of a third party ERP software provider by any company which lacks the resources or prefers not to be its own ERP provider. This third party company is known as an application service provider (ASP) and provides management of applications for a company over a network and this is usually the internet. There are distinct financial advantages for pursuing this ERP strategy, both for the provider and recipient of services, but the integrity and security of the information systems is the most critical variable to consider for all parties involved in this relationship. Economies of scale can be achieved by pursuing the ASP strategy and ERP vendors can enhance their revenue streams while all business, no matter what their economic size is, can receive the benefits derived from usage of an ERP system.

**XBRL FACILITATED BY SAP**

XBRL was originally introduced in 2000, and is a coding structure designed to help standardize financial reporting. It is a global effort to build a coding structure, following Generally Accepted Accounting Principles (GAAP), thus allowing it to become the digital language of business reporting. XBRL is freely licensed and facilitates the automatic exchange and reliable extraction of financial information among various software applications anywhere in the world." (Hoffman & Strand, 2001, p. 11). The definition of XBRL is provided on the XBRL website and is given in the following statement. "The eXtensible Business Reporting Language (XBRL) provides an XML-based framework that the global business information supply chain can use to create, exchange, and analyze financial reporting information including, but not limited to, regulatory filings such as annual and quarterly financial statements, general ledger information, and audit schedules". XBRL is a language, which has its own set of special words (codes) that make up a communications system.

XBRL is an open specification standard that uses XML-based data tags to describe financial statements for public and private companies. Using GAAP standards, XBRL translates financial reports across all software and technologies including the Internet. Based on the ease of sharing financial data, XBRL benefits all members of the financial supply chain, including shareholders, regulatory authorities, suppliers, auditors, and other stakeholders. The key benefits and characteristics that XBRL has to offer are: technology independence, interoperability across varying systems, efficient preparation of financial statements, and the extraction of reliable financial data. SAP supports the loading, administration, and mapping of various XBRL taxonomies to SAP solutions. SAP software supports the gathering of information from a data warehouse and converting it to XBRL instance documents that are suitable for communicating individual financial statements and consolidated financial statements. Also, SAP SEM (Strategic Enterprise Management) can easily publish instance documents on your investor relations website or portal. An XBRL instance document can be considered a database of financial facts, representative of financial statements or reports, and the financial information they contain (Hoffman & Strand, 2001, p. 73). Certain information referenced in the above paragraph can be located at the following website address, http://www.sap.com/solutions/business-suite/erp/financials/pdf/BWP_ERP_Financials_Best_Practice_Accounting.pdf.

Basically, XBRL is a type of Extensible Markup Language (XML) that is specific to business reporting and XML is a World Wide Web Consortium (W3C) standard which allows information to be stored, exchanged, and processed by computer applications. XML can be a powerful tool for building shared meaning in Web-based communities, but it's important to understand that XML isn't a cure-all (Brown & Hagel, 2001, p. 112). XML uses generalized codes for tagging data, and these tags better represent the data and make it easier to utilize and manipulate (Barbour, 2004). XML establishes a common grammar, but it only has limited semantics and the precise meanings of the XML terms have to be determined by the actual partners, the individuals applying the tags (Brown & Hagel, 2001, p. 112). While XML and XBRL describe the information itself, HyperText Markup Language (HTML) only describes the appearance of information. XBRL is only designed to report business data and any related functions that are outside the scope of XBRL would be handled by other technologies. XBRL can be utilized to increase data transparency, accuracy, and credibility while facilitating reconciliation in financial reporting. Also, because XBRL allows financial information to keep its original context, data transparency relating to financial statement consolidation, direct cash flows, and contracts will be enhanced.

SAP supports XML and standard interfaces based on this language.  In the age of e-business and e-commerce, organizations must be able to handle cross-system business processes with their business partners, vendors, and customers with flexibility and adaptability.  Heterogeneous systems must have the ability to communicate with one another and share data.  Currently, SAP develops its own solutions based on open communication standards and is also a member of key standardization organizations.  The HR-XML Consortium and the organization for eXtensible Business Reporting Language (XBRL.org) are two of the leading standardization organizations.  These organizations define the XML vocabulary for human resources management and business reporting, respectively.  Most importantly, the XBRL organization focuses on exchanging financial data over the Internet.  A standard vocabulary, technical aspects, and the business process model are defined when open communication standards are specified.  Actually, SAP managed the working group in the HR-XML Consortium that developed the standard for stock option plans.  The group created an XML schema for each transaction.  The schema defines the structure, content, and semantics of the XML document and is designed so that it also takes international regulations and special features into account.  The information referenced in the above paragraph can be located on the SAP website at the following address listed below, http://www.sap.com/search/index.epx?ct=international&mode=quick&q1=XBRL.

SAP is an advocate of the utilization of open communication standards and is promoting the use of XBRL.  With the use of XBRL, the dictionary (taxonomy) (See Figure 1) consists of data objects, such as the balance sheet item (cash), and the associated text information, such as the management report.  An XBRL Taxonomy Document is a dictionary or vocabulary of financial facts (Hoffman & Strand, 2001, p. 70).  In order to exchange the data, users will attach XBRL tags to their financial reports and these tags will include element names from the taxonomy.  XBRL represents the tags, such as (cash), in the same way in every document, therefore computers are able to retrieve and analyze the financial data automatically.  The XBRL International Financial Reporting Standards (IFRS) taxonomy defines over 3,000 unique elements that represent financial reporting concepts.  The design decisions help ensure maximum reusability and comparability (Ramin & Prather, 2003).  XML and XBRL, structures only the data content without defining the layout.  Therefore, the financial data which was created as an instance document in XBRL can be prepared in different formats, such as a form for managerial or SEC (Securities and Exchange Commission) authorities or as an HTML file for websites.  The critical issue to recognize is that no extra work or cost is involved with these output procedures.  SAP supports data exchange via XBRL usage by including the appropriate function in mySAP Financials.  Ideally, a fully integrated financial SC is set up across various companies starting

with the balance sheet being generated by the originating company.  Next, the file is checked by an external auditor and then sent to a rating agency before being published in a financial portal. The file is then available to all interested parties.

The American Institute of Certified Public Accountants (AICPA) has created and promoted XBRL International (See Figure 2) to promote the growth and usage of XBRL on a global level.  XBRL International was formed as a not-for-profit global consortium of companies and agencies with one common goal, the development of XBRL and the widespread acceptance and use of the new global coding standardization process for financial information (Tie, 2005, p.33).  The benefits from XBRL use are not limited to large corporate entities either, creating a taxonomy designed specifically to meet an individual company's needs is possible.  The purpose of XBRL is "to enhance the flow of financial information through the creation of a globally useful language in which to describe financial facts and concepts" (Kearney, 2005).  The implementation of an XBRL-based reporting system can be viewed as a six-step process, regardless of the size and scope of the reporting activity.  The process consists of Fact Finding, Planning, Resource Allocation, Implementation, Evaluation, and Deployment.  After the Deployment is finished, there will be recurring issues and costs involving training and maintenance of the system (Bergeron, 2003, p. 185).

Many look to the U.S. as a leader and the initiator of the XBRL process, and the movements toward acceptance of XBRL by the SEC and the AICPA have helped add legitimacy to the process.  Technology adoption is a process which takes time and the process holds true for both individuals and corporations.  Corporations actually tend to change or adapt at a slower rate than individuals.  The use of the Technology Adoption Curve (TAC) or (s-curve) can be used to track the time and adoption level relationship for a technology, such as, XBRL.  The time required for group buy-in for XBRL can be perceived.  The curve is broken into five stages: Innovators, Early Adopters, Early Majority, Late Majority, and Laggards (Bergeron, 2003, p.151).  Opinion Leaders can also be included in the TAC (See Figure 3).  It appears that based on the activity in the accounting industry, in 2003 XBRL entered the Early Majority of adoption (Bergeron, 2003, p. 154).  Also, in early 2003, the New Zealand Stock Exchange (NZX) joined XBRL as it was reviewing its reporting processes. At that point in time, the primary adopters and users of XBRL have been the larger corporations and governmental departments (Boyd, 2004).

In 2004, the movement away from paper and digital financial reporting began in Canada. PricewaterhouseCoopers assisted the TSX Group Inc. in preparation of their annual financial report, utilizing XBRL.  As a result, the TSX Group Inc. became the first Canadian public company, as well as, the first publicly listed stock exchange globally, to utilize XBRL in the

publishing of their financial report (Colman, 2004). In February of 2005, the SEC announced an XBRL Voluntary Filing Program (VFP) with the intention of assessing XBRL technology. The SEC wanted to evaluate the ability of the registrants to tag their financial information utilizing XBRL and the benefits associated with using tagged data for analysis (Sinnett, 2006).

While speaking at a U.S. XBRL conference, the SEC Chairman, Christopher Cox, stated that the SEC would play a leadership role in pursuing the implementation of interactive data. Mr. Cox desires results in months and not years; he states that the real basis for the SEC's promotion of XBRL is in the protection of investors. Since the SEC announcement by Mr. Cox and XBRL's expanding international profile, software vendors are developing and launching a remarkable set of tools to help the end user make efficient use of this important technology (Anonymous, 2005). EDGAR Online, Microsoft, Oracle, and Adobe are some of the major companies to bring XBRL solutions software to market in 2005. Now, the rush is on to develop and market software and the new philosophy is, Better, Faster, and Smarter, according to the developers (Anonymous, 2005).

Utilizing XBRL coding for financial reporting purposes is critical. Due to the fact, that under the current non-XBRL financial reporting environment; data retrieval, extraction and input throughout the information supply chain is repetitive and results in astronomical costs. Based on Forrester Research data from 2002, U.S. companies spent $404 billion paying workers to find and re-key information, and this accounted for 11 percent of all wages paid in the United States (Pinsker, Gara & Karim, 2005). This inefficient use of labor resulted in the SEC reviewing only 16% of the 14,000 annual corporate filings in 2001, and not having an opportunity to review Enron's annual report or corporate filings since 1997 (Farewell & Pinsker, 2005). This inefficient use of labor resources wastes a lot of money, increases errors, and decreases worker productivity. In turn, corporate earnings can be reduced and the countries gross domestic product (GDP) can also be negatively affected.

XBRL makes financial reporting cheaper, better and faster, by: reducing the cost of preparing, publishing, and analyzing information. Increasing the effectiveness of business decision making, allowing for real-time reporting and more thorough analysis capabilities, reducing the margin of human error, as well as, improving accessibility and ease of use by enhancing comparability are additional benefits. Automating information migration from systems to financial statements, increasing the speed of data use and related decisions, and simplifying data transfer are another set of benefits derived from XBRL utilization. A list of benefits include: transparency, timeliness, internal controls, fair value accounting, convergence, and principles-based accounting standard-setting (Cunningham, 2004). XBRL use will offer cost savings and benefit all members of the financial information supply chain (See Figure 4). Figure

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5 illustrates the seamless collection and dissemination of information utilizing internet-based standards, in respect to XBRL, and the associated processes and participants which benefit from XBRL implementation, adoption, and utilization.

XBRL will provide a significant Return on Investment (ROI), based on the exponentially decreasing costs associated with information production and consumption. The analysts' firms, Gartner and Forrester, have both published reports regarding the significant cost reductions available by leveraging XBRL and XML enabled reporting processes (Ward, 2004). The repetitive manual steps regarding production and consumption of financial information throughout the supply chain have an adverse cost impact on all associated parties, and translates into vital resources being wasted. See Figure 6 for a comparison of financial data flows, with and without XBRL usage. XBRL offers the industry cost savings, competitive advantage, risk management, and this is a resultant of increased rates of straight through processing (STP) and more accurate information flows (Crosby & Sprenkle, n.d.).

The Federal Deposit Insurance Corporation (FDIC) has saved an estimated 20 to 30 percent since initiating the XBRL implementation process, and the Deutsche Bank reports to have saved an estimated 100,000 man-hours per year from XBRL adoption (Barbour, 2004). EDGAR Online's initial XBRL VFP took around 160 hours to complete, and included the tagging of more than 200 items (Sinnett, 2006). Since they have built a conversion tool and have extensive experience regarding industry taxonomies, their conversion time was greatly diminished. EDGAR Online does have the expertise to assist the market in the implementation and adoption of XBRL, so this could help with the maturity of XBRL acceptance.

The costs for XBRL software were available and I discovered that Rivet software provided Dragon Tag, an XBRL tagging program, at a cost of $299 per license with an additional charge of $99 per license for E-mail support. The EDGAR Online product line was costlier with the I-Metrix Professional Corporate application costing $430 per license and the Analyst version costing $560 per license. Two weeks of training were provided with the purchase of these products. The I-Metrix Vision application costs $10,000 per license and is installed by Theoris. Vision dashboards are available to represent the data with this package. The I-Metrix Architect application starts at $20,000 and is a customized application. This product is useful for organizations with proprietary technologies. The I-Metrix Xcelerate application is priced by RR Donnelley, based on their partnership with EDGAR Online and customer needs.

Based on an article hosted by the Web site, http://www.batavia-xbrl.com/xbrl_main_xbrl_process.html, the advantages provided by XBRL regarding the business reporting supply chain and the associated beneficiaries of the information are:

"XBRL provides advantages at each step in the business reporting supply chain. These beneficiaries of XBRL are the producers and consumers of business reports: accountants, auditors, financial analysts, investors, creditors, business and technology decision makers, such as the Chief Financial Officer (CFO), Chief Information Officer (CIO), Chief Technology Officer (CTO), Controller, and senior executives of Finance, Investor Relations, Financial Research, Software vendors, and Information Technology."

Cost savings are associated with each link of the business reporting SC and value chain analysis could help identify areas within the chain where corrective financial actions may be required. Figure 4 illustrates the XBRL process and related beneficiaries. If a reporting system were broken down and put back together in an XML/XBRL environment, then you could align it with any management intention, including a Balanced Scorecard (BSC) methodology (Stenzel & Stenzel, 2005). The power of XBRL is that financial data is more easily accessed, manipulated, analyzed, processed, and utilized for decision making processes (See Figures 7 and 8). The streamlining of these financial processes allow for more efficient business processes, labor and time savings, cost savings, and ultimately happier customer relations.

Based on the discussions above relating to ERP systems, such as SAP, research provides the evidence that XBRL formatted financial reporting is becoming a reality and my opinion is that it will become mandatory in the near future. Companies which take the XBRL initiative will encounter cost savings based on the fact that they can pursue the switchover to XBRL financial reporting using a phased approach. The problems with repetitive data retrieval and the potential for increased errors can be alleviated by utilizing an ERP system and phasing out the use of disparate legacy systems. Participating in the integration of SC participants in a horizontal fashion allows for the real-time linking of all participants. The transparency, accuracy, credibility, traceability, and regulatory compliance of the data will be greatly enhanced. As a result, greater protection to the end-users will be better assured. A thorough discussion of an ERP system, such as SAP, will be undertaken in the remainder of the paper and I believe the credibility of the SAP ERP system will be established for the reader. Understanding the horizontal integration of members within an organization and throughout the SC allows for the reader to place value in the system and place trust in the data contained in the master file to correctly represent the financial position of a company. Once one understands and trusts the horizontally integrated data system, then the utilization of the XBRL coding components of the system which allow for the transport of the data out of the system in a vertical fashion to associated outside parties, such as the SEC, shareholders, investment groups, and related corporate, educational, governmental, and regulatory groups will be more reliable, credible, viable, believable, and traceable.

**ERP SYSTEMS**

        Current ERP systems are the descendents of the Material Requirement Planning (MRP) systems from the 1980's and have resulted from the trial and error efforts relating to attempts at legacy system integration. The Inventory Management and Control systems from the 1960's were the foundations on which the MRP systems were built upon. ERP has evolved from manufacturing processes coordination into the full integration of back end processes. Originally, ERP systems were designed as a legacy implementation system, but now have evolved into an improved client-server architecture system. An ERP system utilizes software which drives the integration of all business aspects and processes into one single enterprise-wide database or information system ([http://www.erpandmore.com/](http://www.erpandmore.com/)). Basically, at the end of the rollout, the company will have full information visibility, by division, of all inventory and transactions worldwide (Cotteleer & Westerman, 1999, p. 12).

        Data and business processes integration will result in greatly improved efficiencies in business operations. To rapidly respond to a changing environment, an enterprise must integrate business functions into a single system efficiently utilizing information technology, and share data with third-party vendors and customers (Hong, Lee, & Siau, 2003, p. 54). The ERP applications market is growing rapidly and in 2005, the market was valued at $25.4 billion US dollars and approximately 65% of new license sales were controlled by the SAP and Oracle ERP vendors. Within organizations, there is a debate regarding full integration versus best-of-breed applications with the suite applications proponents gaining the lead in respect to market acceptance and applications choice ([http://www.erpandmore.com/](http://www.erpandmore.com/)). Every company that installs an ES struggles with its cost and complexity (Davenport, 1998, p. 10). But, it is critical to understand that the companies which have troubled projects and have the potential to suffer disastrous outcomes are the companies which install an ES without thinking through its full business implications (Davenport, 1998, p. 10).

        ERP is the digital nerve system that connects the processes across the organization and transmits the impact of an event happening in one part of the enterprise to the rest accurately (Mabert, Soni, & Venkataramanan, 2001, p. 73). The central database which is where all the ERP modules will draw information from for handling daily transactional processing, allows for the embedded corporate best practices, as understood by the vendor, to be followed (Anonymous, 1999, p. 64). The implication of ERP usage is that data can be compiled in a central data warehouse and this improves accuracy, credibility, and transparency of the information. The repeated data retrieval and data entry steps can be removed and result in significant cost savings and more efficient use of labor and capital. The real benefits of ERP are its ability to standardize

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business processes, build accurate, trouble-free databases, and minimize data complexity (Hong, Lee, & Siau, 2003, p. 57).

ERP implementation is a five stage process which is composed of the design, implementation, stabilization, continuous improvement, and transformation project components. The project lifecycle can be rather long-term and is longer and more complex for larger organizations.  In fact, there may never be a definite end to the project because the continuous improvement and transformation project stages often produce their own projects with separate lifecycles outside of the original ERP implementation project lifecycle.  But, ERP systems assume process integration with the system absorbing the data, and users losing control over its flow (Ross, 1999, p. 66).  One of the most critical ERP design decisions is process standardization.  Company management often forgets that using the same software will not lead to shared common processes, unless the implementation process is designed to ensure that the same model is implemented across sites (Ross, 1999, p. 66).

Corporations and their employees mistakenly believe that ERP projects are a cure all to their business process and organizational problems and they are Information Technology (IT) projects and not business projects. Computer systems alone don't change organizational behavior (Davenport, 1998, p. 9).  Management also has a tendency to believe that the projects will end after the implementation stage.  The problem is that, if management stops investing in the ERP after implementation, it is unlikely they will ever receive the benefits that can be generated through improved management reports (Ross, 1999, p. 67).  There is a need for effective change management with an emphasis on having project champions to help minimize organizational resistance.  There is a need for corporate cultural change which allows for business processes redesign and an ERP systems value is derived from the ongoing efforts to instill discipline in the company and its components and to strive for continuous improvement in its business processes. Change occurs at several levels in an organization: strategy, process, people, and technology (McAfee, 1997, p. 9).

**SAP AS AN ERP**

ERP system software choice for an organization is a critical component of a modern businesses strategic plan and should be evaluated with precision and accuracy for a best-fit approach.  Information standardization and reductions in information deprivation can be achieved and ERP systems can lead to maximization of business process integration, optimization of decision making processes, and the maximization of information conversion of dispersed data into usable data.

An ERP system, such as SAP, can help a company enhance and protect its core capabilities and gain competitive advantages within its industry. Gaining a sustainable competitive advantage can lead to industry dominance and profit maximization. The best practices of an organization can be achieved and repeated through the embedded business processes contained in the SAP central database. SAP can streamline the SC and promoted lean manufacturing techniques while helping with customer relationship management (CRM).

The SAP ERP system has the capacity to help an organization achieve business process standardization and systems integration, provide accurate, quality, and timely data, decrease inventory levels and delivery cycles, allow quicker service responses, and shorten the financial close cycles. In order for such successes to be obtained, senior management must provide support in allocating resources and setting project priorities, as well as being a champion of the project and pursuing the necessary reengineering of business processes. The extent of these changes suggests one factor that is necessary for reengineering to succeed: executive leadership with real vision (Hammer, 1990, p. 112). Management must consider the SAP ERP project to be a business solution rather than an IT solution.

A successful SAP implementation strategy is composed of six distinct components. First, senior management must be involved at the outset of the project and establish clear project priorities. Second, cross-functional implementation teams with senior level management leaders must be established. Third, the implementation teams need to spend more time upfront defining in detail how the implementation should be carried out and create a map or rule-book to assist in the procedures. Fourth, clear guidelines (metrics) need to be laid out so there is a method for performance measurements. Fifth, the criteria for utilizing outside consultants needs to be established and the process regarding knowledge transfer needs to be addressed. Finally, and most importantly, a detailed plan for training end-users must be established and training must be a part of the whole project from the inception stage onward.

Reengineering of organizational business processes is critical for business and SAP project success. Reengineering requires looking at the fundamental processes of the business from a cross-functional perspective (Hammer, 1990, p. 108). The only way companies can save money with ERP systems is by using them to support more efficient and effective business processes (Monk & Wagner, 2006, p. 181). Basically, the new SAP ERP system shouldn't recreate a company's current business processes and IT systems in the new SAP ERP package. Changing the current business processes to fit the SAP system will prevent the IT workers from attempting to alter SAPs internal programming language, which is called Advanced Business Application Programming (ABAP) and is similar to Common Business Oriented Language

(COBOL).  Pursuing the ABAP alteration approach can also result in SAP warranty and serviceability problems and issues.

A company must determine what industry it belongs to and which manufacturing and business processes support their business.  It must be determined if the company is a service or manufacturing based business and the company should determine its total yearly sales.  ERP software is broken into a three tier system and the above criteria helps one determine which tier software your company should choose.  Tier 1 software is for a large Multinational Corporation (MNC) or for companies with many diverse business units and revenues exceeding approximately $250 million US dollars.  Tier 2 software is designed for companies with one to many branches doing similar things.  Tier 3 software is designed for smaller single site companies that do not have very complex processes.

SAP, Oracle, and JD Edwards are examples of tier 1 software vendors.  SSA ERP LN, Epicor Vantage, QAD, IFS, IBS, and Microsoft Dynamics AX or NV are examples of tier 2 software vendors.  Made-2-Manage, Microsoft Dynamics GP, Intuitive Software, Global Shop, DBA Software, and Epicor Vista are examples of tier 3 software vendors.  When a company determines which tier software would best match their organizational makeup, then they can start investigating the focus niches of each of the systems and compare their specific company requirements to the functionality of each of the targeted ERP systems.

SAP provides solutions, technology, and maintenance services, backed by more than 30 years of service.  SAP AG was founded in 1972 in Waldorf, Germany with the goal of producing integrated application software for corporations (McAfee, 1997, p. 5).  SAP is the worldwide market leader in customer relationship management (CRM), ERP, and SC software with a 26% CRM market share, a 29 % ERP market share, and a 19% SCM market share by total software revenues.  It is important to note that SAP has exceeded overall market growth rates in all three segments.  Also, SAP has a 30% market share in financial management applications, a 24% market share in human resource (HR) applications, a 34% market share in manufacturing applications, a 29% market share in sales applications, a 28% market share in customer service applications, a 15% share in marketing applications, a 27% market share in SC planning applications, a 24% market share in service parts planning applications, and a 21% market share in sourcing applications.  The above market share data is from (http://www.sap.com/index.epx).

The SAP R/3 system is composed of various modules and allows for a fully integrated information system with one shared common database.  At its core is a single comprehensive database (Davenport, 1998, p. 2).  Some of the SAP modules are sales and distribution (SD), materials management (MM), production planning (PP), quality management (QM), plant

maintenance (PM), asset management (AM), human resources (HR), financial accounting (FI), controlling (CO), project system (PS), and workflow (WF) (Monk & Wagner, 2006, p. 26-27). Because the systems are modular, for instance, companies can install only those modules that are most appropriate to their business (Davenport, 1998, p. 3). A fully functional ERP system may handle general ledger, accounts receivable, accounts payable, fixed assets, human resource administration, payroll, production planning, materials management, order entry and processing, warehouse management, transportation management, project management, plant maintenance, and customer service (Anonymous, 1999, p. 64). The above mentioned modules aid in data integration, credibility, accuracy, transparency, and regulatory compliance issues and help assemble and cleanse the data for eventual XBRL coding for SEC financial reporting purposes.

**WEB SERVICES COMPLEMENTING SAP ERP**

The growth of the internet and the evolution of e-commerce have driven companies to connect their ERP systems to the internet to facilitate the sharing of data between companies and customers. We believe that ERP systems enable and enhance e-commerce initiatives, primarily by providing accurate, integrated transaction processing capabilities for a firm (Mabert, Soni & Venkataramanan, 2001, p. 76). In order to share data, a combination of software tools which lets different programs communicate with other applications is known as Web services. SAP has invested a lot of time, money, and energy into its Web services platform, NetWeaver (Monk & Wagner, 2006, p. 204). NetWeaver allows various vendor applications to share data and is a collection of components which facilitate and support business transactions over the internet. This would enable an enterprise to have agility and flexibility as well as standardization and compatibility through the Internet (allowing for efficient e-commerce, e-business, and m-commerce) (Hong, Lee & Siau, 2003, p. 60). NetWeaver offers more flexibility in adding both SAP and non-SAP components to their SAP R/3 systems and also lets external partners access certain parts of the company's ERP system.

The SAP NetWever platform is an enabler of change and you can deploy a services-oriented architecture and obtain more business value from existing IT investments, thus reducing the total cost of ownership (TCO). NetWeaver is a single platform with all components synchronized into a single package with a single installation process. The components and tools which make up the platform are SAP Enterprise Portal, SAP Business Intelligence, SAP Master Data Management, SAP Exchange Infrastructure, SAP Mobile Infrastructure, SAP Auto-ID Infrastructure, SAP Web Application Server, SAP Solution Manager, SAP Composite Application Framework, SAP NetWeaver Visual Composer, SAP NetWeaver Developer Studio, and Adaptive Computing Controller. The 2004 release of NetWeaver is the first time a platform

has integrated these components into a synchronized single package with one price (http://www.sap.com/platform/netweaver/pdf/BWP_OV_SAP_NetWeaver.pdf).

SAP NetWeaver can help improve user productivity with personalized access to Web-based portals, enhanced collaboration, and knowledge management.  IT complexity is reduced, business flexibility is enhanced, and the following IT practices are enabled.  The key IT activities supported by SAP NetWeaver are: user productivity enablement, data unification, business information management, business event management, end-to-end process integration, custom development, unified life-cycle management, application governance and security management, consolidation, and enterprise service-oriented architecture design and deployment.  The integration of an organizations intra-organizational business processes and the synchronization of its internal Information Systems (IS) architecture with SAP R/3 can be a precursor for the integration of its inter-organizational processes with its suppliers and customers via electronic commerce (EC) applications (Puschmann, 2001, p. 7).

SAP NetWeaver aligns people, information, and business processes and the associated business benefits include flexible business strategies, innovative business processes, superior business value, improved business performance, and a superior and lasting user experience.  The IT benefits delivered include a favorable sustainable cost structure, improved development potential, reduced TCO across the entire IT landscape, and the easy development of extensible best practices.  The ability to enhance best business practices is possible.  An organization can take advantage of existing skills to improve current practices or develop new functionality and critical success factors (CSF), see the following website at the listed address for related details, (http://www.sap.com/platform/netweaver/businessbenefits/index.epx).  SAP now offers access to its system through a Web browser in addition to the standard graphical user interface (GUI).  The ability for more efficient and timely communication within the supply and value chain is now a reality for SAP users and this allows for better data transparency.

**RFID USAGE AND SAP**

RFID usage has an impact across virtually all processes and industries and has the power to transform your business processes.  RFID technology provides enhanced warehouse efficiencies, better tracking of equipment maintenance processes, product tracking and authentication, accuracy of product data, credibility of transaction data, among other valuable product information.  SAP has developed a viable platform and delivers many pre-configured scenarios to expedite RFID implementation in most business areas.  SAP RFID technology allows companies to minimize the lag time between acquiring data, converting it to meaningful information and automating all associated transactions and processes.

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Modern global organizations seek methods to gain competitive advantages, optimize SC processes, and increase data visibility, accuracy, and transparency while adding revenues. Businesses also seek ways to reduce working and fixed capital outlays. Based on the SAP NetWeaver platform, SAP RFID technology can be integrated into existing IT landscapes, enabling the use of RFID data in SAP and non-SAP IT landscapes while supporting SCM and enterprise asset management.

RFID technology provides for the data contained within the SAP central database to be accurate, credible and considered real-time. The data improves customer service by assisting in the detection of shrinkage and counterfeits and supporting the efficient distribution of assets. The data also helps manage an assets lifecycle activity and assists in the most efficient use of the asset. RFID technology also helps a company meet the challenges of providing accurate, real-world and real-time data on products as they move across the value chain. This reliable product data in turn translates into reliable, accurate, transparent, and believable financial data resulting from the organizations operations. The above information relating to this topic can be found on the SAP website at the following link, http://www.sap.com/company/press/factsheets/rfid.epx.

**SCM INTERLINKED TO SAP**

Modern companies are looking for ways to increase SC flexibility and responsiveness in order to improve business processes and performance. Consequently, the traditional linear SC is being transformed into an adaptive SC network. The key to the efficient coordination and control of the organizations business processes is only achieved through the use of integrated information systems that deliver timely exact and right information at every point in the value chain (Puschmann, 2001, p. 1). The use of mySAP SCM provides three cornerstones which form the foundation of the adaptive SC network. These are the synchronization of supply and demand, the ability to sense and respond within the fulfillment network with RFID capabilities, and network-wide visibility, collaboration and analytics. The resulting benefits are improved order tracking, enhanced customer service, greater data transparency, real-time performance management information, and traceable information. The SAP website located at http://www.sap.com/company/press/factsheets/scm.epx provided some of the above data.

The key capabilities of mySAP SCM are: SC design and planning, SC execution and management, SC coordination, and SC collaboration. The SCM component is built on the SAP NetWeaver platform and enables adaptive SC networks by providing planning and execution capabilities to manage enterprise operations, as well as, visibility, collaboration, and RFID technology to streamline and extend those operations beyond corporate boundaries. The associated benefits of these systems are improvements via cost reductions, service-level

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increases, and productivity gains resulting in greater profit margins.  SCM aims at optimizing the flow of goods between multiple processes (Puschmann, 2001, p. 7).

SCM applications help to translate customer and market demand into production plans and aids in efficient production and resource use and SCM is an area which can benefit from an ERP system.  With the advent of ERP systems many companies have achieved considerable levels of internal SC optimization (Puschmann, 2001, p. 7).  But, for a SCM project to be successful, the company must achieve certain critical key factors.  A list of these factors includes: the use of a business-driven strategy, management commitment, supplier and partner expectation management, internal expectation management, and the acceptance of a learning period.  The implementation of a SCM system without paying attention to the critical factors listed above will result in poor performance.  Also, a company must decide how their supply chains should be designed and run, and then use technology to implement those goals (Monk & Wagner, 2006, p. 105).

The ultimate goal of SCM is to increase efficiency, productivity, and profitability of company operations and provide accurate, timely, transparent, and credible financial and operations data.  Streamlining the SC and improving service is one way to help achieve these desired results.  The organizations business processes must also be streamlined to provide greater responsiveness to market fluctuations, provide greater forecasting accuracy, help obtain and maintain desired service levels, and aid in the reduction of inventories.  Connecting the company, its customers, and all associated supply and vendor parties throughout the SC allows for data sharing and data transparency.  When all parties are dealing with shared data from a shared common database, then the accuracy, credibility and reliability of the data is greater.  Outside parties, such as the SEC, can now rely on and put more trust in the financial information which corporations are presenting in their financial statements.

**ASP ALTERNATIVES**

An application service provider (ASP) is a company that provides management of applications for a company over a network (Monk & Wagner, 2006, p. 197).  This new breed of services allows for small companies to utilize ERP systems, such as SAP, and gain the benefits such a system has to offer.  The ASP provides ERP software with a significantly lower start-up cost and this removes the exclusion of small companies from the utilization of ERP systems.  These small companies are not burdened with the high costs of installing and maintaining their own ERP systems.  The ERP companies are also interested in ASP capabilities and their potential to enhance revenue streams because the ERP providers can provide ASP services as well.

SAP and IDS Scheer Small and Medium Enterprises Southeast have developed ARIS SmartPath for the ASP/internet service provider (ISP), which provides a reasonable solution to application and internet service providers.  The product provides the best practices, rich functionality, and integration of mySAP Business Suite and the pre-configured solution allows providers to integrate the full range of business processes.  The quick implementation allows for the product to contribute immediately to your business goals while you can avoid time-consuming and costly upgrades and migrations.

Because the solution was developed exclusively for the ASP/ISP market, it focuses on the functionalities, reports, and roles specific to your industry. This results in minimum investment, minimum risk, and maximum return on your investment.  It also provides the opportunity for smaller companies without access to vast cash resources the ability to utilize ERP systems and permits them to partake in SCM and derive the benefits of data transfer and become active members of the value chain.  The ability of these smaller companies to interact with their customers and vendors will validate the credibility of their organizations financial data and allow for the SEC to put more trust in the smaller companies data integrity, reliability, transparency, and traceability.  Information regarding this topic is available at the SAP website which is located at, http://www.sap.com/solutions/sme/allinone/prepackagedsolutions/ids_ASP.epx.

**CONCLUSIONS**

In the modern global economic arena, "An infrastructure designed around information flow will be the 'killer application' for the twenty-first century" (Puschmann, 2001. p. 8).  An ERP system, such as SAP, facilitates the flow of accurate, credible, reliable, regulatory compliant and traceable information resulting from transactional and operational processes.  Business processes are designed to facilitate the information flow into a master data warehouse or file and the interlinking of vendors, customers, and all associated parties within and outside of the organization which are part of the SC or value chain providing a fully functioning and horizontally integrated information and process driven system.  Effectively managing the transformation to a process-centered organization will be critical to the success of the twenty-first century organization (Puschmann, 2001. p. 9).  The tracking, sorting, manipulating, analyzing, storing, transmitting, and sharing of information is critical to all modern organizations and the old disparate legacy systems do not offer the functionality, dependability, and integration of ERP systems, such as SAP.

The issues of effective organizational internal controls, regulatory compliance, transactional tracking, and data transparency are more efficiently addressed when an ERP system is utilized and the integrated parties share data from a central source.  There is more reliability in

the data which is generated from parties within the SC, such as vendors and customer, and from within the organization itself.  An auditing trail is left in SAP and this reduces the likelihood of fraudulent and deceptive accounting practices.  Transactional and operational data exchanges can be traced to the specific associated parties and party accountability is possible.  Since there are specific operations which lead one to believe that the master data is represented fairly and accurately, and in accordance with the Sarbanes-Oxley Act of 2002, GAAP, and Generally Accepted Accounting Standards (GAAS), the end-user of the data is offered reasonable assurance regarding the validity and credibility of the data.  Also, the likelihood that there are effective internal controls within the organization and that fraudulent and deceptive accounting practices are greatly reduced as a result is another area which the end-user can have reasonable assurance in.  Importantly, the repetitive aspects regarding retrieval of the financial data are limited, because the data is housed in a common shared source, therefore, errors and costs are reduced.

Now, based on the effective horizontal integration of financial data through an ERP system and the ability to offer the financial data in XBRL tagged form to outside parties in a vertical fashion allows for completion of the information integration and usability scenario.  Any interested parties, such as the SEC, other governmental and regulatory agencies, investment groups and investors, related corporate partners, or any group which has the resources to access XBRL tagged financial reports may utilize the data.  Ones ability to share, retrieve and analyze, transfer, manipulate, extract, and have reasonable belief and assurance in the data is reinforced through the use of XBRL technology.  As mentioned, the problem of extracting and manipulating financial data without the repetitive nature of multiple parties undertaking the same procedures while increasing the costs and chances for errors will be solved with the use of XBRL tagging procedures.  But, the data must be deemed accurate and reliable, and this is where the use of an ERP system, such as SAP, delivers such data.  The use of an ERP system in conjunction with its XBRL coding and reporting components allows for the perfect marriage of the two similar technologies and promotes the use of accurate, credible, reliable, and traceable data which is in compliance with GAAP and GAAS, as well as the Sarbanes-Oxley Act of 2002.
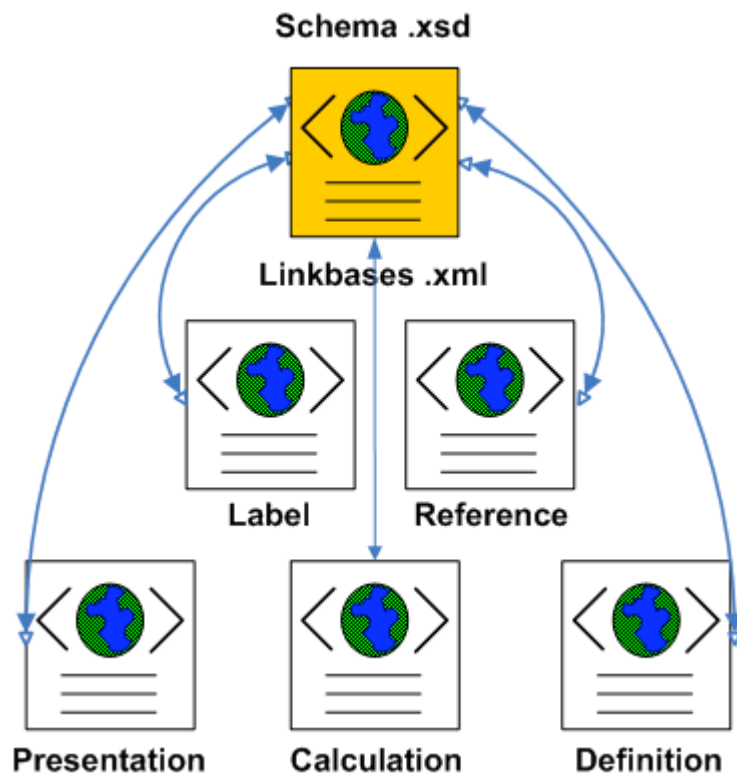
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http://www.ifac.org/Library/SpeechArticle.tmpl?NID=11059888052029543

**FIGURE I**

**Taxonomies**

Schema .xsd

Linkbases .xml

Label

Reference

Presentation

Calculation

Definition

**Source:** http://www.ey.com/global/content.nsf/International/XBRL-What_are_Taxonomies
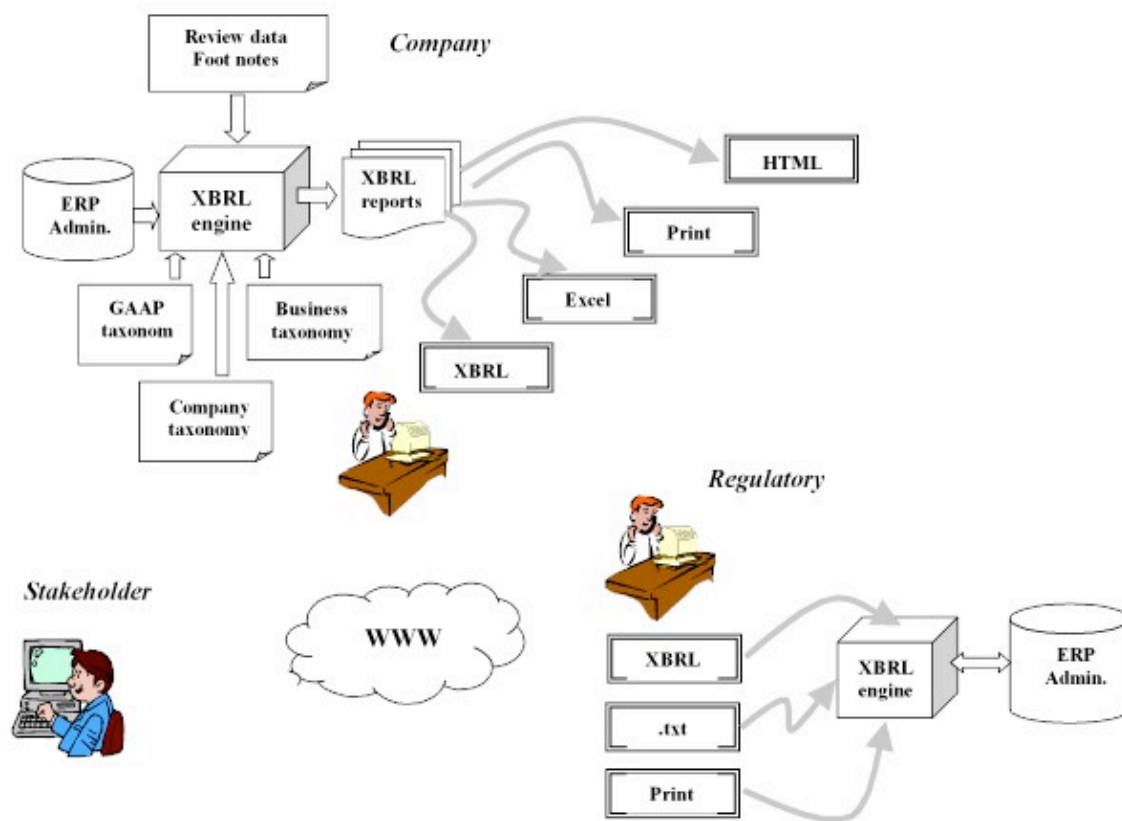
**FIGURE II**

**XBRL Organizational Chart**



**Source:** http://www.xbrl.org/AboutTheOrganisation/
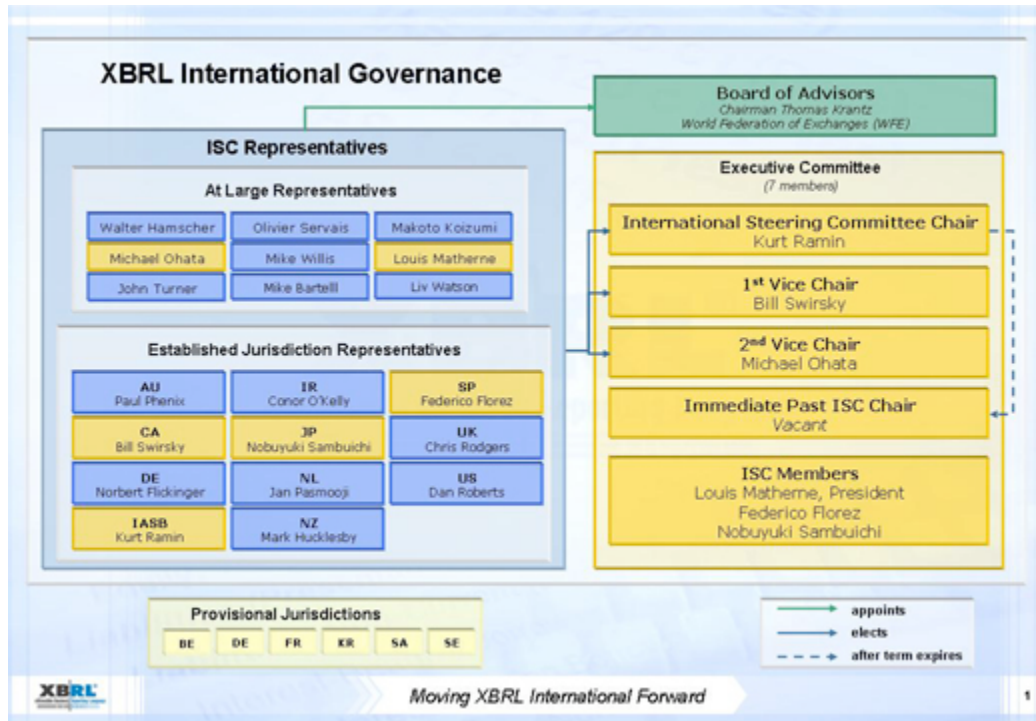
**FIGURE III**

**Technology Adoption Curve**



**Source:** http://www.sageresearch.com/TechnologyAdoption.htm
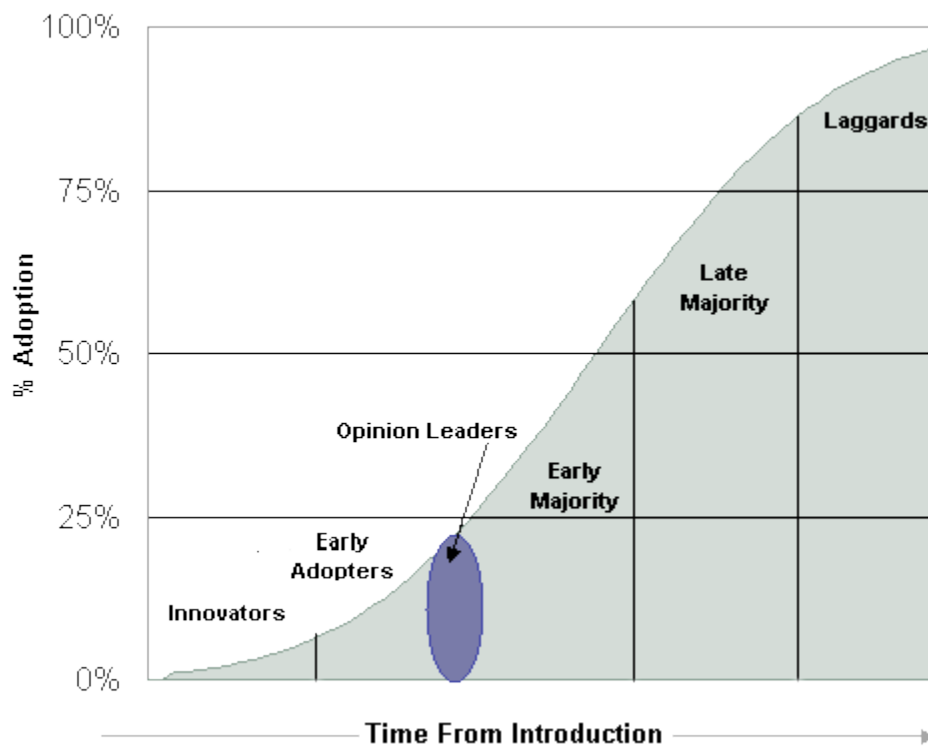
**FIGURE IV**

**The XBRL Model and Associated Users**

**FIGURE V**

**XBRL Seamless Data Collection and Dissemination**
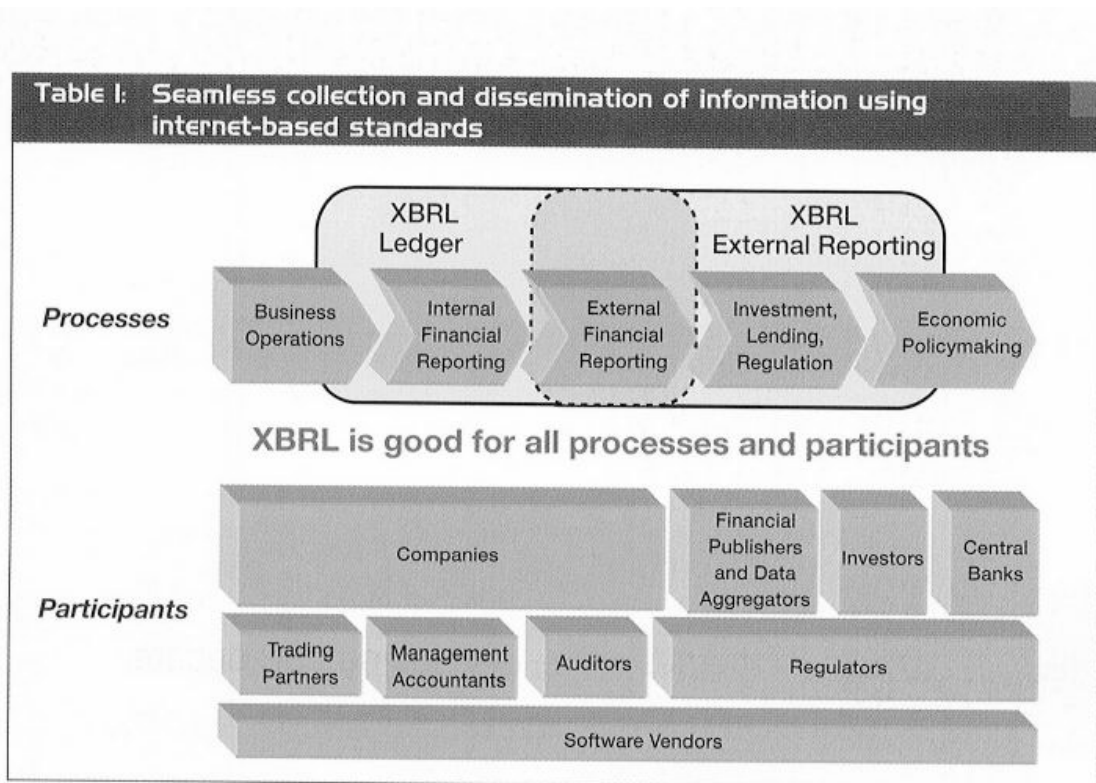
**FIGURE VI**

**Financial Data Flow**

**Current Reporting Data Flow**
(Without XBRL)

ERP
Legacy
Sales

Excel
Financials

Word
Summary

Financial
Analysts

Forms
8-K
10-K
10-Q

Convert to
ASCII/Text → SEC
Filing → HTML
"View" → Data
"Cleansed"

Investors/
Analyst

Metrics
KPI's

**Future Reporting Data Flow**
(With XBRL)

ERP
Legacy
Sales

Excel
Financials

Word
Summary

Financial
Analysts

Forms
8-K
10-K
10-Q

Microsoft Office
Tool for XBRL

XBRL
Creation | XBRL
Consumption

(Not yet supported
by SEC)

SEC
Filing

Investors/
Analyst

Metrics
KPI's

**Source:** http://www.aicpa.org/pubs/jofa/may2004/naumann.htm

**FIGURE VII**

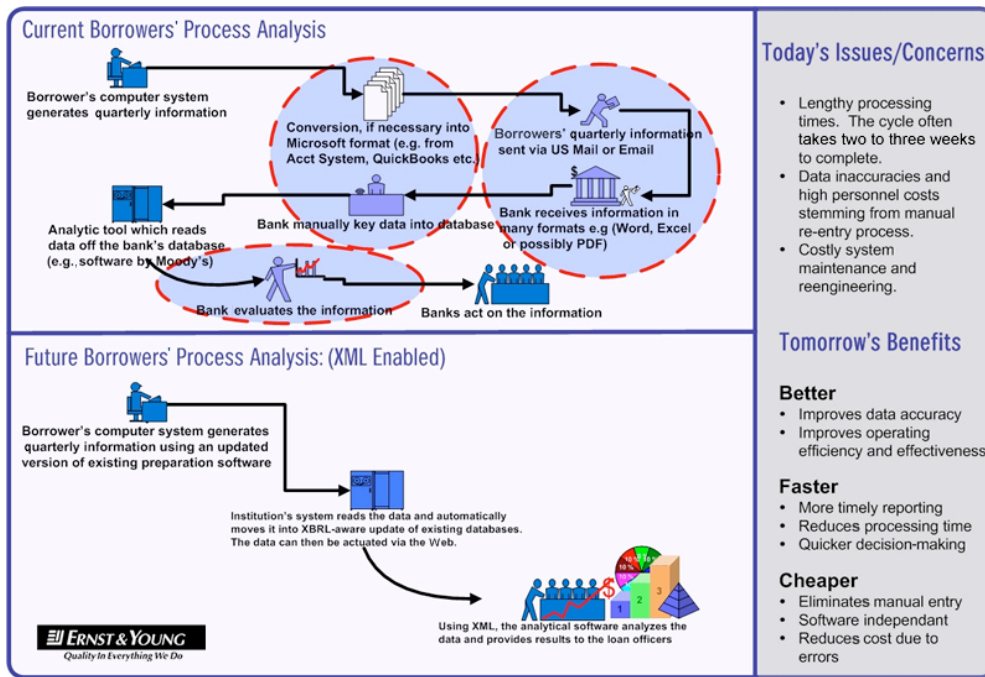**Investor Reporting Utilizing XBRL**
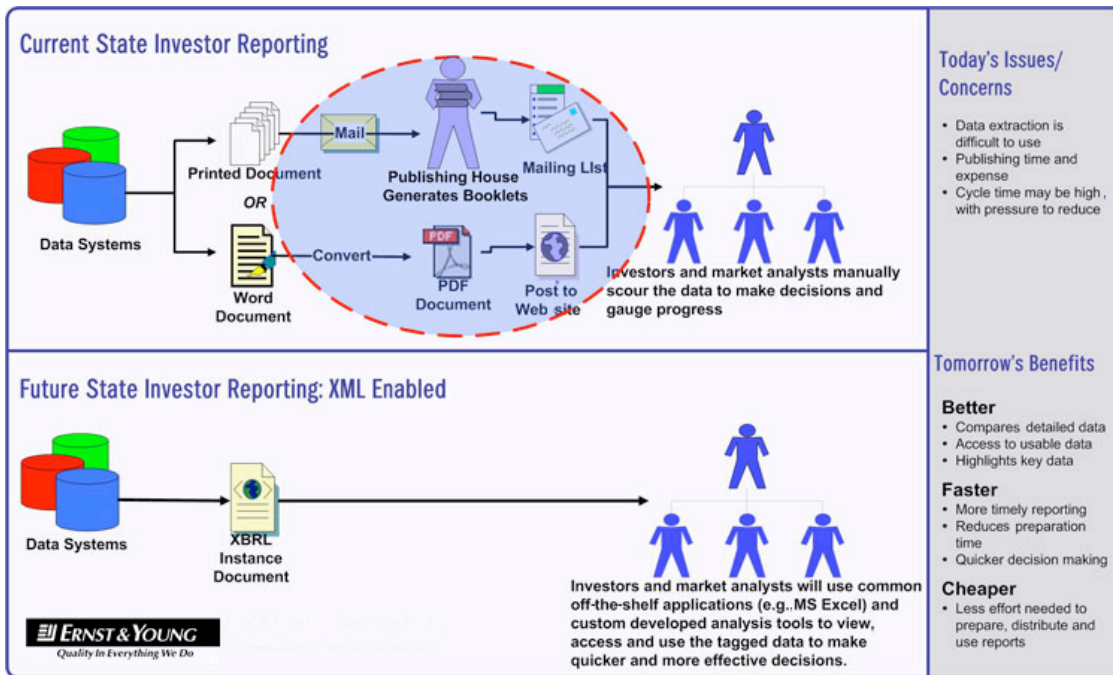


**Note:** Image modified from original source.

**Source:** http://www.ey.com/global/content.nsf/International/XBRL-Investor_Reporting

**FIGURE VIII**

**Borrowers' Process Analysis Utilizing XBRL**



**Note:** Image modified from original source.

**Source:** http://www.ey.com/global/content.nsf/International/XBRL-Borrower_Reporting