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Implementing an Sap Transportation Management System Solution: a Case Study

Debra F. Wycoff
Regis University

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Project Paper Revision History

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Executive Summary

System implementations sometimes result in unexpected system behavior. This paper is a case study focusing on an SAP transportation management system implementation that resulted in unexpected system behavior and a different user interface than the one that had been tested. Through a grounded theory approach the case study researched specific data gathered from the project documentation and from interviews with key system developers and a primary business user. The findings from the study can be applied to other similar system implementation projects and also provide some insights related to additional research that could be expanded.

Please note that the name of the company, the name of the project and other information related to this system implementation have been changed to mask the identity of the consumer goods company being studied.

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CHAPTER ONE: INTRODUCTION

BBC Company is a large consumer goods manufacturing company with headquarters in the United States. During 2007 and 2008 the company performed a technical upgrade of its SAP enterprise resource planning (ERP) system globally across its three business divisions. The enterprise-wide project, named Project Evolution, was the over-arching project, with three separate work streams, one for each of its business divisions located in Canada, the United States and Europe. The U.S. upgrade is the focus of this study. That work stream was referred to as the U.S. Evolution Project (USEvolve). In addition to a technical upgrade of the SAP R/3 and APO modules, the USEvolve project included an Oracle system upgrade and the replacement of the legacy transportation management system (TMS) with the SAP platform which included two new SAP system modules--Transportation Planning and Vehicle Scheduling (TPVS) and Event Manager (EM).

Overall, USEvolve project was successful in that the BBC Company was able to perform its planning, production and distribution processes without shutting down its manufacturing operations when the project was implemented into the production environment although some manual interventions were required. The functionality and design of the replacement transportation management system that was deployed into production differed considerably from the system that had been planned and tested in the development and testing environments. In particular, the Event Manager system's graphic user interface (GUI), known as the Web Communication Layer (WCL), had a number functional components and attributes that were significantly different than the test version and different than the training provided to the users--both internal users and external users. The production versions of the electronic data interchange (EDI) transactions were different than the ones that were tested with transportation carriers, creating issues and challenges for them. System performance was extremely slow. There were also a number of issues related to the functionality in TPVS.

The issues experienced following the deployment of the new TMS system to the production environment created confusion among all the users and disruption to their normal, expected business processes. As a result, a significant amount of additional work and manual intervention was required by the users and the technical resources to ensure shipments were not delayed.

During the six-week production support period following the system deployment, a number of problems were identified and cataloged through the “Help Desk” process. At the end of the production support phase of the USEvolve project, a significant number of issues remained. Following the production support phase, the system maintenance and support was transitioned to the technical resources and a separate enhancement phase was launched to solve some of the outstanding issues.

Problem to Be Investigated and Goal to Be Achieved

The TMS system transition from the test environment to the production environment should have been fairly seamless and transparent to the users. The purpose of this paper is to analyze the BBC Company’s TMS replacement project to develop a better understanding of the problems that occurred during the deployment of the new transportation management system and explore what can be learned and applied to future system implementations.

Relevance of the Project

SAP AG is currently the leading supplier of enterprise resource planning system and supply chain management system software globally (Datamonitor, 2008a). At the time, its transportation management system, especially the Event Manager module, was a fairly new system that was not yet in wide usage.

As such, there was an opportunity to learn much more about this transportation management system and to apply that knowledge to other system implementations, upgrades, and enhancements.

Since the system upgrade and TMS replacement project, BBC Company has merged with another company and has begun plans to develop an SAP system design to support the new expanded company structure. The new organization could potentially benefit from the findings provided by this case study.

BBC Company has conducted benchmarking with other consumer goods companies in the past. Other organizations considering an upgrade or replacement of a transportation management system with the SAP platform could potentially utilize any knowledge gained from this case study to prevent some of the same issues that BBC Company experienced.

Barriers and/or Issues

The primary barrier encountered with this case study was the availability of the technical resources for further, in-depth exploration or explanations of the causes related to the problems that occurred during the transition of the TMS applications from the test environment to the production environment. The primary technical resource leading the development of the Event Manager module, a consultant, left BBC

Company at the end of the production support phase to work with a different company on a new project. While he did participate in an interview, the depth of the information obtained was limited by the short duration of the interview. Other technical resources, who were project participants, were largely unavailable for extensive interviews and explanations. Many of the resources exited the company after the project. Some were reassigned to new projects related to the company's merger. Most of those who were reassigned were immersed in their new work responsibilities with limited time to participate in a case study.

The personal nature of each person's role and experience related to the USEvolve and the fact that there were some challenges associated with the TMS replacement implementation presented another potential barrier to finding the true root cause of many of the issues. It was known that this case study would be influenced to some degree by subjectivity.

Questions to be Discussed or Answered

There were a number of questions to be answered through this case study in relation to the TMS replacement project. What caused the dysfunction in the TMS deployment? Why did the TMS production version differ from the test version and the training provided to the users? Why did it take so long to resolve many of the issues? Were the issues a result of business requirements that were either not defined or poorly defined? If there were business requirements that were defined but were not delivered, what were the reasons? What can be learned from the issues encountered with this system implementation that can be applied to future system implementations to prevent similar problems?

Scope of Case Study

The BBC Company's USEvolve project included an upgrade of its SAP legacy modules R/3 ad APO. The project also included replacing the Manugistics legacy TMS with SAP's TPVS and EM modules. While there were some issues associated with the upgrade as a whole, the focus of this case study was on the transportation management portion of the system. The author's involvement with the project was related to the transportation management system.

Figure 1 is a high-level representation of the BBC Company's functional architecture related to the transportation management system and SAP prior to the system change.

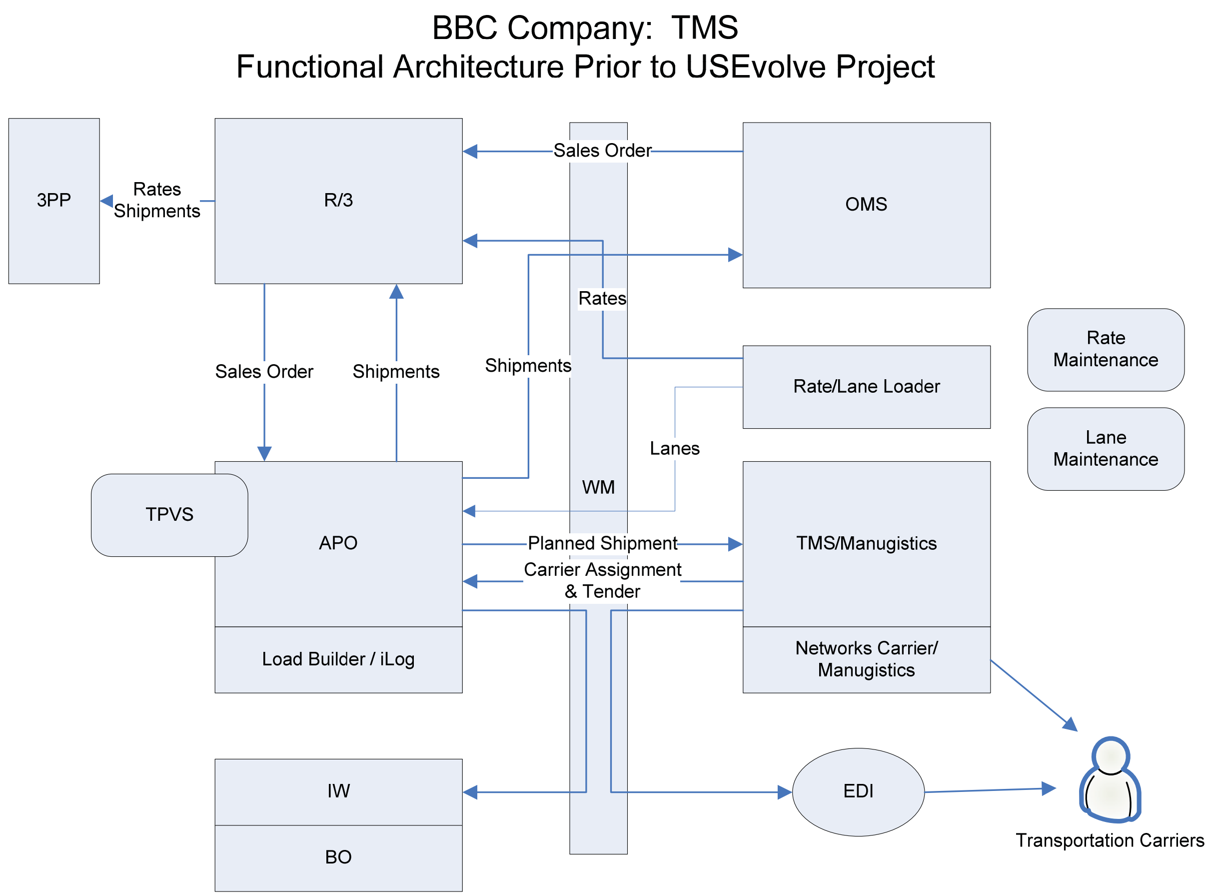

Figure 1. BBC Company: TMS Functional Architecture Prior to USEvolve Project

Source: BBC Company Documents

Figure 2 below incorporates the changes from the USEvolve project to show the functional architecture of the SAP applications that replaced the Manugistics TMS and the rate-and-lane-loader application.

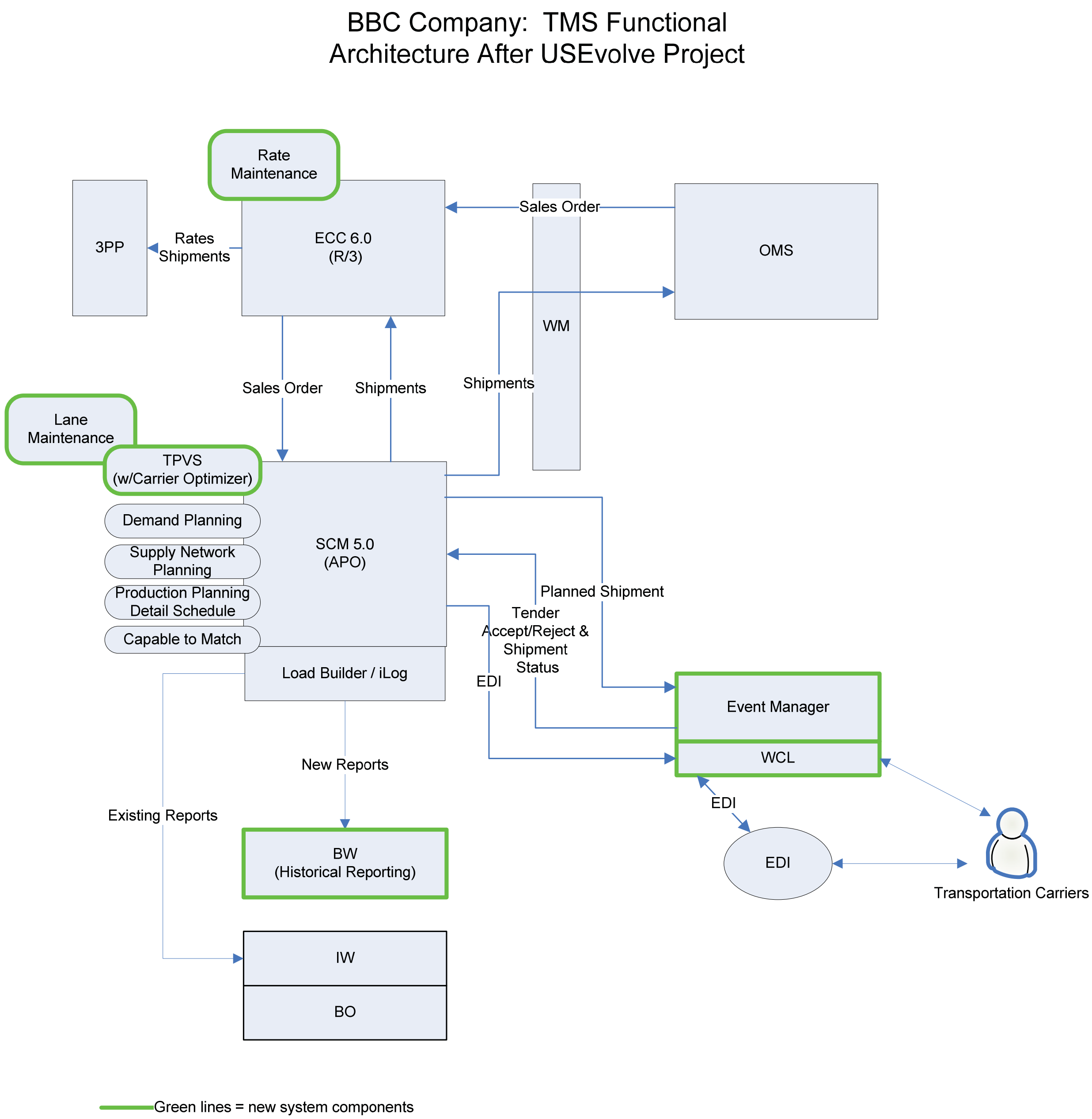

Figure 2. BBC Company: TMS Functional Architecture After USEvolve Project

Source: BBC Company Documents

While USEvolve included an Oracle system upgrade and the upgrade of the SAP Business Warehouse (BW) along with additional reporting capabilities, the case study scope concentrated specifically upon the transportation management functionality.

Figure 3 depicts the high-level scope related to this case study.

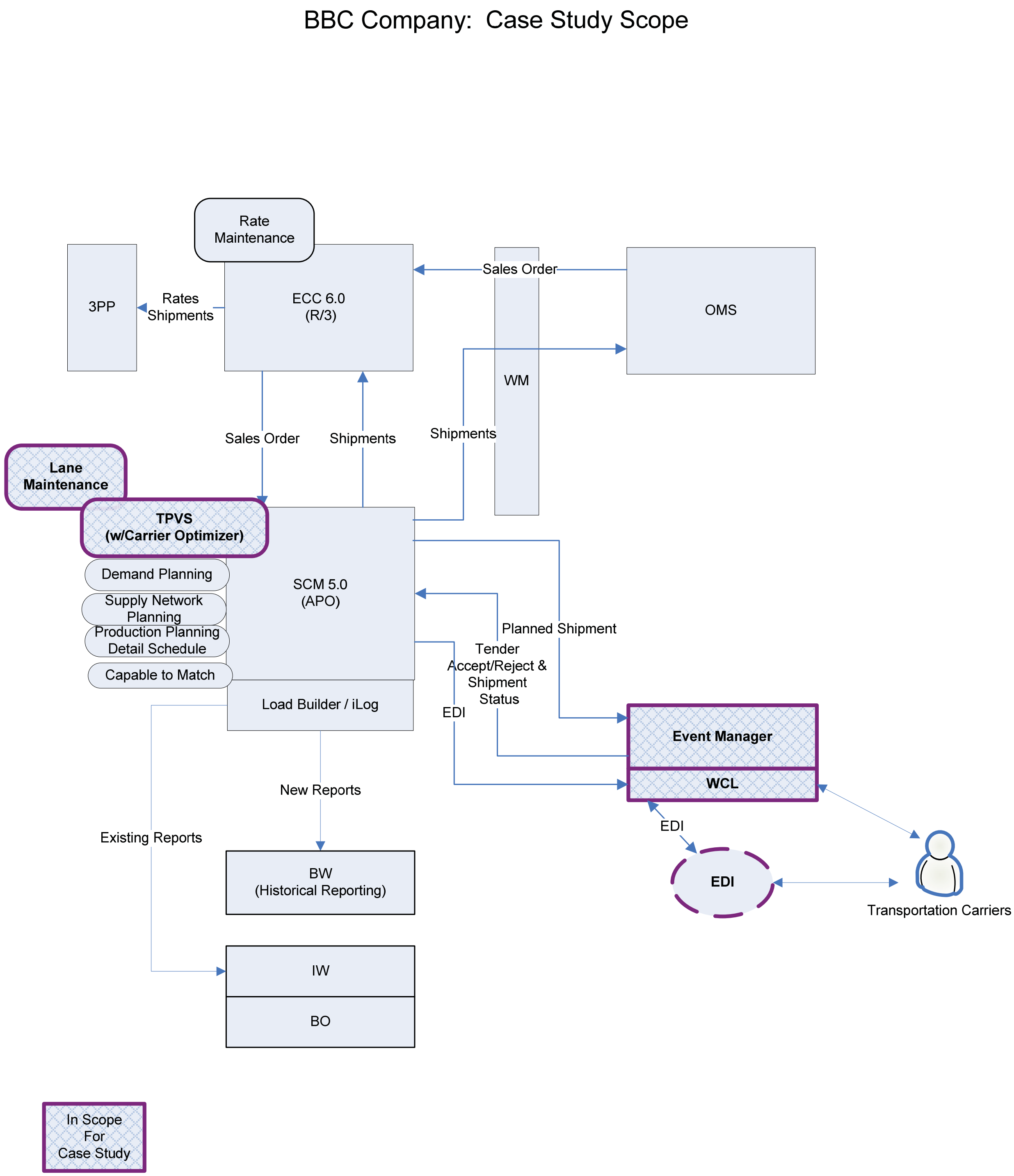

Figure 3. Scope: Case Study, BBC Company USEvolve Project

In an effort to narrow the focus of the case study for manageability, some of the TMS functionality was determined to be out of scope. The freight rate maintenance functionality was excluded from the scope of this study even though the rate master data was a critical TMS system component and the automated rate loading was problematic during the deployment of the system. The Business Warehouse and reporting functionality was also considered out of scope.

Reverse logistics, shipments of returnable dunnage and reusable packaging materials, were another component that was considered beyond the scope of this study because the system design was significantly different than the design for outbound finished goods shipments. The design decision for reverse logistics shipments was required to support the legacy front-end Web tool that was utilized by BBC Company's customers.

Other system modules and applications that were excluded from the scope of this case study included the interfaces, middleware, the yard management system (YMS), and the third-party payment process. Some of the issues related to EDI transactions were reviewed in this study, although not at a technical, in-depth level. The EDI component of this project could have been the subject of a separate case study.

Time was also a defining factor related to the case study scope. This case study was limited to the issues reported from the go-live date, March 3, 2008, through the six-week production support phase and through the definition of the TMS enhancement phase.

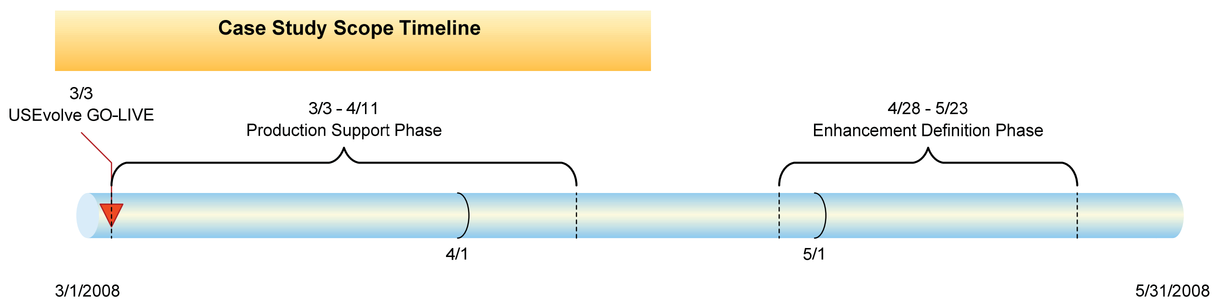

Figure 4. Case Study Scope Timeline

Definition of Terms

Several key terms have been used throughout this paper are defined below. Appendix A contains a list of additional terms used in this paper.

Term	**Definition**
SAP AG	software company that produces enterprise resource planning and supply chain planning software, e.g., ECC(R/3); SCM(APO); SCEM(EM); WCL
TMS (in context of this paper)	transportation management system; system used to plan and manage the distribution of finished goods to wholesale customers and the return of reusable packaging materials

	and dunnage, the items used to protect the finished goods during shipment.
R/3 & ECC	Both terms refer to the SAP enterprise resource planning (ERP) module that is used for financial management and business execution. ECC is the upgraded name for R/3.
SCM & APO	Both terms refer to the SAP planning module that is used for planning production and transportation carrier optimization. SCM is the upgraded name for APO.
TPVS	SAP Transportation Planning and Vehicle Scheduling application; part of the SCM/APO planning module
SCEM	SAP Supply Chain Event Management; used interchangeable with the term EM and Event Manager
EM	Event Manager; refers to SAP's SCEM
Event Manager	refers to SAP's SCEM
WCL	SAP Web Communications Layer; refers to the Web interface that sits on the SAP Event Manager
SAP Enterprise Portal	front end of the SAP NetWeaver platform
SAP NetWeaver	serves as an integration layer that can host business applications

Throughout this paper, several terms have been used interchangeably:

- R/3 and ECC refer to the execution module of the SAP architecture
- APO and SCM refer to the planning module of the SAP architecture

- SCEM and EM both refer to the Event Manager system

Chapter Review

The purpose of this paper was to analyze the issues that were encountered with the new transportation management system that was implemented by the BBC Company in March 2008, to develop a better understanding of the causes associated with those issues, and to determine if there were findings that could be applied to future BBC Company projects or to system implementations in general.

Although USEvolve included upgrades associated with multiple SAP modules, the scope of this paper was limited to the replacement transportation management system that included TPVS, EM and its Web Communications Layer (WCL). Issues related to the EDI transactions were included in the analysis as they related to the transportation carriers but were not analyzed at a technical level. Because the system design for reverse logistics shipments was significantly different than the system design for finished goods shipments, reverse logistics were not included in this study.

CHAPTER TWO: REVIEW OF LITERATURE AND RESEARCH

Overview of All Literature and Research on the Project

The research in conjunction with this case study encompassed many different forms. Formal literature review was conducted related to the subject of qualitative analysis, specifically focused on the grounded theory approach to case studies. Other literature reviews included life-cycle methodologies such as the waterfall and iterative methodologies, project management, SAP AG and its systems, and the BBC Company.

The BBC Company's intranet provided much of the information related to the company's objectives, organizational structure, program and project management processes, and details related to the USEvolve project. Research related to the SAP AG and its system components included the company's Website, books written about the company's system, presentations made by SAP to the BBC Company, a Webinar, system documentation, and a training class related to the TPVS functionality. Interviews with system developers and a key business user associated with USEvolve were also utilized. Knowledge developed as a result of the Regis MSCIT program and personal experience from USEvolve and other previous transportation management system implementations was also applied to this case study. The Project Management Institute's third edition of the *PMBOK Guide* was consulted for the project planning and the project management of this case study. Research related to the American Psychological Association's (APA) writing style guidelines was also conducted. It included a workshop conducted by Regis University and consultation of the *Publication Manual of the American Psychological Association.*

Literature and Research Relevant to the Project

Grounded Theory and Case Study

Grounded theory is a qualitative case study research method originally developed by two sociologists, Barney Glaser and Anselm Strauss, and published in 1967 in their book, *The Discovery of Grounded Theory (Traverse, 2001)*. According to Myers (1997, Grounded theory section, para. 1), "Grounded theory is a research method that seeks to develop theory that is grounded in data systematically gathered and analyzed." It is characterized by an inductive, iterative approach that Glaser and Strauss termed the "constant comparative method" (Gorman & Clayton, 2005).

Qualitative research evolved from the social sciences and is research related to social and cultural phenomena in comparison to quantitative research which evolved from the natural sciences (Myers, 1997). Quantitative researchers use numeric methods and generally use deductive reasoning, meaning the research begins based on a general hypothesis that must be proven through the research details. Qualitative research generally reviews specific data to gain understanding of the relationships and generalizes from the details (Scholz & Tietje, 2002). Qualitative research can use a number of different methods for conducting research related to a phenomenon. Myers (1997) categorizes the qualitative methods as 1) action research, 2) case study, 3) ethnography and 4) grounded theory. The method helps to determine the research design and the way the data is gathered (Myers). He suggests that grounded theory is a useful method of research, especially in information systems, because it is "extremely useful in developing context-based, process-oriented descriptions and explanations of phenomenon" (Grounded theory section, para. 2).

White (2000, p. 110) explained grounded theory in the following manner, "Qualitative research . . . should not simply describe a situation, but look for explanations and analyses, and at all levels a search should be made for generalizations or theories to explain and understand the topic being investigated. These generalizations or theories should, therefore, emerge or be 'grounded' in the empirical research. . . . Implicit in the process is that the researcher constantly looks back and reflects, and as a result refines the theory against new research findings."

According to Yin (2003b, p. 1), "case studies are the preferred strategy when 'how' or 'why' questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context." He stressed the importance of developing "preliminary concepts" or theories at the beginning of the research to help define the "unit of analysis," and the relevant variables to determine the data to be collected (p. 3).

Yin (2003a, p. 5) points out that "the term theory covers more than causal theories. Rather, theory means the design of research steps according to some relationship to the literature, policy issues, or other substantive source."

Grounded theory is characterized by specific processes that differentiate it from other research methods. Bryman and Bell (2003) outline the processes utilized in grounded theory research beginning with developing the research question as the first step, followed by theoretical sampling, data collection, and data coding. This in itself is not particularly different from other research methods; however, the iterative nature of this method does differentiate it. Different processes can be conducted in parallel with other processes, processes can move constantly forward and backward in the four steps outlined above conducting a constant comparison of indicators and concepts. The comparison results in the generation of categories (Bryman & Bell).

Bryman and Bell described the outcomes in grounded theory as concepts, categories, and hypotheses. Concepts are "labels given to discrete phenomena" and are the result of an open coding process (p. 429). A category is a higher level of abstraction than a concept, "a concept that has been elaborated so that it is regarded as representing real-world phenomena" (p. 430). They define hypotheses as "initial hunches about relationships between concepts" (p. 431). Other coding methods called axial coding and selective coding are also utilized in grounded theory (p. 429).

Pandit (1996, Data analysis phase section, para. 5) describes the coding processes as follows, "Whereas open coding fractures the data into concepts and categories, axial coding puts those data back together in new ways by making connections between a category and its sub-categories." He said, "Selective coding involves the integration of the categories that have been developed to form the initial theoretical framework" (para. 6).

Qualitative research has been criticized as being too subjective and lacking rigor. Because it often involves a single phenomenon or a small number of cases, some believe it does not provide reliability nor allow for generalization based on the findings ((University Of Texas, 2008). Stake (1995), in his book, *The Art of Case Study Research*, acknowledges that subjectivity does influence qualitative research:

> There is no particular moment when data gathering begins. It begins before there is commitment to do the study: backgrounding, acquaintance with other cases, first impressions. A considerable proportion of all data is impressionistic, picked up informally as the researcher first becomes acquainted with the case. Many of these early impressions will later be refined or replaced, but the pool of data includes the earliest of observations. (p. 49)

Research design is a critical component in overcoming the criticism. The research design should incorporate the research objectives, the methodology to be used in the research, the data collection and data analysis to be used and how the data will be managed (White, 2000).

White (2000) indicates that planning in the design phase is critical to establish validity and reliability. Validity is related to whether the research design fully supports the research questions or objectives and reliability is related to consistency in the research and whether another investigator would be able to develop similar findings based upon the research design.

Triangulation was reported by Yin (2003b) to be an important concept related to validity and reliability. He suggested that using multiple sources of data or using more than one observer or interviewer in a research project were methods that could be incorporated to triangulate or validate the data while providing greater objectivity.

Yin (2003b) outlined the following as the six most commonly used sources of evidence in qualitative research: 1) documentation, 2) archival records, 3) interviews, 4) direct observations, 5) participant-observation, and 6) physical artifacts. He pointed out that using more than one source of evidence provides a form of triangulation.

BBC Company Research

An overview of the company, its business and IT organizational structures and project methodology will be reviewed to provide some context for this case study. Much of the information related to the BBC Company was obtained from the company's internal documentation, most of it found on the internal portal. Additional research included *Datamonitor* company and industry profiles and a case study published in a credible information systems journal related to the BBC Company's portfolio project management structure and process. The case study referenced above was co-authored by two BBC Company employees, an IT strategy consultant, and the head of an information technology department at a reputable university. It outlines BBC Company's project portfolio management structure and methodology. It also includes a high-level analysis related to the BBC Company's maturity model.

Information from these sources was utilized but the specific details related to the source are not shown in the reference section of this paper in order to maintain the anonymity of the BBC Company.

Overview

Datamonitor (2008b) reported that BBC Company ranked in the top ten among consumer goods manufacturers in its industry segment with annual revenue in 2007 of $6.2 billion. BBC Company employed nearly 10,000 people in its three divisions located in the United Kingdom, Canada and the United States. Its headquarters are located in the United States.

BBC Company was considered strong financially and competitively from both a market position and a brand portfolio position (Datamonitor, 2008b). Mergers and acquisitions have been prevalent in the industry and the trend toward consolidation is expected to continue (Datamonitor).

Organizational Structure

The BBC Company was structured as a global enterprise led by the global chief executive officer (CEO). Reporting to the global CEO were the CEOs from each division and the global chief information officer (CIO). A global program management office (GPMO) reviewed all of the organization’s IT and business projects to ensure there was alignment with the company’s strategic goals, to provide standardized processes across the organization, and to coordinate projects to capture synergies. The GPMO reported to the global CIO.

Each division was organized with a CIO, chief strategy officer (CSO) and a chief financial officer (CFO) reporting to its CEO. Each of the three areas had its own program management office (PMO) respectively — information technology (IT) PMO, product PMO, and finance PMO. The three different functional groups formed a divisional PMO. Across the three divisions, each functional area acted as a center of excellence (COE) providing a global methodology for its area. For example, the global IT methodology provided a framework for all IT projects. It defined the organizational roles and provided standardized templates that could be adapted to each project. Each division had an executive steering committee comprised of the "chief" level leaders across its division. The role of the steering committee was to review and prioritize IT projects. It was also responsible for approving funding for IT expenditures and resolving conflicts that were escalated to that level.

All projects throughout the enterprise followed a five-step stage-gate waterfall methodology. Each stage was required to be completed, and then reviewed and approved by the appropriate management before the project could move to the next phase. The involvement of the financial PMO varied depending upon the amount of the expenditure associated with the project. All projects that exceeded $1 million are considered capital projects and required a more rigorous financial methodology. Metrics related to the project's schedule, cost, scope and risk were utilized throughout the project and were published using a dashboard to visually depict the status of a project at any time. At the end of each project an evaluation was conducted based on the metrics established early in the project. It was rated as having been delivered on target, above target or below target. Project methodology will be discussed in further detail later in this chapter.

A project steering committee, made up of the appropriate business and IT leadership, provided guidance to the project team and resolved issues associated with that project. Issues that had broader company implications were escalated to the executive steering committee.

Projects were generally initiated by a business unit through its IT business partner. The business partner's role was a position that was established as a liaison between the IT organization and the business. Each business partner was knowledgeable about an area of the business and its associated technology. The business partner reviewed business requests, established the business requirements and developed a business case. The business case estimated the timeline and cost associated with the planning and analysis phase of the project as well as the resources required. The business case was submitted to the technical review board for an architectural review and for resource planning. Once the business case was reviewed and accepted by the technical review board, it was submitted to the operations committee, composed of the CIO's direct reports, for approval. Once it was approved by the operations committee, the business case was then reviewed and prioritized by the executive steering committee. A global architectural review board reviewed all business cases approved by the executive steering committees to ensure they met the enterprise architectural standards and fit any longer-range planned changes.

The IT organization was characterized primarily as a matrix organization. Some activities such as SAP configuration and architecture were centralized; however, most of the IT organization had dual accountability to both IT and a business unit. BBC Company employed a limited number of people in the leadership area of the IT organization. Through a strategic partnership agreement with EDS, most of the IT services for projects and day-to-day IT support requirements for BBC Company were provided through the EDS organization. Other IT consultants were also hired as necessary to fulfill a specific technical need.

Project Methodology

As discussed earlier in this paper, all BBC Company projects followed a 5-step stage-gate waterfall method in which one stage was required to be completed and approved prior to moving to the next stage. The project life cycle included all project management activities and deliverables. Projects involving system implementations also included and followed a similar traditional waterfall systems development life cycle (SDLC) with the following sequence of activities: (a) planning, (b) analysis, (c) design, (d) implementation, and (e) support (Whitten 1998). The support or maintenance phase included continuous improvements which eventually lead to the process starting again. In general, BBC Company maintained an n-1 strategy related to the versioning of its systems.

Change Control Governance Process

Changes to the BBC Company's systems, whether in the production environment or in association with a project, were required to be processed using the change control governance process. Change requests in general were tracked using Peregrine software. The Change Control Board met regularly twice a week to review change requests or as needed if emergency situations arose. Any change request that involved a project scope change had to be approved by the steering committee.

Most changes were required to be made sequentially, first in the DEV environment and then the QA environment. If testing was successful, the change was moved into the production system. Some changes were made directly in the production system. For SAP changes, called transports, the changes were managed through a toolkit called the Transport Management System (SAP TMS) — not to be confused with the transportation management system implementation that is the subject this case study. "A transport request is a container of objects that contain objects (ABAP programs, screens, menus, texts, messages, table definitions, or structures) or configuration data (Sens, 2008, 4.5.1 Transport activities section, para. 2)." The system tracks changes to objects and configuration so the change can be managed and moved to the next system in the SAP landscape (Sens).

Distribution Network

The replacement TMS, which is the focus of this case study, was to support the U.S. Division's distribution requirements, so it is important to understand the BBC Company’s distribution network.

Two manufacturing facilities, one located in the eastern portion of the U.S. and one located in the western area of the U.S., produced and packaged finished goods for distribution within the Unites States and to a few export locations including the Puerto Rico and Caribbean area.

There were approximately 600 wholesale customers that received products either directly from a manufacturing plant or indirectly through a distribution center depending upon the volume and the mix of products that were ordered. BBC Company used a segmentation model to determine, by customer, where each product would be sourced and the mode that would be used to ship that product. Customers submitted a weekly order for products to be shipped the following week from a plant or a distribution center.

Shipments to customers within the U.S. were managed by the BBC Company, and could be shipped to a customer via rail, truck or intermodal modes depending upon the location. Export customers had different shipping terms and the product was shipped via ocean. Export customers were out of scope for this study.

A few customers received shipments via a cross-dock. In this case the products were shipped via rail to a facility that unloaded the railcar and transferred the product immediately to trucks for delivery. This shipping method provided cost savings associated with the rail mode to customers that did not have rail receiving capabilities. Multiple stop shipments were sometimes sent to customers that had less-than-truckload (LTL) order quantities.

All of the transportation lanes from an origin shipping location to a customer destination were contracted with transportation carriers. Specialized transportation equipment was required for certain products to protect the product in transit. Lane assignments to carriers included the types of equipment that was required. There was more than one carrier and more than one equipment type assigned to a transportation lane.

USEvolve Project

Documentation related to the USEvolve project was stored on the project's official SharePoint site and was utilized as the primary source of information regarding the overall project and the replacement of the TMS specifically. Additional information related to the project was derived from emails, meetings, conversations with various resources, and interviews with system developers and one of the primary business users.

The following section provides high-level background information related to the USEvolve project to provide context for the case study. The project was much more complex than can be covered in this paper.

Project purpose and background.

Project Evolution was initiated to upgrade the BBC Company's SAP systems in each of the organization's three business divisions to improve overall functionality and to ensure the version being utilized was supported by SAP. The U.S. Division's project, USEvolve, also included the replacement of the legacy transportation management system with the SAP platform. The legacy TMS consisted of an older, unsupported version of Manugistics NetWorks Transport and NetWorks Carrier.

At the time USEvolve was initiated, APO had been in place for over five years, was four releases behind the current version, and the functionality was no longer adequately supporting the business in the areas of demand planning and supply planning. The business had begun to use solutions outside the SAP system. Manugistics was the legacy TMS system in place, and the version had not been supported for three years. The total cost of ownership of this application was high.

The upgrade of R/3 4.6c to ECC 6.0 was organized as a separate work stream from the APO upgrade and TMS replacement components of the project. The data warehousing and reporting aspects of the project were also organized as separate work streams. For the purposes of this case study, USEvolve focused primarily on the TMS replacement but also included some references to the APO upgrade portion of the project to provide some background and additional context related to the overall scope.

The overall project, Project Evolution, aligned with and supported the corporate goals of improving profitability throughout the supply chain and by helping to better position BBC Company for a potential merger by providing a viable, scalable system infrastructure. The BBC Company leveraged its project synergies by combining the regression testing for APO and R/3 and coordinating a single go-live among the divisions. The combined effort resulted in overall dollar savings, reduced the total amount of time required for the project, and set the infrastructure for seamless integration between systems. Savings resulted from having one project manager, one steering committee and one go-live effort. While there were efficiencies gained overall, the APO upgrade and, consequently, the TMS replacement project had to be extended and incurred some additional costs because some of the same resources were required for the R/3 project work stream. The coordination effort began after the U.S. division's project had begun.

Costs and benefits.

The total cost of the APO upgrade and TMS replacement portion of the USEvolve capital expense project was $4.2 million, approximately $1 million more than the original estimate. Most of the additional cost was labor cost incurred for project resources. Throughout the project, the scope was not expanded; however, the schedule was extended first to coordinate the go-live date for all of the work streams and later to allow for additional testing and defect resolution. The initially planned February, 2008 go-live date was later extended by two weeks.

Benefits identified with this project included net operational savings from the retirement of the Manugistics TMS system, a reduction in the number of servers required, and a reduction in the number of Oracle instances required. The estimated payback period was 10-11 years.

Other opportunities from the project included reducing the architectural complexity, eliminating interfaces between Manugistics to and from each of the SAP modules, reducing the number of vendors, and consolidating the licensing fees and system maintenance with one preferred vendor—SAP.

TMS alternatives.

According to the USEvolve business case, four alternatives were considered related to the TMS system:

1. upgrade Manugistics TMS to the current software version
2. conduct an request for information (RFI) or a request for a proposal (RFP) for a different replacement TMS software package
3. continue with the current Manugistics TMS software package and move to a "life-support" system, such as the PeopleSoft application
4. replace the Manugistics TMS system with APO functionality

The IT organization’s goals included reducing the number of different applications supported and moving to a simpler architecture. Its recommendation was to replace the Manugistics TMS with the SAP APO functionality. That solution was adopted and implemented. Timing was a critical success factor and was identified as a risk associated with the selected TMS solution. The solution needed to be implemented in the first quarter of 2008 to avoid having to adopt the “life-support” solution. That option would have resulted in significant custom coding for new interfaces from Manugistics to SCM and ECC, and the project’s net operational benefits would not have been fully realized. To meet the timeline, the TMS solution scope was limited to a like-for-like functionality. No additional functionality was allowed to be implemented even if it were available.

A request for proposal (RFP) process was ruled out due to the time constraints associated with the project and the timing of the upcoming busy season in relationship to implementing a new TMS solution.

New technologies associated with TMS solution.

The new TMS solution utilized three new SAP system applications--Event Manager, WCL and the enterprise portal (EP). All were new technologies to the organization that required technical resources with specialized skills and knowledge. The technical skills required included SAP Basis, SAP ABAP and Java programming.

SCEM 5.0 (EM) was the event management functionality contained within the SCM 5.0 software. Event manager could have been configured in many different ways and could have been used for many different purposes. It is designed to provide visibility to a supply chain process, usually with an organization's trading partners, that requires monitoring by measuring a sequence of expected events against the actual event status and providing defined alert notifications if the actual event is not reported or an unexpected event occurs, thus allowing for management by exception. The information related to the planned and actual status, called an event handler, is interfaced to the BW repository for reporting and performance measurement (SAG AG, 2005).

BBC Company implemented EM as a communication tool to monitor the transportation process, tracking the status of a shipment from the time it was created until it was delivered to the customer. Transportation carriers, through the WCL or EDI transactions, received a shipment tender that provided the expected events such as when the shipment was expected to be loaded and when the shipment was expected to arrive at the destination. Other business rules or contractual service standards defined some of the other expected events. For instance, an acknowledgment from the carrier either accepting or declining the tender was expected within a defined time period.

When an event did not occur, an alert was sent to the appropriate people.

SAP EM had standard content that was configurable for customized events, statuses, and business rules. It interfaced to ECC and to SAP NetWeaver BI, the business intelligence reporting application. WCL was the user interface that provided visibility to a shipment's status for both carriers and internal transportation planners (SAG AG, 2005). The version implemented by BBC Company was not a NetWeaver application, but a one-off SAP application utilizing Java 2 Enterprise Edition (J2EE) that only worked with SAP Event Manager. According to the SAP documentation for the configuring the WCL application, "It is based on two development components: program code (Java classes) and user interface (JSP pages)" SAP AG (2008, p. 6).

The enterprise portal was used as an authorization pass through for both the Event Manager and the business warehouse (BW) for user access. The portal also utilized Active Directory (AD) to authenticate users for single sign-on (SSO). An overview of the transportation processes will be covered later in this chapter.

Impact to the organization.

The departments that were primarily impacted by the USEvolve project included Supply Chain Planning, Customer Service and Logistics/Transportation. Enhanced demand planning capabilities to support the high-volume season planning requirements were to be delivered to the Supply Chain Planning department via the APO upgrade. Their key work processes had been addressed, but the impact to this group was limited. The TMS solution required a conversion of all transportation processes from the Manugistics solution to the SAP TVPS and SAP EM TMS solution. Transportation processes identified included the automated assignment of carriers to shipments, tendering and communication of shipment information to carriers, receiving shipment acknowledgements and status updates from carriers, planning multi-stop shipments, handling cross-dock shipments and communicating with the third-party payment (3PP) vendor. The 3PP process is handled in the ECC system, so it is out of scope for this case study.

According to the project documents, USEvolve required work process analysis, process re-designs, integration activities, system configuration and technical changes to support the work processes in the new version.

Transportation planners, the primary TMS internal business users, required training in the new work processes associated with using TPVS to assign carriers and equipment to planned shipments, to make carrier and equipment changes to shipments in both TPVS and ECC prior to the actual loading and departure of the shipment, and to monitor shipment status in TPVS and EM. Other BBC internal users from the customer service department and the manufacturing scheduling department also required training on new work processes related to creating, changing and deleting shipments.

Transportation carriers, the primary external TMS users, required training too. Carriers either exchanged information electronically via EDI or through the Web interface. Those carriers that utilized the Web interface required training to access the SAP portal and to use the WCL to accept or reject their shipment tenders and to submit shipment status updates such as “arrived at destination” notifications. Minimal changes were made to the EDI specifications related to the new system. Carriers that utilized EDI were required to make the changes in their systems and test the transactions prior to the planned go-live date.

USEvolve project organization structure.

Members of the USEvolve management team responsible for the APO upgrade and TMS replacement included the following roles:

- Business Partner Owner
- IT Solution Delivery Lead
- Project Sponsor

- Business Partner
- IT Lead
- Project Manager
- Lead Architect

Detailed descriptions of the responsibilities associated with these roles can be found in Appendix B. Because the project crossed the company divisions, in some instances, such as the project manager role, the same person fulfilled the role for the larger project scope.

The USEvolve steering team was comprised of the vice president of operations, general managers from each manufacturing facility, the business partner owner, the IT solution delivery lead, the project sponsor, the director of logistics (TMS system owner), the APO IT lead, and the R/3 IT lead.

The APO IT Lead was responsible for the entire APO solution, which also included the replacement TMS. Technical IT resources made up that team. Initially, there were two developers assigned to configuring the Event Manager and WCL. One, known as EM Dev1, was a BBC Company technical resource. The other, EM Dev2, was a consultant hired for this role. EM Dev1 had additional responsibilities related to the upgrade. Coding changes were being made to the Load Builder application to remove custom coding for functionality that had become available in APO. The Load Builder IT Lead (LB 1) was a BBC Company employee. There were two technical resources assigned to the Load Builder work. One (LB Dev1) was an EDS production support resource and the other was a consultant (LB Sup1) from iLog, the LB supplier.

At different times during the project, especially pre-go-live and post-go-live, additional resources were hired or assigned to the project. Other technical support teams including Basis, ABAP, Security, Testing, Change Management, and Training provided resources as required.

On the business side, subject matter experts (SME) representing different process areas including demand planning, supply planning, production planning and detailed scheduling and transportation participated in the project. For most of them, the role primarily involved user acceptance testing. The transportation representative had a larger role to assist defining the business requirements and ensuring the technical solution met the business needs. In September 2007, the transportation business representative left BBC Company and another resource was assigned. As the project progressed, more of the business users were involved in reviewing the design, assisting with transportation master data setup, and testing. Training classes for the external transportation carriers were conducted by a few of the business users. Classes to train internal business users were also taught by business representatives from the Logistics department. There were approximately 100 external transportation carrier users that were trained initially. The business users were primarily from the Logistics department; however, users from the other APO business processes were also trained in the new TMS functionality.

Project schedule.

The initial timeline for the USEvolve project was planned as a seven-month project beginning in February 2007, placing the go-live date in late September. See Figure 5 below.

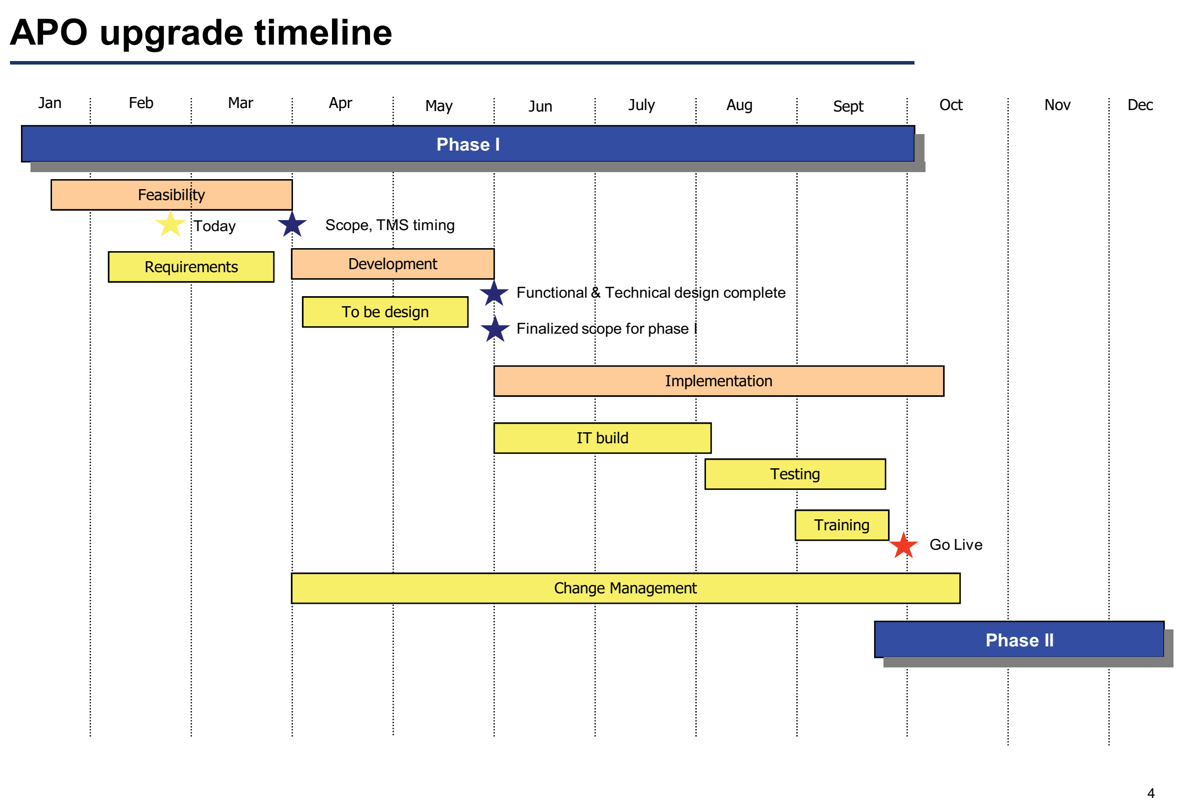

Figure 5. APO Upgrade Timeline

Source: BBC Company Documents

This plan coincided with the BBC Company's high-volume season which precluded the required level of business user involvement in the project. As a result, the project go-live date was extended until mid-February, 2008. It was determined that the project either had to be implemented by the third week in March 2008 or that it would have to be postponed until the end of the peak season, sometime after September.

The company's Program Management Office recommended combining R/3 and APO upgrade project management activities within the umbrella project, Project Evolution, in order to create synergies and congruity across the organization while reducing the overall project costs. Subsequently, in May 2007, a single project manager was assigned to ensure consistency throughout the enterprise and to leverage synergies such as combining the regression testing, the go-live activities, and the production support following the cutover. As a result, the project was managed as a program and the U.S. Division funded its portion of the overall project. Each division still had its own team resources and managed its overall local system landscape. USEvolve also had a separate project plan and project team with technical resources to support the U.S. Division’s specific APO and TMS requirements.

Following is the planned schedule for the overall project that was published in October 2007 (Figure 6).

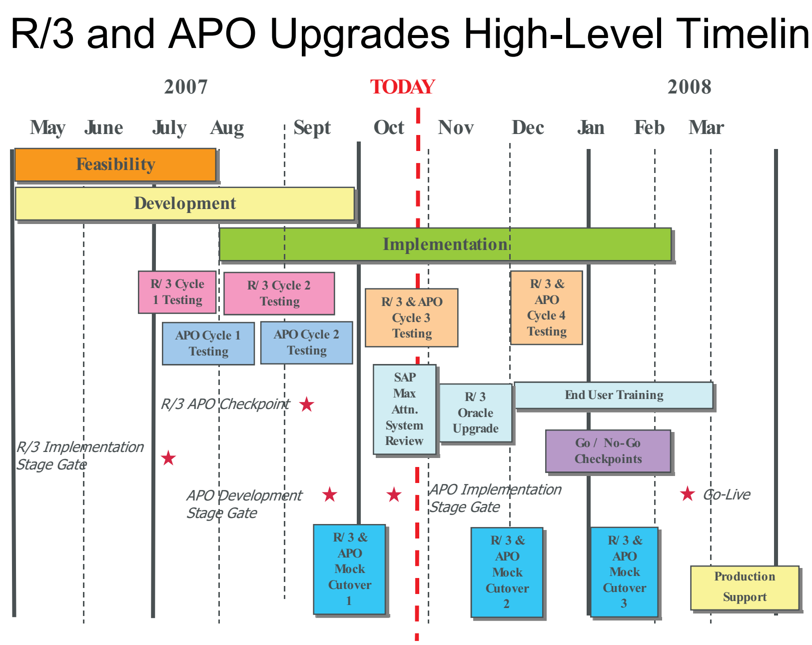

Figure 6. R/3 and APO Upgrades High-Level Timeline

Source: BBC Company Documents

The development stage in this timeline overlapped with the feasibility and implementation stages, which was not consistent with the project methodology. The overlap was probably created as a result of combining the upgrade efforts for the two modules across the organization.

In January 2008, business users from all of the functional areas raised concerns regarding the limited amount of testing that had been had been successfully completed. Issues with the Load Builder functionality had delayed end-to-end testing, and TMS processes were dependent upon the Load Builder in order test. TMS users were extremely uncomfortable with the new system. The project was extended approximately two weeks with the new go-live date of March 3, 2008.

TMS solution overview.

This section will cover some high-level information related to the TMS solution including a description of the weekly transportation process from the planning stage through the execution phase and finally the reporting phase. Figure 7 depicts the flow of the data.

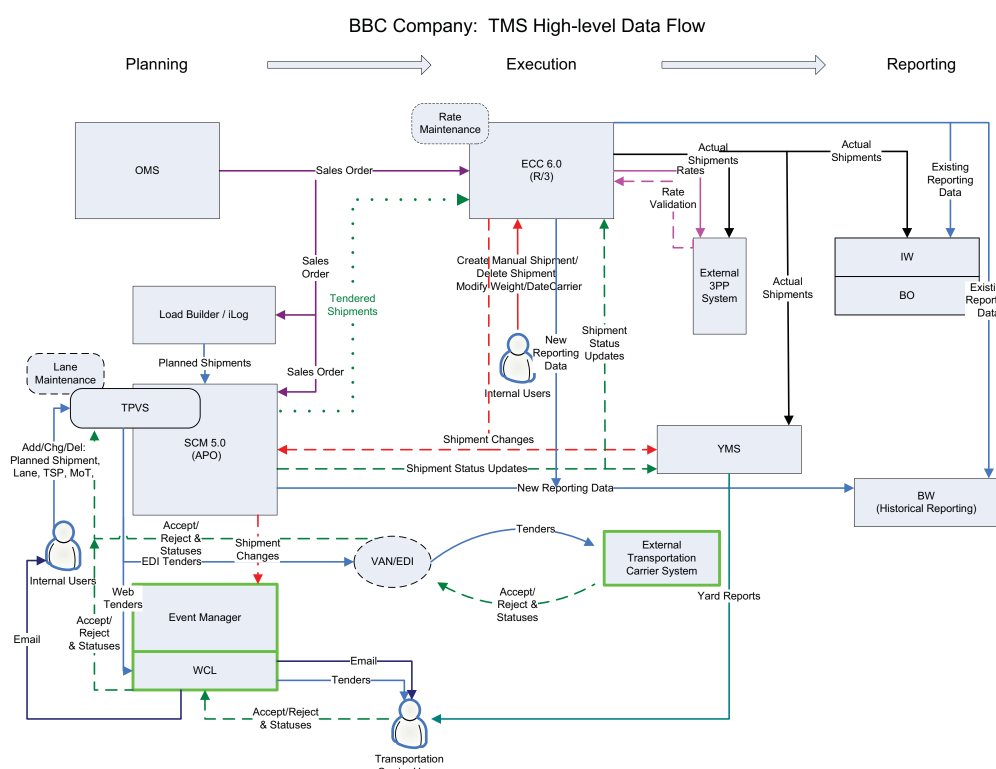

Figure 7. BBC Company TMS High-Level Data Flow

Weekly Planning Process: Each week wholesale customers submit their orders on Monday for products to be shipped the following week. Tuesday, the weekly planning process is initiated. Upstream processes from the transportation planning activities follow a planned sequence beginning with the demand planning (DP) process followed by the supply network planning (SNP) process and the production planning and detailed scheduling (PPDS) process. The result is passed to TPVS and the Load Builder in a shippable subset of the customer's order. Load builder performs a shipment optimization process for each shipping origin. A shipping origin can include a manufacturing plant, a distribution center or a contract manufacturing location. It uses the transportation lane master data in TPVS to determine the appropriate transportation mode and equipment to be assigned based on the product inventory availability and the production schedule, then builds planned shipments that have been optimized for the best solution. Different parameters can be applied to the optimization to test different scenarios.Once the solution is released, planned shipments are available in TPVS.

Transportation planners then perform a carrier optimization process. If the transportation lane data is set up correctly with the desired transportation service provider (TSP) and means of transport (MoT), the results of the carrier optimization require very little, if any, manual adjustment. Once the transportation planner is satisfied with the results of the carrier assignments, the planned shipments are released in TPVS. The release triggers the tendering process to the transportation service providers and the tendered shipments are interfaced to the Event Manager and the WCL in a “new tender” status. The shipment information along with the scheduled ship date is interfaced back to the order management system as information for the customer.

Transportation service providers who are configured to receive EDI transactions receive an EDI 204 transaction for each shipment. All carriers receive an email notification for each tender. Transportation service providers that are not EDI enabled can access their shipment tenders through the WCL. They can accept or decline a shipment tender using the WCL functionality. EDI carriers then return an EDI 990 transaction either accepting or rejecting the shipment tender. The shipment status is updated in the Event Manager and interfaced to WCL, TPVS and ECC with the “accepted” or “rejected” status.

The WCL user interface provides two different screen options called visibilities for transportation service providers. One is titled the Planned Shipment Visibility and the other is the Transportation Visibility. Shipments that are planned in TPVS but have not yet been published to ECC, reside in the Planned Shipment Visibility. Once shipments are published from TPVS to ECC, they move to the Transportation Visibility. TPVS owns the document until it is published. Once the publishing process occurs, the shipment document is transferred to ECC and ECC becomes the document owner. When the shipment is published, a delivery document is created for the shipment. In some instances, there is more than one delivery associated with a shipment. Shipments with multiple stops have multiple deliveries associated with a single shipment. The shipment and information related to the products on a shipment and the status of that shipment should be the same. Any changes made to the shipment in ECC should interface back to TPVS, Event Manager and the WCL on a real-time basis.

Changes to a shipment may be made prior the loading and departure of a shipment. The change may be made in TPVS until the shipment is published. If it has been published, the change must be made in ECC. TPVS provides a simpler method for changes. Changes to the product on a shipment or the date of a shipment may be made by customer service or the facility where the shipment is sourced. Transportation planners may adjust the carrier or the vehicle resource, which is an equipment type, as necessary. In some cases, a shipment may be deleted.

Each change should trigger an email notification to the transportation service provider. EDI carriers will receive an EDI 204 transaction with the appropriate change information. Event Manager and WCL are also updated with the changes.

Weekly Execution Process: Customer orders placed the prior week are scheduled to ship the current week. Transportation service providers are responsible to provide the appropriate equipment for the shipment at the loading facility location on the scheduled shipment date. Some locations have a yard management system. Carriers check in their equipment for the scheduled shipment. A report related to the status of a carrier's equipment inventory on the property is emailed to the carrier every two hours.

When the equipment is at the loading dock, the status on the shipment is changed by a warehouse user to indicate it is loading. When the loading process is completed, the warehouse user performs a post goods issue (PGI) transaction in ECC. At some locations, the carrier delivers the equipment to be loaded. The carrier receives a notification when the trailer is ready to be picked up. When the shipment is picked up, the driver signs the bill of lading and a user performs the ship start transaction in ECC which changes the shipment status to "enroute" status. The shipment data in the order management system is updated for the customer. A daily report is emailed to a carrier indicating the shipments that loaded and departed that day along with the bill of lading number that is required for proper invoicing of the freight movement.

Once the shipment is delivered to the customer, the transportation service provider either submits an EDI 214 transaction or updates the shipment status using the WCL. The status is then changed to "arrived at destination." The customer will also update the order management system to indicate that the shipment has been delivered. The date and time that the load is delivered is the key information associated with this status. The "shipment end" is triggered in the system.

History related to the shipment is stored in one of the two repositories--the Information Warehouse (IW), a custom data warehouse or the SAP Business Warehouse (BW)—for reporting purposes.

Once the driver has picked up a shipment, the transportation service provider receives the bill of lading number and can submit a freight invoice to the third-party payment (3PP) vendor.

The above process outlines at a high level the transportation processes and what happens to a shipment from beginning to end. Truck and intermodal shipments follow this process. Rail shipments are slightly different in that the tender in not offered to the rail transportation providers for planning purposes. Orders for boxcars are placed with the servicing railroad. When the loading of a boxcar has been completed, the shipment instructions are transmitted to the railroad via EDI 404 transactions. The primary difference is that rail tenders are placed in “accepted” status by a transportation planner rather than the transportation service provider. Once the PGI occurs, the “ship start” is systematically triggered, and the ship start in turn triggers the EDI 404 transaction. Another difference is that the EDI transaction is generated from the ECC system rather than TPVS. The status updates are interfaced to the other systems, so that all systems have synchronized information related to the shipment.

Manually created shipment activity is conducted in the ECC module.

Original Design Note: The project team originally intended for the transportation planning work to be performed in TPVS rather than ECC. Instead of publishing all of the shipments for a week, the plan was to publish a couple of days' shipments at a time, re-run Load Builder as necessary and allow the system to solve for inventory or production issues. The timing associated with this planning solution drove some of the design in the WCL providing a separate visibility to shipments in the planned status vs. those in that had been published to the ECC. It was thought that carriers would need to perform most tender acceptance processes using the planned shipment visibility and that the arrival updates would be completed using the transportation visibility. The planned publishing process was changed back to the weekly method before the new system was implemented. Publishing the following week's shipments occurs shortly after the tendering is completed for a location, so new tenders often move from the planned shipment visibility to the transportation visibility within minutes.

Logical architecture.

Figure 8 shows how the system will be designed.

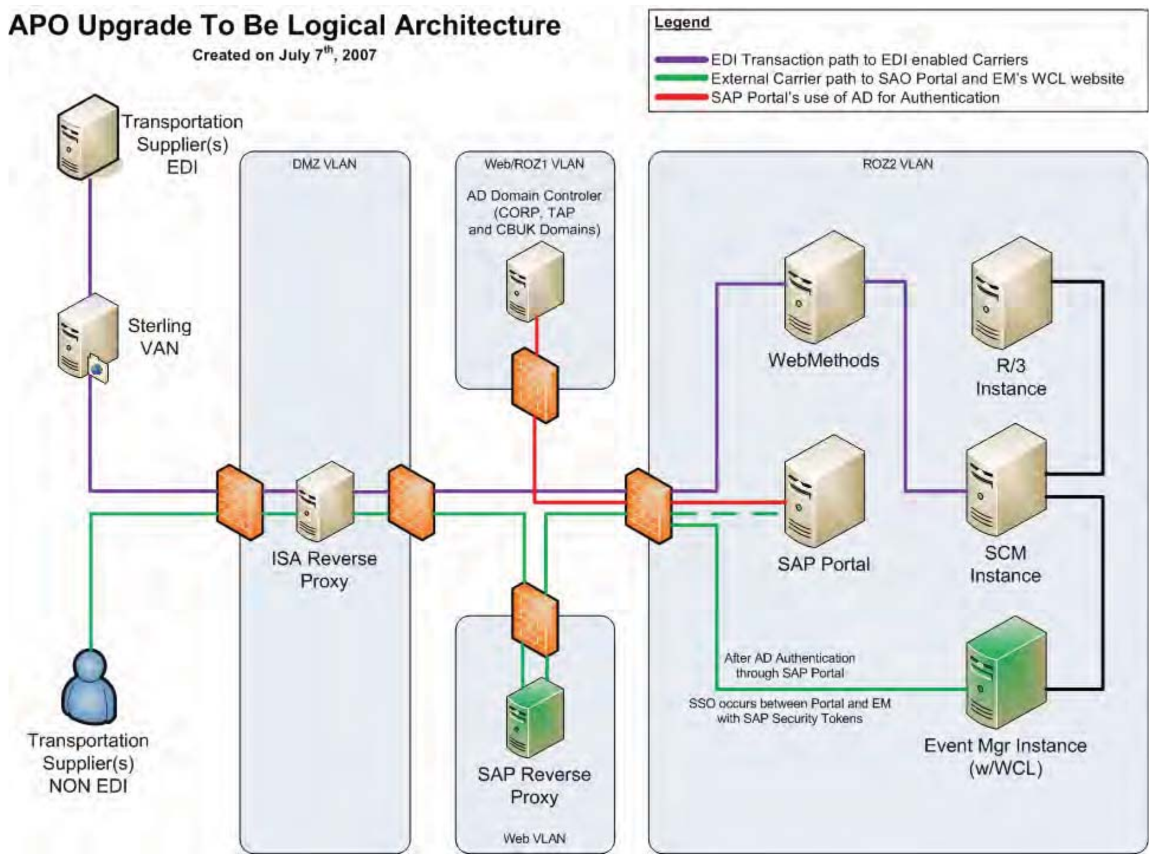

Figure 8. BBC Company Logical Architecture After Implementation of the APO Upgrade and TMS Replacement

Source: BBC Company Documents

The project documentation indicates that there were no changes required to the existing infrastructure to support EM or SCM. SAP uses a three-tier client/server architecture. Tier 1 is the client user interface, tier 2 is the application and tier 3 is the database (Bancroft, Seip, & Sprengel, 1998).

Security.

External WCL system users were required to register for a user id to enable them to access the system. Each carrier was encouraged to have all potential users register for his or her personal user id, and each carrier was encouraged to have at least two users—a primary and a backup. The carrier interface architecture was structured to use an SAP reverse proxy to gain access to the SAP applications with the SAP portal providing the initial authentication. The carrier user IDs were maintained in a separate domain in the active directory (AD) from the corporate users.

The initial password was designed to be emailed to the user when he or she successfully entered the correct user ID and the same information--first name, last name and email address--that was provided during the registration process. If the information matched, the password was emailed to the user's email address. If the information did not match, access was denied.

Pre-implementation and post-implementation processes for setting up the users were developed. The first was a spreadsheet with the user registration information. The latter required a formal IT request with specific information related to the user and the carrier. Each user was given a unique User ID that was recorded in the domain for non-employee users. Once the user ID was issued, the user permissions had to be set up in the SAP portal. Lastly, the user profile in Event Manager had to be configured for the specific carrier so that only that carrier's shipments were visible to the user.

Internal user IDs were created in a different domain. These users were given visibility to all shipments in the WCL and access to the enterprise portal. They were supposed to have single sign-on (SSO) capability in WCL, meaning they did not have to enter a user ID and password to access the WCL if they were already logged into the network.

SAP landscape.

The SAP landscape included a development (DEV) environment that was used for all configuration and program coding; a test (QA) environment that was fully integrated and used for regression testing and integration testing; and the production (PROD) environment.

Testing.

Four testing cycles were planned for USEvolve, each with its own objectives. The purpose of Cycle 1 testing was to execute regression test plans in the DEV environment to validate the existing APO functionality. Cycle 2 had two different phases. The first phase was planned to perform configuration, unit and string testing in DEV related to the TMS replacement components which included TPVS, EM, WCL, master data, and R/3 rate management. Part two of Cycle 2 included several activities in the QA environment. At that time, QA was not fully integrated so some of the testing was limited. The tasks included in this testing involved user acceptance testing (UAT) of APO functionality not related to TMS, monitoring system performance, and performing the first mock cutover test.

Cycles 3 and 4 involved further testing in the QA environment including end-to-end testing. Cycle 3 required users to execute test cases again and validate that all work processes worked as designed and sign off. The plan for testing in this cycle expanded to include the TMS functionality along with carrier testing if the functionality was available at that time. It also included system integrations and interfaces that were not available in the previous cycle, additional performance testing, and a second mock cutover.

The final cycle of testing, Cycle 4, was to finalize all test cases, resolve any outstanding defects, test the portal and event manager via the firewall, perform carrier testing for both the portal functionality with external access and EDI functionality. This phase also included performance testing of the portal.

The team leads were responsible for the test cases and assigning the testing to the appropriate users. Test cases were managed through SAP Solution Manager, a toolset used to define process hierarchies and to manage the testing process and documentation.

SAP AG Company Overview

SAP AG is a software company specializing in enterprise resource planning (ERP) software packages. Globally, it is ranked first in the following enterprise software markets: enterprise resource planning (ERP), customer relationship management (CRM) and supply chain management (SCM)(Datamonitor 2008a).

The company is headquartered in Walldorf, Germany and has a strong global presence operating in 50 countries through its partners and subsidiaries. The company has three business divisions—product (software), consulting and training (Datamonitor 2008a). Revenue in 2007 for the company was E10.2 billion with the U.S. business, its largest market, accounting for over 26% of its business. SAP AG employs nearly 44,000 throughout the world (Datamonitor). Competing with MicroSoft, Oracle and other large business software companies, SAP held 28.4% of the market share in 2007. Its software is utilized by over 38,000 companies globally (Datamonitor).

The name SAP is an acronym for its German name, “Systeme, Anwendungen, Produkte in der Datenverarbeitung,” which means “Systems, Applications, and Products in Data Processing” in English (Williams, 2000). *Datamonitor* (2008a) reported the company was established in 1972 by five former IBM engineers and released R/1 the following year. It also indicated that SAP AG initially evolved through its own development work and most recently it has expanded its success by acquiring other software companies that excel in a specific market segment. In 2004, the company developed its roadmap to achieving a service-oriented architecture (SOA)(Datamonitor). SAP NetWeaver has been a very successful innovation for the company and has made the system easier to implement and enhance (Datamonitor).

The SAP system has several different applications that represent a business process. Most utilize a fourth-generation programming language called Advanced Business Application Programming (ABAP) ((Williams, 2000).

Summary of What is Known and Unknown About the Project Topic

There are a number of things known about this case study. When the new replacement transportation management system was cut over to the production environment, there were many unexpected problems encountered. Most of the issues were documented through the BBC Company’s help desk and a ticket was logged for each issue that was reported for all aspects of the project. Some of the problems experienced, especially during the first day or two, were managed outside of the formal process via direct telephone or email contact with the technical resource. A log of the help desk tickets is available from the daily production support meetings in which the tickets were prioritized and resources were assigned. The author, who was an observer-participant during part of USEvolve, has maintained an archived email database from the project which contains reference to most other TMS-related problems that occurred after the cutover.

Project Evolution followed the BBC Company’s prescribed project management process and its global IT methodology. Most of the project’s documentation was performed using the approved templates. The project utilized a Microsoft SharePoint site for team communication and collaboration. That site is the official Project Evolution documentation repository. The TMS business requirements and the defect log for the total project are both available on the site.

Details related to the TMS enhancement phase are available in the Logistics department’s database. To sum up what is known is that there is a significant amount of information related to

Project Evolution that may or may not answer the questions related to this study.

What is not known about Project Evolution is greater than the amount that is known. The author became an observer-participant in the project during the training phase. Prior to becoming a trainer, knowledge of the project was at a very high level of detail. The training role required the author to learn how to use the new TMS system, including TPVS and Event Manager, well enough to teach others how to use it for their particular roles and to assist the TMS users with support during the production support phase.

It is not known how the design phase of the process was conducted for TPVS and Event Manager. It is not known how the testing phase of the project was conducted.

In general, it is not known what caused the go-live issues. In a few instances, an explanation related to specific problem has been offered by the technical IT resources.

Contribution This Project Will Make to the Field

The cost associated with upgrading or implementing an IT system tends to be expensive, so anything that can be learned from this study may reduce overall expenditures for future BBC Company projects or for other companies undertaking similar work. It is hoped there will be implications for both the business and the technical aspects of the project that can be applied.

CHAPTER THREE: METHODOLOGY

Research Methods to Be Used

A grounded theory approach was selected as the most appropriate method to research the TMS system implementation phenomenon that occurred when the BBC Company deployed the new system to production. This approach best supported the nature of the research objectives to develop a better understanding of Project Evolution overall and, more specifically, to develop a better understanding of what occurred during the go-live process and the following six-week production support period and what may have caused the problems that were encountered. Grounded theory was well suited for research within the actual business context, allowing the data to drive the research and allowing for iterations as required. This particular study was not conducive to a quantitative research methodology.

Life-cycle Models to Be Followed

Two basic life-cycle models, a waterfall model and an iterative mode, were followed in this research. The waterfall methodology was used in the project management life cycle and the research life cycle. The research model outlined by Dul and Hak (2008, pp. 12-13) included nine steps in three different phases. Phase one of the research model, the preparation phase, included 1) defining the research topic, 2) defining the general research objective and the general type of research and 3) defining the specific objective and specific type of research. The second phase was the actually research phase which included developing the research design 4) selecting the research strategy and 5) selecting the instance(s); 6) data collection and 7) data analysis. The final phase included 8) discussing the results and 9) reporting the research (Dul & Hak).

An iterative life-cycle model was utilized in conjunction with the grounded theory method. This model supports flexibility in the data collection and data analysis phases of the research. It has been referred to as a recursive model by some as the data collection and analysis often occur in an almost parallel nature rather than sequential and the process can move forward or backward within the processes (Bryman & Bell, 2003).

Specific Procedures

Preparation Phase

A project plan for organizing the professional project and presentation was established and the literature review related to research methodologies and research design was begun. The project proposal and the initial research design was developed and submitted to the project advisor and subsequently approved.

The questions to be answered included:

- What system issues were encountered when the system was implemented in production?
- What was the nature of each of the issues?
- Were the problems experienced during cutover different than the problems that were uncovered during the testing phase?
- Were any of the problems related to business requirements that were not defined?
- Were any of the problems possibly related to poorly defined business requirements?
- Were any of the reported issues business requirements that were defined and not implemented? If so, why was it not delivered?
- Why did it take so long to resolve the issues identified?
- Why did the production version of TMS differ from the test version and the training materials?
- What can be learned from this TMS implementation that can be applied to future implementations?

Research Phase

Research Design

Initially, high-level questions related to the BBC Company's TMS system implementation were outlined, and the appropriate data collection techniques were identified. Based on the literature reviewed earlier in chapter 2, it was determined that documentation from USEvolve was a good source of evidence and could provide many insights into the project issues. Three specific documents were initially identified for analysis as the first phase of the data collection process.

The first document to be reviewed was the log of issues from the help desk process. This would provide an objective source of information related to the nature of the system issues.

The defect log was the second document selected for analysis. The purpose of this log was to document and track any known problems encountered during the testing phase of the systems development life cycle and the status of the particular defect. Comparing the problems documented in the defect log against the issues reported in the help desk log would provide objective insights related to a specific problem--whether an issue was defined prior to the system cutover, whether the problem had been resolved prior to cutover, what the resolution was and whether there were any implications as to why the problem still existed at go live. Theoretically, all defects should have been resolved prior to cutover or documented as to why a defect was not resolved.

Business requirements defined for a project are generally used in the system design. The business requirements document was selected as the third source of evidence providing an objective approach for comparison to the help desk ticket log. Analysis in this area was planned to review three different possibilities: 1) to determine whether there were business requirements that had not been defined, 2) to determine whether there were poorly defined business requirements and 3) to determine if there were business requirements defined that were not delivered.

Interviews were also determined to be an appropriate source of evidence for providing insights and potentially answering the research questions. Interviewing was planned as the second data collection phase to allow for further exploration depending upon the findings from the first data analysis phase. Planned interviews were targeted to both technical project resources and business project resources. The specific individuals would be selected based on the first phase analysis and availability of the resources.

A third planned source of evidence was the author's observation as a participant. To limit the subjectivity introduced to this study, the project documentation was planned to be utilized as the first source of information wherever possible followed by the interview information. The entire USEvolve project repository was a planned source of evidence for any other research that would potentially need to be done. Other possible resources could be defined as the project progresses.

Triangulation of the data sources was planned to improve the objectivity and reliability of the study. To further increase the reliability of the information, a case study database along with the data analysis and interview notes will be maintained.

Data Collection and Analysis

First, the help desk ticket log was retrieved. The log included issues that were reported from the cutover of the system through the six-week production support phase. Items in the log that were not specifically TMS-related were deleted. Each remaining item in the log was given a new identifying number and categorized based on the system(s) that were impacted (e.g., TPVS, EM, WCL, ECC, Other). Next, each item was categorized as an email, EDI, rate or functionality issue. Items that were out of scope were eliminated. Similar items were then grouped together. For example, there were several individual items related to logging into the WCL or to EM. Minimal changes to the information on the spreadsheet were made to ensure the privacy of the company.

Finally, a review of the help desk log from a participant-observer role revealed there were some missing issues. A systematic email review was undertaken to add items that were reported to the technical resources rather than using the official help desk process. For the most part, the missing items occurred during the first two days; however, there were some other items that were not officially reported throughout the six-week timeframe. As an example of an item that was added from the email database is an issue that occurred the first two days. Almost all users were unable to log into the system. Carriers called the Logistics department for assistance and the business users passed the information directly to the WCL and EM technical resources rather than logging a ticket. Although the issue had many instances, it was logged one time for each instance that contained a different description or details related to the issue or that identified a specific resolution. The intent in logging it more than once was to preserve any information that may provide insights for future reference.

Next, each item in the revised TMS help desk ticket log was analyzed against the Project Evolution defect log to identify any known issues for further analysis. The defect number, if found in the defect log, was recorded in a separate column next to the ticket information on the ticket log. A description of the defect, status and the resolution information was also recorded in a separate column next to the defect number.

A copy of the detailed business requirements was retrieved from the repository. Each item from the revised TMS help desk ticket log was reviewed against the detailed business requirements to determine first whether a business requirement was defined in relation to this issue. If there was a business requirement, the detailed business requirement was noted in a separate column. If there was no business requirement defined, that was recorded on the spreadsheet. An assumption was made that a business requirement was probably fulfilled if there was not an issue defined in the help desk ticket log. That may or may not have been a valid assumption, but the focus of the analysis was on the reported problems. The analysis of business requirements in relation to how well they were defined was to be a separate process to be done after the initial analysis.

In the process of reviewing the detailed business requirements, it appeared there were some problems encountered in the “original document” which resulted in detailed requirements aligned with the high-level requirements that did not make sense. It appeared to be a “copy and paste” error. The high-level requirements have some additional documentation. (It was confirmed that the same data is in the original document that was signed by all parties.)

An additional component of analysis, namely, the work defined for the enhancement phase, was also analyzed in relation to the TMS help desk ticket log.

Once this initial analysis was completed, all documentation in the USEvolve project repository was reviewed for further information related to the questions posed in this case study. The initial analysis did not really answer the questions other than what issues had been reported and the nature of the issues; it created more questions. Reviewing the additional documentation provided more contexts for the project and some observations related to the project and the project management process but did not provide any major insights into the go-live issues.

Interviews were arranged after the initial data analysis and the documentation review was complete. The results of the analysis, which will be discussed later, pointed to the WCL as the area that created the most questions. The developers of the

WCL and EM system were both interviewed to gain their perspective on the issues. A primary business user who had been most involved in the resolution of issues on an on-going basis since the implementation was selected for an interview to represent the business perspective.

Questions to be used for the interviews were prepared in advance to use as necessary during the interviews; however, the actual interviews were conducted as conversations rather than a structured interview. The goal was to gain understanding from each participant related to his role and insights related to the TMS replacement project and system.

Formats for Presenting Results/Deliverables

The data collected for the analysis was copied into a Microsoft Excel spreadsheet with several different worksheets. Most of the analysis was performed in the worksheet labeled "HELP Desk Ticket Log – TMS." Supporting information was provided in the other worksheets: 1) "Bus Req – High Level" 2) "Bus Req – Detail Level" 3) "Enhancement Project" and miscellaneous pivot tables. Concepts related to the analysis process are presented in the last worksheet as a list. Please note that the official defect log document was not added included as part of this analysis document due to the many names and references to products that might identify the BBC Company.

Interview notes were documented immediately following the interviews using the notes taken during the interview and the protocols utilized. The following protocol was utilized. In each interview, the purpose of the case study was defined. An overview of the method of analysis that had been utilized so far in the study was reviewed. The disclosure was made to each person that his interview would become a part of a formal research paper and that neither his name nor the name of the company related to the project would be disclosed. Concepts from the interviews will be captured in the same worksheet listed above for the data analysis in order to keep everything in one place. Observations will also be added to that worksheet.

Key concepts, categories and hypotheses will be reviewed as part of this paper. In addition to the data analysis and the study results, a significant amount of descriptive information related to USEvolve and the TMS system was presented in chapters 1 and 2 to provide the necessary background and context for the results that will be presented later in this paper.

Review of the Deliverables

Deliverables represent the final phase of this case study. The deliverables associated with this study include the description and context related to the phenomenon being researched, the analysis documentation, interview questions and notes, and the review of the study results presented in this paper. Both the analysis document and the interview information will be included in Appendixes C and D respectively for reference.

Resource Requirements

Resources required for this project included the interview candidates' and the author's time to complete the activities associated with the study. Supporting resources, namely project advisors and other faculty were the other key resource requirements to successfully complete the professional project.

Outcomes

The research design was helpful in guiding the work for the study and for defining the data collection and analysis process. The analysis process of the documents seemed logical but did not provide as many insights into what caused the issues as originally thought. The defect log could have provided more insights had it been utilized to record issues that were encountered during the testing phase along with a detailed explanation of the resolution that would allow another technical resource to easily resolve known issues.

Analyzing the business requirements was very difficult. There were so many help desk tickets that were not directly related to the definition of business requirements. They were related to the system configuration, functionality or design. Logically, business requirements may not have been the appropriate vehicle for a correlation to the reported issues. Reviewing the enhancements defined in relation to the business requirements was perhaps a better analysis process.

Reviewing the project documentation did not provide answers to the study's questions but was viewed as an objective source of project information. In this instance, the information was not found; however, in another project, answers or clues might actually exist. Whether information of this type is available is dependent upon the documentation and the discipline applied during a project.

The interviews were definitely the most interesting aspect of the study. The people interviewed provided some valuable insights and identified some common themes for additional areas of research. An interesting theory surfaced related to the cause of the much of the system’s dysfunction; however, no definitive technical answers were revealed. The depth of the interviews was limited by the amount of time. Follow-up interviews could have potentially provided additional details. Interviews with a wider base of resources could have also offered more information related to the study questions.

Chapter Review

This chapter outlined the methodology used to conduct this case study. The grounded theory approach was selected as an appropriate method for studying this phenomenon. The life-cycle models that will be utilized were defined. Specific procedures to be followed were explained. A review of the deliverables, the resource requirements for the study and the outcomes were also discussed in this chapter. The next chapter will provide the project’s history.

CHAPTER FOUR: PROJECT HISTORY

How the Project Began

This case study was born from the desire to better understand the impacts experienced by the Logistics department business users and external transportation carriers during the implementation of a new transportation management system at the BBC Company. From that understanding, the objective is to determine better methods or practices associated with system implementations especially in relation to the SAP TMS system applications. The intent of the study was to also fulfill the professional project requirements of the Master's degree program at Regis University.

How the Project Was Managed

A project management plan initially laid the groundwork for the professional project. After a significant literature review, the project proposal with a high-level approach and research design was submitted for approval. Once approved, the research design was refined and the official data collection and analysis began. The specific procedures were outlined in chapter 3.

The data collection and analysis phase followed an iterative process. The discovery of clues throughout the analysis process led to additional research related to a number of subjects that were probably outside the boundaries of this study. Eventually, the process of trying to synthesize the information into findings led back to the original research design and back to the final coding stage to complete the study.

Significant Events/Milestones in the Project

The act of beginning to write this paper was a significant event for the author. Finishing it was an event of greater significance.

Changes to the Project Plan

The project schedule for this study was pushed out a number of times usually as a result of other work-related responsibilities. Shortly after USEvolve was completed, the anticipated company merger occurred bringing a flurry of new activities, changes and different responsibilities for the author.

Scope creep occurred to a certain extent as well. Scope and boundaries, in an iterative process, are easily expanded by interest and curiosity as to whether a new path will lead closer to an answer. After the interviewing component of the data collection and analysis phase, additional research was conducted to learn more related to the SAP transport management system, the SAP NetWeaver platform, the SAP SCEM system, and the WCL application. In retrospect, these may not have been necessary steps in the study, and they were very time consuming activities. A more experienced researcher using the grounded theory method might have been more disciplined around adherence to the boundaries.

Evaluation of Whether or Not the Project Met Project Goals

From the aspect of providing insights to better managing future system implementations, the project definitely met its goals. The author would have liked to have had more definitive, concrete technical answers; however, the author eventually accepted the fact that additional investigation will be required. Even with a further investigation, there is no guarantee that a definitive answer will be found.

Findings from this study provide a direction for some of the additional research that could be pursued and some recommendations for developing better methods and practices for use in future systems development life cycles and project management life cycles. While the study did not provide any technical outcomes that SAP AG and other companies implementing the SAP SCEM application will likely be able to apply, overall the study successfully accomplished the objective of developing a better understanding of the phenomenon.

Discussion of What Went Right and What Went Wrong In the Project

Interviews provided the most valuable insights in this study. The people involved were extremely open and honest. The discussion related to each person's personal context within USEvolve helped to add perspective to some of the other data analysis and helped in developing some of the inferences. Additional interviews with others on the team might have added some dimensions to the findings. The time constraints of the study and the availability of the other resources prevented additional interviews.

The initial data analysis of gathering, coding and analyzing the TMS help desk ticket issues provided evidence indicating what the most prevalent issues from a quantitative perspective were. They did not provide any insights related to which issues caused the greatest impact. The analysis comparing the tickets with the defect log and the defined business requirements did not reveal the expected relationship. Reviewing the documents in the USEvolve project database provided additional understanding of the overall project and provided some context. The outcome from reviewing the documents in the repository was not very enlightening in answering the study questions.

All of these different research aspects were in some way helpful to the end results. The findings would not have been the same without the multiple data sources. The interviews would not have provided as much insight without the knowledge gained through the analysis of the help desk tickets and the other information that was gathered.

Discussion of Project Variables and Their Impact on the Project

This case study could have been approached in many other different ways. It is unclear whether the sequence utilized for the data collection would have influenced the overall results. For instance, had the data collection and analysis begun with interviews, the topic of documentation might not have been included in the interviews. Since multiple sources of evidence were used, theoretically the documentation issue would have surfaced from the sources of data and the other data analysis processes. Confirmation from the developers regarding the purpose of the defect log and how it was used would have required additional investigation steps with the developers.

Findings/Analysis Results

TMS Help Desk Ticket Log

Some initial high-level quantitative analysis related to the nature of the TMS help desk tickets from the log helped to provide insights as to the direction and focus the study should take. Of the 86 tickets, approximately 86% were related to the Event Manager and WCL systems and 14% were related to the APO and TPVS systems.

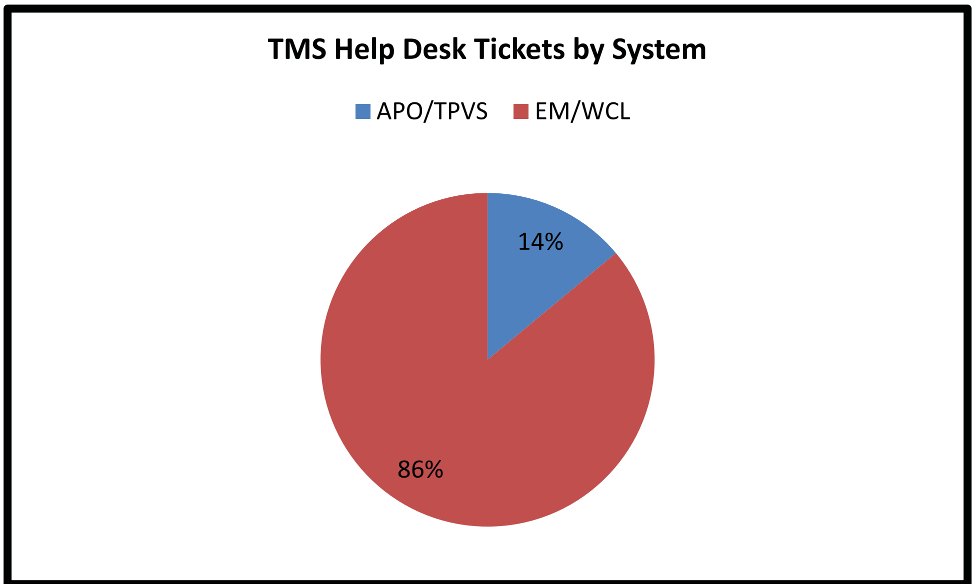

Figure 9. TMS Help Desk Tickets by System

There were some overlaps in that some tickets affected both APO and EM applications and some instances that also affected ECC. (Please note, the percentages shown are intended to provide the general direction; they are not statistically exact.)

Next, the tickets were categorized by the type of issue. The three general categories emerged from the initial coding: 1) EDI, 2) email or 3) functionality issue.

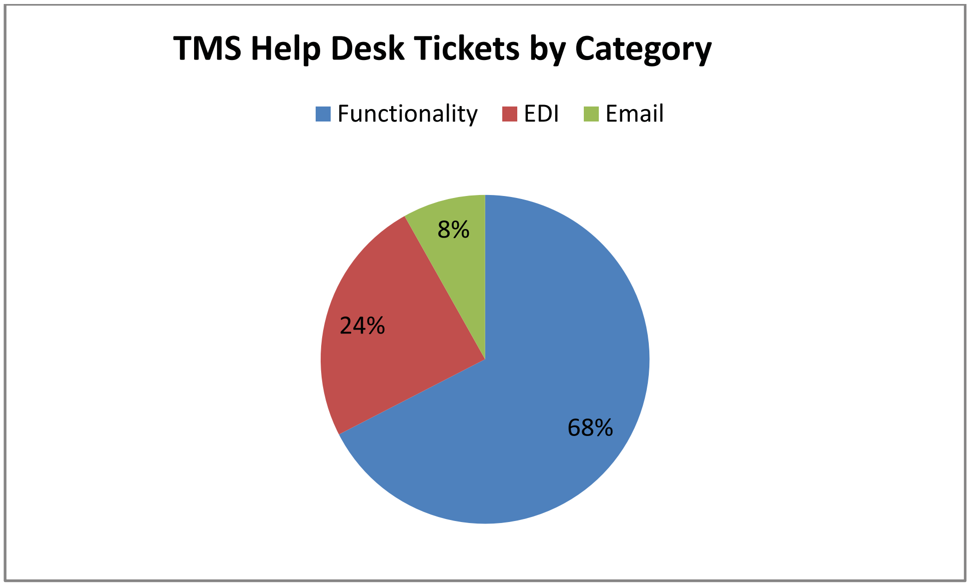

Figure 10. TMS Help Desk Tickets by Category

All of the tickets could probably be categorized as functionality, but there were a number of issues specifically related to both EDI functionality and email functionality. Many of the EDI and email issues were similar in nature, so if the problem was resolved two tickets were resolved.

It was expected that the relationship of the tickets reported at and following go-live to the defect log would be low. It was hypothesized that any known issue prior to go-live that was logged, resolved and closed as a log item would not be correlated to a ticket. If the known issue in the defect was not resolved prior to go-live, there was a likelihood a ticket would be in the help desk log and the reason for the ticket could be easily explained. It was also expected that if an issue was known prior to go-live it would be cataloged in the defect log.

It was expected that if some of the issues seen at go-live had already been resolved in testing, there would be information as to how they were resolved that the ticket could be quickly closed.

There were seven instances in which a defect was logged in relation to the tickets. Of those, all but one were closed as defect items. One of the closed items had a workaround but was not resolved. The other five were issues that had been resolved prior to go-live and reoccurred. The information related to the resolution was very limited or non-existent.

Based on the author's email documentation, another round of analysis was conducted in relation to the tickets and whether the issues were known prior to go-live.

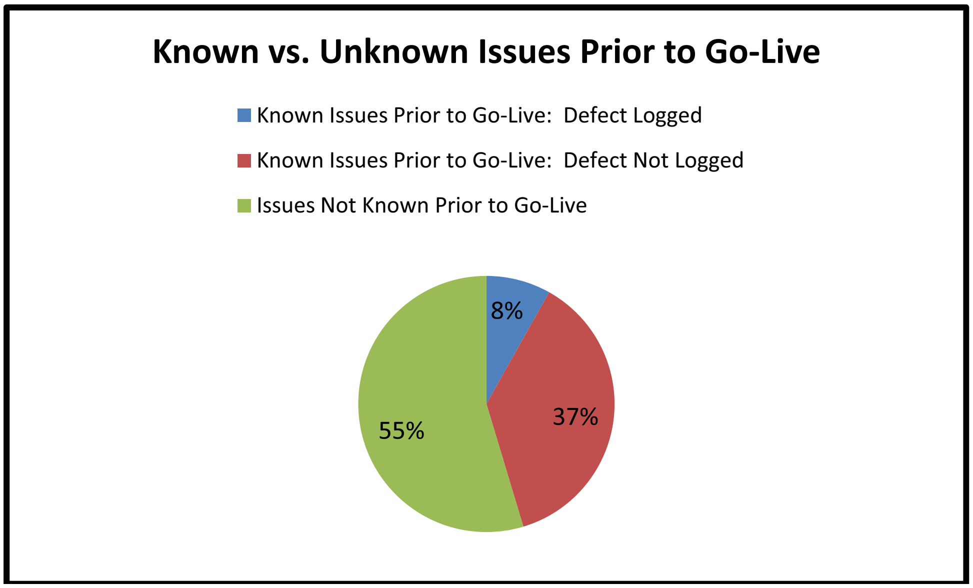

Figure 11. Known vs.Unknown Issues Prior to Go-Live

Analysis of the known versus the unknown issues prior to go-live indicated that approximately 45% of the issues were known prior to go-live. Only 8% of the issues had been logged in the defect log. The other 37% of the issues had not been logged indicating that the documentation was either not done or was stored in a different document than the defect log.

Next the tickets were reviewed in relation to the defined business requirements. If the ticket logged was associated with a defined business requirement, the requirement number was noted. There was no clear relationship between the tickets and the defined business requirements. Only seven of the 59 defined business requirements were identified in the ticket log. In analyzing the tickets that were not associated with a defined business requirement, it became apparent that many of the help desk tickets were related to system configuration, a programming issue, application of a business rule, or some other functionality and that a business requirement would not have been expected to be defined. In three instances, no business requirement was specifically defined. Business users expected the same functionality to exist in the new system; they were promised like-for-like functionality by the IT project leadership. Other types of issues that had no business requirement defined involved system performance, process or design.

The analysis of the ticket log in relation to the defined business requirements created more questions than answers. Intuitively, there is a relationship, but the information that is being analyzed in this scenario is not robust enough to draw meaningful conclusions.

EM Dev1 said in the interview that many of the help desk ticket log items were enhancement requests that were beyond the original scope of the TMS replacement project. So the enhancements were analyzed in relation to the tickets and the business requirement definitions. In reviewing the thirteen enhancement project catgories, there were some new requirements, but a number of the enhancements represented functionality that was available and working properly in the previous system. From a business perspective, that work was in the project scope in the like-for-like deliverable. One of the enhancement categories was for WCL work. Some of the issues in that category had been resolved in the test system and a large number of the design issues were identified prior to go-live even though there was not enough time to complete the changes before the system implementation. From a technical perspective, some of these issues might be considered new requirements.

In the interview with EM Dev1, he indicated that one of the goals related to the the TMS replacement project was to reduce the amount of customization and push the Logistics team to use more standardized practices. The IT team's direction was to provide the "vanilla" version of EM and TPVS and "shoe horn" the business processes into the system processes. Then, whatever didn't work would be customized as required. This approach to system design might provide some of the explanation for the large number of tickets and might indicate that an enhancement phase was planned rather than just an outcome of the TMS project.

The initial analysis of the TMS help desk ticket log provided some definition around what the go-live issues were and what difficulties were encountered during the analysis with regard to the defect log and the business requirements. What the analysis did not provide was a true guage as to the severity of the issues. There were approximately four tickets related to system performance. Both of the EM developers reported system performance as the most critical issue at go-live. The poor system performance, incorrect information, and the improper functioning of our transportation carrier communications—EDI, the WCL, and emails—caused many issues for our carriers. They were not receiving the correct information, they were unable to view the information on the WCL and in some cases the incorrect EDI transactions were causing severe system errors.

The internal transportation planners were waiting hours for the tendering process, fielding calls and troubleshooting the carrier difficulties related to logging into the WCL, emailing screen prints of tenders to carriers, and finding ways to deal with the information gaps. There was a great deal of chaos beginning Day One.

Nearly every transportation carrier user had difficulty logging onto the system intially due to a number of different causes. In many instances, the authentication information required for the initial password to be emailed to the user failed because there was a space preceding the contents of one or more of the required fields. In other instances, a component of the security set-up process was not complete or was incorrectly configured. Testing this functionality was not feasible prior to implementation.

To close out the analysis of the help desk ticket log, the defect log, the business requirements, and the enhancements, key thoughts and questions were recorded in a separate tab in the analysis spreadsheet labeled "Concepts, etc." That worksheet was used to record key ideas from the interviews along with other observations as a participant. This information was used in the development of categories and the sythesis of the study's findings.

Interviews

The following is a discussion of some key concepts from the interviews that were conducted with the two EM/WCL system developers and one of the primary business users. The notes from the interviews are located in Appendix D of this paper for reference.

When asked for insights as to what caused the differences between the test and production versions of EM, WCL and TPVS, both system developers indicated that system performance was the primary cause. Both confirmed that a stress test was not performed because the QA system was not designed for that type of testing. The impact of so many users at one time was not anticipated.

EM Dev2 said that WCL version (4.1) was an older version using Java and was not designed for the volume of transactions and the number of system users at one time. He indicated there is a newer version (5.1) that is based on an ABAP platform that would have better supported the performance requirements.

EM Dev1 offered another explanation of the differences in the test and the production versions of the systems. Normally, a change to the system follows a sequence of progression from the DEV environment to the QA environment and finally to the PROD environment. At go-live, some SAP transports (system changes) were created directly in PROD without going through the normal sequence. Whenever a transport is created, it locks objects in the system. The objects must be "released" before other transports can be applied. Some of the objects were not released properly. As a result, other transports could not be properly applied as they were moved from QA to PROD. The system was left in a different "state." That is why the system looked and functioned differently than expected in the production version.

This explanation seemed to make the most sense related to differences that were unexpected. This could explain a very large number of the help desk tickets. However, EM Dev2 did not concur. When asked about the tranport process, he indicated there was not a problem with that system. The interviewer did not ask clarifying questions at that point and should have. It is possible that EM Dev2 interpreted the question in relation to the transport management system in SAP rather than the way the transports may have been applied and the resulting problems.

Further investigation of this explanation would be warranted. If it truly was the cause of so many of the issues, it needs to be well understood by technical resources to prevent further occurences.

Both system developers suggested the TMS replacement project should have been a separate project with focused resources. Many of the technical resources were responsible for supporting more than one system so they were pulled in many directions. The number of resources that had the capability to assist with development of EM and WCL were very limited. There were a total of four resources and three of them had other responsiblities to balance. The technical resource responsible for TPVS was also responsible for the Load Builder application. There were problems associated with the Load Builder that delayed testing for TPVS, EM and WCL. Responsibilites for other upstream processes also impacted the work EM Dev1 could perform related to EM and WCL. Because of the dependencies, the upstream processes had to be resolved before the next step in the process sequence could be completed.

Constrained business resources were also an issue according to the developers interviewed. The project had a business project lead assigned. He left the company mid-way through the project. A different person was assigned to that role. Both felt there was a gap in the knowledge transfer during the transition. Neither of the people assigned to the business lead role was a primary system user. It was suggested that the role should have been filled by a primary user who could provide more of the day-to-day business requirements.

Testing was a key area that all three of the people interviewed brought up as having been problematic. From the business user's perspective it was the biggest issue related to the project. He felt it lacked structure and was not thorough enough. He said that data and system problems impacted the testing the TMS users were able to do almost every time they tried to test. BusUser1 conducted many of the training classes for the transportation carriers. He said it was difficult to get data for testing and he never knew for certain that the data would be available for each class because there was a limited amount and multiple groups were using the same data. He felt that there was a lot of productive time lost when trying to test.

Both technical resources interviewed agreed that there was not enough testing. EM Dev2 felt there was not enough integration and system stress testing. He also suggested that more carriers should have been included in the testing phase. Each EDI carrier did participate in testing transactions; however, only one major carrier was involved in most of the testing.

The design phase of the development life cycle was challenging for both the developers and the business team. EM Dev1 indicated EM was a very new system and that it was new to the company's IT team. They were learning the new software on the "fast track." Because the system was so new, it was extremely difficult to find an experienced resource with knowledge of the EM and WCL.

According to the developers, the defined business requirements did not provide enough detail to effectively configure the new systems. The original business lead was involved early in the project and provided some initial direction for the design. BusUser1 said he was involved in an early design phase meeting, but did not see the prototype until several months later. The business user said he had never seen the original business requirements nor any documentation following the design meeting.

Once the developers were ready for the business involvement it was the company’s busy season and it was difficult for business users to attend meetings. Different users often alternated attending meetings. This created some other problems as the user attending would provide input on how the system should be set up. At the next meeting, a different user would request it be changed. There was no group consensus. Some users did not have an opportunity to provide input. The developers indicated that sometimes the primary business users were not at the meetings and their expertise in the day-to-day requirements was critical. By the time the primary users had an opportunity to test the new system, it was too late to incorporate many of their requests for system design changes due to the project schedule.

Both developers recommended early user involvement with the primary business users as a critical success factor for future projects. BusUser1 recommended that the developer spend time actually sitting with the business users prior to beginning the design to understand the users' work and the business requirements.

Other implications or learnings from these interviews related to the business requirements and design suggest that communication within the business team and between the technical team and the business team could have been much better.

Incomplete or missing documentation was a consistent theme throughout the case study research. During interviews with the two EM system developers they confirmed that the defect log was not utilized properly throughout the project for EM and WCL issues. Time constraints caused them both to prioritize the delivery of the system over documenting the issues they encountered during testing and the resolution. It was pointed out that the nature of process related to the defect log tends to discourage its use to some extent. A logged defect usually is assigned back to the same technical resource along with a deadline for resolving the issue. Once the issue is resolved, there is more work for the resource to update the documentation.

EM Dev1 reported that most of the changes to WCL were made in the DEV or QA system while a user was present and could validate the changes. No formal documentation of the changes was maintained. These system developers were not the only ones who did not maintain documentation. The examination of documents in the project’s repository also revealed many missing project documents or incomplete documents. For instance, documentation of lessons learned has always been a standard process for all projects. None was found on the site other than one specifically prepared by the training team. The business requirements document is an example of incomplete documentation. It had been approved by the appropriate parties but still has sections that indicate they will be defined by a specific person. There is no additional or updated documentation associated with those requirements.

Another distraction that EM Dev1 reported in the interview that probably impacted the development, testing and focus on USEvolve was the announcement made a few weeks prior to go-live that Hewlett Packard (HP) had been selected to replace EDS as the company’s strategic partner. At the time, HP and EDS had not yet merged, and many of the BBC Company’s IT employees were affected by a reduction in force. A number of the employees, including EM Dev1, transitioned from BBC Company to HP and continued to perform the same work as an HP consultant to the BBC Company. The elimination of positions impacted other employees working on the project. The timing of this stressful event was poor.

Summary of Results

Analysis of the TMS help desk ticket log indicated that the majority of issues reported were associated with the Event Manager and the WCL. EDI and email issues accounted for a significant percentage of the tickets. Analysis of the help desk ticket log and the defect log revealed that there was very little documentation related to problems that had occurred prior to go-live, and it led to additional incremental analysis related to categorizing tickets that represented issues that were known prior to go-live versus the tickets related to issues that were not known prior to go-live. It supported the idea that more information should have been documented in the defect log. Business requirements that had been defined during the feasibility stage of the USEvolve project were compared with the help desk tickets and no clear relationship was established. It was determined that many of the tickets were related to a type of system functionality that generally would not necessitate that a business requirement to be defined. The last step in this initial analysis phase involved reviewing the tickets with the enhancements that were defined for a subsequent project to determine if a business requirement had been defined for that enhancement. There were some new business requirements, but a number of the enhancements were defined originally as a requirement. A few were found to be functionality that was available in the previous system and expected by users in the like-for-like solution that was delivered.

The quantitative analysis did not reveal the severity of the impacts related to the system performance and the significance of the impact of incorrect information being emailed and transmitted systematically to the transportation carriers.

Information from the interviews was extremely helpful in adding context to the phenomenon. System performance was the main problem experienced during go-live from a technical perspective. The volume of transactions and the high number of users at one time was not anticipated and overwhelmed the system.

A technical explanation of how system objects that were not properly released after they were changed in the production system caused an altered state of the production system as additional transports were moved into production offered one of the most logical explanations related to one of the key study questions. The fact that the second developer did not agree was extremely disappointing. However, because of the significant impact the incorrect system version had on the business and its partners and the cost implications, it is an important concept to continue to pursue.

Other themes that evolved from this case study included challenges that were faced and suggestions for future projects. Some of the major challenges were the constrained technical and business resources for the project, losing a key person during the project, system design and testing problems related to the dependency upon upstream processes and applications, conflicting user requirements, and the lack of documentation discipline. Ideas for improving future implementations included some of the following suggestions: 1) organize each system implementation or upgrade as a totally separate project to allow resources to focus their efforts, 2) ensure primary business users are actively involved in defining business requirements and participating in the additional requirements gathering and system design processes, 3) develop a process to ensure there is consensus among the users related to business requirements and system design that includes a process for escalation to resolve conflicting requirements, 4) conduct comprehensive testing to include integration and stress testing, 5) include external users in the process as much as possible, and 6) proactively communicate key information within the business team and with the technical team.

CHAPTER FIVE: LESSONS LEARNED AND NEXT EVOLUTION OF PROJECT

What Was Learned From the Project Experience

The descriptive nature of the grounded theory approach requires a significant amount of narrative to adequately set the stage for the audience and provide the context related to the study. Researching the company and the project at the level of detail required to become knowledgeable about how the project was structured, what the system changes entailed and to genuinely understand the project required reading and absorbing all of the project documentation and further researching areas that were not fully understood.

Writing the story created a continuous search for more knowledge and additional information. Even as the deadline loomed to complete the writing, there was still tendency to want to go research a subject more completely. Setting the boundaries for what was an acceptable level of knowledge was challenging.

As a novice utilizing the grounded theory method, the process was uncomfortable at times. Initially, it seemed as though there was little or no information to support the answers to the study questions. There were times when the real question in the author's mind was whether the work was being carried out correctly. Additional iterations of reviewing the data that had been collected eventually led to some inferences that were meaningful although not the technical level of explanation that was being sought. The process also made it clear that the technical answer might not be found without initiating a different study method. The time and cost associated with a more technical, root-cause type of analysis might end up being higher than the value returned.

Gorman and Clayton (2005) were referring to an automated process when describing qualitative research, but the description seems to sum up the work conducted regardless of whether the data is collected and analyzed manually or using an automated system. "By its very nature qualitative research encourages the collection of too much data, and the abilities of information technology only compound this tendency" (p. 219). It is ". . . more conducive to breadth analysis rather than depth analysis" (p. 220).

What You Would Have Done Differently in the Project

Accepting the research design boundaries would be the major change the author would have made in conducting this study. While the author learned a great deal about SAP systems, the unplanned research conducted throughout the study took a great deal of time. Certainly some of the information was applied to the study, but it probably would have been better to have acknowledged the lack of detailed knowledge on the subject and identified the subject as a possible future direction to continue researching in a later, separate study.

Discussion of Whether or Not the Project Met Initial Project Expectations

As previously discussed, the project did not meet the author's initial expectations. The answers were not neatly documented in the project's repository. There were few clues in the data other than what issues were defined through the help desk tickets. The information obtained from the interviews was much closer to meeting the initial project expectations. After a certain number of iterations of reviewing and analyzing the same information in different ways, the results seemed more meaningful and satisfying.

What the Next Stage of Evolution for the Project Would Be If It Continued

There are several different avenues that could be pursued as the next stage of evolution for this study. Because of the tremendous operational and cost implications associated with implementing an incorrect version of a system into the production environment, the first opportunity would be to research the change process further to determine if the explanation provided by EM Dev1 is a valid explanation related to the system object locking and release sequencing. If it is proven to be true, then additional training and controls need to be implemented to ensure this issue is not repeated during future system changes of any kind. It is possible that the company's IT Centers of Excellence would assist with the investigation and the training.

In light of the company's recent merger, there are a number of activities that could be included in the next stage of evolution for this project as preparation for the next system change. From a business perspective, a project to research best practices for writing effective business requirement definitions could be initiated. Improving the current definitions would provide the foundation for defining the business requirements for the next generation system that consolidates both companies' business operations. The process should be done systematically so that the requirements include all business activities that are conducted.

Another important step in preparation for expected system changes that could be undertaken relates to documentation. The current state system, including all processes, applications, interfaces, data and architecture, should be completely documented before a consolidation effort is begun. As another step in documentation, it might be helpful to conduct some short follow-up interviews with the appropriate technical resources to document, even at a high level, what is known about the actions that were taken in the past to resolve the initial help desk tickets.

Since it is known that the current WCL system is not scalable, researching alternative solutions for the short term and the longer term could be started. This work stream could include an investigation into methods for conducting the appropriate stress tests in the future to ensure system performance is acceptable.

Another continuous improvement work stream that could be pursued, perhaps by the IT Centers of Excellence, relates to finding better methods to incorporate documentation efforts into projects. The company has implemented a disciplined organizational structure and a formal methodology to support successful projects. It is providing a framework that is not being utilized effectively. The full value of the investment is not being realized. The nature of the work involved with documentation sometimes drives the wrong behavior. There may be opportunities for increasing the value of the documentation to the company and, at the same time, making the documentation process less time consuming and easier to use for technical resources.

Conclusions/Recommendations

Several opportunities have been identified as a result of this study. It is recommended that two work streams be pursued in the near future. The first work stream would be conducted by the technical organization. The team would review the validity of the theory proposed by EM Dev1 regarding the SAP system object locking and release behavior. The findings would determine any subsequent action to be taken, if any.

The second work stream would be assigned to the business team to research best practices in writing effective business requirements. Both of these actions would support more successful future system implementations and support future system changes required as a result of the company’s merger.

Other opportunities have been identified and could be future projects and may depend upon the timing and nature of the company’s business plans.

Summary

The purpose of this case study was to examine the TMS replacement project and develop a better understanding of the problems that occurred when the system was deployed. It was hoped that analyzing this project would provide insights as to what could be learned from the problems and effectively utilized for improving future system implementations.

The study followed a defined research design using the grounded theory method. Through its iterative process, a number of themes developed that helped to explain some of the challenges and influences that contributed to the go-live system issues. The themes developed into suggestions for improving future projects and potential work streams to continue to the next evolution of this study.

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Appendix A: Terms and Acronyms

Term/Acronym	**Definition**
3PP	third-party payment
ABAP	Advanced Business Application Programming; 4th-generation programming language used in most SAP applications
AD	Active Directory; system for authenticating users for single sign-on
APO	See SCM
Basis	SAP system administration—requires skills related to database management, GUI and the operating system
BO	BusinessObjects; reporting system used for extracting information from the Information Warehouse
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CIO	Chief Information Officer
COE	center of excellence
CRM	Customer relationship management
CSO	Chief Strategy Officer
DEV	development system environment
DP	demand planning
ECC	See R/3
EDI	Electronic data interchange
EDI204 transaction	Tender offer to transportation carrier via electronic data interchange
EDI990 transaction	Accept/decline acknowledgement to a shipment tender (EDI204) sent by a transportation carrier via electronic data interchange
EDI214 transaction	Shipment status notification sent by a transportation carrier via electronic data interchange

EM	Event Manager; refers to SAP's SCEM
ERP	Enterprise resource planning
Event Manager	refers to SAP's SCEM
GUI	graphic user interface
IW	Information Warehouse; customized data repository
J2EE	Java 2 Enterprise Edition
Load Builder	System that optimizes the planned production schedule and the inventory availability to build discrete shippable vehicles
Manugistics	Software company that produces the transportation management system which includes NetWorks Transport and NetWorks Carrier modules
OMS	order management system
NetWorks Carrier	Manugistics Web-based tool for communication with transportation carriers
NetWorks Transport	Manugistics carrier selection module
Oracle	relational database management system produced by Oracle
PPDS	production planning and detailed scheduling
PMO	program management office
PROD	production system environment
QA	quality assurance, or testing, system environment
R/3 & ECC	Both terms refer to the SAP enterprise resource planning (ERP) module that is used for financial management and business execution. ECC is the upgraded name for R/3.
rate/lane loader	home-grown application for loading rates and lanes into the Manugistics TMS
SAP AG	software company that produces enterprise resource planning and supply chain planning software, e.g., ECC(R/3);

	SCM(APO); SCEM(EM); WCL
SAP Enterprise Portal	front end of the SAP NetWeaver platform
SAP NetWeaver	serves as an integration layer that can host business applications
SCEM	SAP Supply Chain Event Management; used interchangeable with the term EM and Event Manager
SCM & APO	Both terms refer to the SAP planning module that is used for planning production and transportation carrier optimization. SCM is the upgraded name for APO.
SME	subject matter expert
SNP	supply network planning
TMS (in context of this paper)	transportation management system; system used to plan and manage the distribution of finished goods to wholesale customers and the return of reusable packaging materials and dunnage, the items used to protect the finished goods during shipment.
TPVS	SAP Transportation Planning and Vehicle Scheduling application; part of the SCM/APO planning module
TSP	transportation service provider
UAT	user acceptance testing
WCL	SAP Web Communications Layer; refers to the Web interface that sits on the SAP Event Manager
WM	webMethods middleware

Appendix B: *USEvolve* Project Team Management Structure

Role	Responsibilities
Business Partner Owner	• *Owns Business Case benefits realization.* • *Ensures business resources are available for project and accountable to project.* **Sets direction for the project** • Drives buy-in of project scope and future state solution with process advisory team and executive steering team. • Set priorities between projects. • Determine priorities between scope, quality, time, cost & customer satisfaction. **Escalation path for issue resolution** • Resolve conflicts that extend beyond the teams control. • Removes barriers for project team to ensure success of the project. **Delivery of APO Upgrade/Leverage business case** • Business Case Development (Business needs and benefits), communication and approval. **Program execution** • Owns execution and reporting of ongoing business benefits. • Gathers project support from all stakeholder areas. • Solicit business resources for the project. • Champion the cause and remove barriers.

IT Solution Delivery Lead	• Ultimately responsible for entire business solution (business and IT portions). **Sets direction for the project** • Keep the project focused. **Approves final project plan** • Provide the project team with time to plan. **Delivery of APO Upgrade/Leverage business case** • Approves Planning and Analysis, Design, Build, and Implement phases of APO Upgrade/Leverage program. **Program execution** • Sets overall program direction for project resources. • Ensure overall project plan meets business objectives. • Provides clarity of roles and responsibilities for the leadership team of APO Leverage/Upgrade program. • Owns project scorecard and project metrics. • Reports APO Upgrade/Leverage program status to project chair, process advisory team. • Sets expectations with process owner team members. • Provides on-boarding for new process owner members. • Consolidate issues and action items for the process owners meeting. • On time/On budget for the project budget. **Issue resolution** • Resolve project issues. • Identify critical path issues that emerge as unresolved. • Escalates unresolved issues, scope changes and budget concerns for the APO Upgrade and Leverage project.

Project Sponsor	**Drive the scope and design of future state solution** • Drive definition of business requirements. • Sets direction and expectations for Business Process design with APO Upgrade/Leverage project team. • Ensures business process design meets business requirements. **Drive final approvals.** • Drive testing and acceptance of future state solution. • Final approval of business requirements. • Give final signoff and approval of all processes, including tool customizations and process workarounds. • Approve design and scope of Planning and Analysis phase of project. **Drive change management related to internal and external stakeholders** • Lead communications, change management and issues resolution in his/her processes to internal and external stakeholders. • Obtains, schedules business resources required by the project. • Provides resource support for implementation and production support. • Provide calendar time to the project. • Act as second tier for issue resolution, suggesting elevation to process owner advisory group if necessary. • Communicate decisions to key stakeholders, program sponsors, and other involved parties. • Reaffirm that all decisions are considered binding and final. **Drive benefits** Owns execution and reporting of ongoing business benefits from the project.

Business Partner	• Understand the overall enterprise view of various projects and their inter-dependencies from the business perspective. • Ensure all business requirements are captured and represented in the business case. • Participate in project approach and review sessions as determined by the PM. • Stage gate reviewer for Analysis deliverables, and other deliverables going forward. • Provide overview and sign-off on the developed business case and communicate and sell its content to stakeholders and IT operating committee members. • General consulting/thought leadership for the various projects needs. • Drives I/T Business Case review and approval. • Ensures that the projects being delivered by the PMO are guided by BBC approved business strategies and priorities • Monitoring of annual IT financial plan - Oversight, guidance, and barrier removal. • Executive decisions on program scope and scope changes (PCRs) based upon the parameters that require escalation to the I/T Operating Committee. • Executive decisions on program and project risks & issues based upon the parameters that require escalation to the I/T Operating Committee. • Owns the Quarterly Prioritization Process (ensuring proper quarter sequencing, and I/T processes adhered).
IT Lead	• Lead design activities. Responsible for the ultimate design of the project work product (application, system, processes) • Monitors, reviews and assists with system configuration. Configuration of SAP Enterprise Portal, documentation of configuration and unit testing configuration. • Identifies and ensures completion of functional specifications for all authorizations, reports, interfaces, conversions, and enhancements. • Ensures that result/output of all enhancements, interfaces, conversions, and reports meet business needs and use best practices in respective areas. Responsible for functional design documentation working with onsite developers. • Ensures development of adequate configuration support plan. • Ensures adherence to PMO methodology including stage gates. • Reviews and approves test plans (functional and technical) to ensure integrity and quality of production system. • Manages business demands in the sandbox environment. • Acts as primary contact for escalating functional and technical issues related to the sandbox environment. • Participate in business process mapping. • Monitor development efforts for all enhancements, interfaces, conversions, reports and forms. • Assist I.T. Teams as needed to gain understanding of business and performance needs and design points. • Assist with Organization readiness for go-live.

Project Manager	**<u>Ensure use of CDM Stage Gate methodology</u>** • Defines and gains approval for project management standards and procedures. • Defines and gains approval for Project Management Process Design. • Aligns project plan to ensure that the Feasibility, Development and Implementation phases are planned appropriately. • Conduct formal reviews at the completion of each phase. • Provide guidance to project team on Stage Gate methodology. **<u>On time / On budget delivery of project</u>** • Acts as the advisor to all team members regarding Corp Development Methodology Stage Gate deliverables and Project Management discipline (schedule, risk, resource, etc.) • Is responsible for facilitating development of an integrated project plan that is complete, actionable and valid with respect to tasks, work effort, timeline and resources. • Responsible for APO Upgrade/Leverage PMO deliverables. • Ensures consistency for all APO Upgrade/Leverage project deliverables in accordance with APO Upgrade/Leverage program project schedule and CDM methodology. • Is responsible for utilizing the Project Evolution Issues Management process that enables visibility, communication, progress tracking, escalation and closure. • Is responsible for management of project scope via the established PCR process. • Is responsible for Project Status Reports that are credible and provide sufficient information to know where the project stands. • Is responsible for escalating issues <u>to team leads</u> and beyond (as appropriate) for resolution. Escalates issues, scope change requests, budget concerns, etc. to <u>project owners</u> for resolution. • Schedules APO Upgrade/Leverage resources.
Lead Architect	▪ Ensure that the technical requirements for the system are met. ▪ Ensure technical design is in accordance with the strategic BBC Company architecture plan. ▪ Ensure that the technical design is appropriate and that the design will support future system upgrades ▪ Be responsible for taking immediate corrective action in case of deviation. ▪ Ensure adherence to CDM standards. ▪ Escalated unresolved issues, scope change requests. ▪ Identifies integration points between projects.

Source: BBC Company Documents

Appendix C: Analysis

Analysis documentation is attached as a separate electronic file: TMS Replacement Analysis v 04

Appendix D: Interview Notes

Interview with System Developer1: TMS Replacement (EM, WCL and TPVS)
March 13, 2009

Overview:

A one-on-one interview was conducted with the EM System Developer1 (EM Dev1). During the SAP Upgrade/TMS replacement project, he was the BBC Company's IT resource responsible for the development and configuration of Event Manager to include the WCL; the other EM system developer (EM Dev2) was a consultant.

The interview lasted approximately one hour. Background regarding the purpose of the case study was reviewed with EM Dev1 at the beginning of the session. He understood and agreed to the fact that the information he shared would be utilized and quoted in the formal paper related to the case study and that his name and the company's name would not be disclosed. The purpose of the interview and the case study was explained to EM Dev1-- to better understand how the project was organized, if the root cause of some of the go-live issues had been found, and to identify specific learning could be applied to other implementations of this particular system or other system implementations in general.

An overview of the method of analysis utilized thus far was also disclosed:

- reviewed the documentation of the project's SharePoint site
- reviewed and categorized the HELP Desk Tickets created during the 6-week production support phase (go-live to hand-off as normal system maintenance)
- analyzed the HELP Desk Tickets in relation to the defined business requirement, the defect log and the enhancements that were identified for the enhancement phase following the production support time period
- this interview was another iteration in the project analysis as there were many unanswered questions from the documentation

He was asked to share his knowledge and insights related to the project. Interview questions were prepared in advance to use as necessary to lead the conversation, but the goal was to understand the issues from his perspective and his role in the project. The interviewer allowed the conversation to occur, asking pertinent questions that had not yet been answered.

Project organizational structure:

The upgrade/TMS replacement project was part of the BBC Company's PMO portfolio. The project included an executive team, the steering committee and the project team.

There was a PMO project manager who was responsible for managing the overall project. The TMS replacement project was set up as a sub-project under the larger one. There were additional project managers assigned to specific components of the project. For example, there was a project manager assigned to the TMS replacement component of the project from the BBC Company. His normal role was as a liaison between the business and the IT organizations.

Most other IT resources who participated on the project were BBC Company employees, SAP consultants or EDS consultants. There were a few consultants from other third-party companies. During the project, HP was selected to replace EDS as the IT strategic partner. EDS and HP eventually became one organization. Many of the IT employees of the BBC Company were affected by job eliminations. Many of them, including EM Dev1, transferred to HP and are continuing to do the same work/role as an HP consultant for BBC Company.

TMS replacement portion of the project, there were several IT resources assigned and one TMS business lead:

- project managers (2)
  - BBC Business Liaison
  - EDS Technical
- solution designers (2)
  - one for the R/3 (ECC) module (BBC)
  - one for the APO (SCM) module (BBC)
- EM system development/configuration (2)
  - EMDev1 (BBC)
  - EMDev2 (SAP)
- TPVS system development/configuration
  - TPVSDev1 (BBC)
  - TPVSDev2 (ILOG-focused on the load creation module)
  - SAP resources as required
- ABAP Team (3 plus off-shore as required)
- webMethods

- Logistics Business Lead (BBC) – first representative left mid-way through the project

There was some overlap of resources. EM Dev1 was also responsible for the upgrade of other portions of the APO module that included process orders and the plant scheduling functionality. As a result, he was pulled in more than one direction at times. The sequence of the processes sometimes affected the prioritization of work. Because the TMS and other functions were dependent upon the success of the process orders and the plant scheduling, it was necessary to focus on those areas first.

Project Methodology

A waterfall methodology "with a BBC Company twist" was followed. BBC Company utilizes a "stage-gate" process. The project is approved from one stage gate to another; however, there is not a "hard stop" for each stage. In many instances, we keep moving to the next stage before completing everything in the previous stage.

EM Dev1 believes the company's project execution is good. There is a tendency to go live on the fly.

Training in the methodology was ½-1 day of training. The company culture, as a whole, is not disciplined with regard to structure and documentation.

HELP Desk Tickets/Go-Live

From his perspective, many of the HELP Desk Tickets submitted during the production support phase represented new business requirements. He felt the business requirements defined in the project were not at a low enough level of detail. They did not necessarily represent the "day-to-day" business requirements.

EM/WCL Design Methodology

Based on the comment that the business requirements did not define the day-to-day needs, he was asked what methodology the team used to configure the system. He indicated that several of the IT resources were knowledgeable regarding the business based on previous experience with the Logistics Department--(TPVS Dev1, EM Dev1, and Solution Designer1). They had some input from the Logistics Department Business Lead. The Business Lead then left t he BBC Company to pursue a different job. A new Business Lead stepped into the role but had very little training/knowledge transfer related to the project before the original lead left the company..

One of the goals related to the TMS replacement project was to reduce the amount of customization and push the Logistics team to use more standardized processes. While the software was new, the direction was to reduce customization to save money. The IT Team's goal was to provide a "vanilla" version of EM/TPVS and "shoe horn" the business processes into the system—make the business fit the system process. The leadership felt that whatever didn't work once the business users started reviewing different scenarios would be customized as required. The business processes maps that had been developed during the initial system implementation about five years ago were reviewed and modified by the project team. There were very few modifications to the business process maps.

Meetings were scheduled by the project team to present the system to the internal business users and get feedback from them. The meetings were not as successful as planned. The business users had difficulty attending the meetings due to timing of the project. BBC was experiencing the busy season during the project development and testing phases. The attendance at meetings was low. Different users attended the meetings—alternating so others could keep the business running. The user(s) attending would provide their thoughts on how the system should be configured. Someone else would later ask that it be changed. No consensus because it was not a "group" decision. Some of the user's needs were not identified during the meetings.

Overall, there was not enough user involvement in the design or the testing of the new TMS. Not always the correct users for the design/testing needs, not enough user input, different requirements by different users. A definite gap in the knowledge transfer when the first business lead left and passed the responsibility to the next one.

Another issue related to the system design and development was that the EM tool was very new. The system was new to the BBC IT resources. They were learning the new software on a fast track. It was extremely difficult to find a resource outside of the company with any kind of knowledge and experience with the EM/WCL.

TPVS/WCL/EM Test vs Production Versions?

When asked for insights from a technical perspective regarding differences in the system that was delivered in production vs the system that was tested, EM Dev1 provided a couple of findings:

System Performance – TPVS, WCL, EM

System performance was extremely slow at go-live. There was not an effective way to stress test the new system components.

There are three different environments (SAP instances) :

- Development (DEV) - used for initial testing. It is not fully integrated, so limited in testing capabilities
- Test (TEST) – integrated copy of the SAP Production, but is a snapshot of the production system at a given time. With some exceptions, can do end-to-end testing
- Production (PROD) – fully integrated system

System instances are not in synch. A refresh takes four complete days to bring the system down and back up. The cost is extremely high. Given the time to copy the production system (refresh TEST), the systems will never be completely in synch.

TEST system

- Different data set than PROD (older version of production data, less data)
- Different user base (fewer, different access for some)
- Performance tends to be faster in TEST as a result.
- Stress tests were performed prior to go live. Thorough stress tests were performed on the ECC portion since it is the company’s priority system. Minimal stress testing completed for the TPVS/EM. Day 1 – slow performance for all users. Process of tendering loads took hours rather than minutes. User queries in WCL were extremely slow, often timing out before the result was returned. Had not tested the impact of all of the users – 100+ external carrier users and internal users.

Configuration changes – moving from DEV to TEST to PROD

BBC Company uses Peregrine to track "transports." A request for change (RFC) is created that tracks the changes to be made. Theoretically, the sequence of movement is from DEV to TEST and finally to PROD. The changes are tested each time.

At go-live, some transports were created directly in PROD without going through the normal sequence. Whenever a transport is created, it locks objects in the system. The objects have to be "released" before other transports can be moved/applied. Some of the objects were not released, thus other transports did not get applied properly as they were moved from TEST to PROD.

This left the systems in a different "state"—thus the difference between what the system looked like and how it functioned prior to go-live and just after.

EM/WCL Technology

The user interface of EM is set up in the SAP Portal, which uses the NetWeaver. The WCL uses a different platform—the same one that was used for the SRM application.

Documentation

In response to the observation that many documents were missing or incomplete on the project's SharePoint site, EM DEV1 indicated that, in general, BBC Company is not disciplined in updating documents. While there is a methodology that BBC Company subscribes to, every project seems to have different standards. He felt that some of the documentation was "limited" because the IT resources are generally not technical writers and have to prioritize the delivery of the system over documentation.

The defect log was not updated for most of the TMS issues that were encountered during testing. When asked what the criteria were for creating a defect, EM Dev1 indicated that it was not utilized as designed. The design of the defect log process, by its nature, discourages logging issues to some extent. When a defect is logged, it generally gets assigned back to the same technical resource to solve within a time period. The resource was then expected to update the documentation. Most of the changes to configuration were done in the testing phase, but were not well documented. Many changes were made in DEV or TEST while a user was present and could validate the changes.

Following the merger of BBC Company and XXX Company, a new methodology and documentation process has been defined and adopted. It focuses heavily on documentation. From the perspective of EM Dev1, there needs to be some balance that allows a technical resource with specific skill sets to utilize their skills rather than spending so much time documenting. Having additional resources specifically for the documentation efforts would be helpful.

Lessons Learned – Recommendations for implementing this System for a Different company?

1) Set up the TMS replacement project as a separate, focused project rather than having it as sub-project of the larger upgrade. This would allow technical resources to focus their efforts rather than being pulled in different directions.
2) Technical resources: Ensure there is a resource with experience in EM/WCL so that there is less time required in the learning mode.
3) Define a methodology for the project, follow it and enforce its use:
    a. Ensure you have resources with the following skills
        i. Process expert
        ii. Technical expert
        iii. Documentation expert
    b. Requirements gathering needs to be focused and detailed with the right business users, consistent user input, proper identification of hard and soft constraints, and prioritization of requirements when there are conflicting requirements or to determine which requirements/issues receive the resource time.
    c. Utilize UML modeling.
    d. Organizational understanding that there is no such thing as a purely "technical upgrade." End users are impacted by changes to the system. The importance of user involvement and the potential impact to users should not be underestimated.
    e. Organization understanding that change management involves more than training.
4) Develop a permission/approval process for system configuration changes. Resist the temptation to make a change without a consensus of the appropriate parties.

At the end of the interview, EM Dev1 was thanked for his time and his willingness to share his insights related to the TMS Replacement Project. It was reinforced that his identity would be kept confidential and that the BBC Company’s name would also not be disclosed in the case study.

Interview with System Developer2: TMS Replacement (EM, WCL and TPVS)
March 27, 2009

Overview:

A telephone interview was conducted with the EM System Developer2 (EM Dev2). During the SAP Upgrade/TMS replacement project, he was the consultant responsible for the development and configuration of Event Manager to include the WCL; the other EM system developer (EM Dev1) was a BBC Company employee from the IT Department.

The interview lasted approximately half an hour. Background regarding the purpose of the case study was emailed to the EM Dev2 when the interview was requested. EM Dev2 initially declined the interview as he was concerned about confidentiality and a conflict of interest. Subsequent to the BBC Company project, EM Dev2 worked on a similar project for a competitor of BBC Company. He was assured that the interview would not involve any information related to the competitor company. He agreed to share his ideas related to the BBC Company's project and what lessons were learned from the project—what he would do differently if he were to implement a similar project. He understood and agreed to the fact that the information he shared would be utilized and quoted in the formal paper related to the case study and that his name and the company's name would not be disclosed. The purpose of the interview and the case study was explained to EM Dev2-- to better understand how the project was organized, to determine if the root cause of some of the go-live issues had been found, and to identify specific learning could be applied to other implementations of this particular system or other system implementations in general.

An overview of the method of analysis utilized thus far was also disclosed:

- reviewed the documentation of the project's SharePoint site
- reviewed and categorized the HELP Desk Tickets created during the 6-week production support phase (go-live to hand-off as normal system maintenance)
- analyzed the HELP Desk Tickets in relation to the defined business requirement, the defect log and the enhancements that were identified for the enhancement phase following the production support time period
- interviewed EM Dev1

- this interview was another iteration in the project analysis as there were many unanswered questions from the documentation

He was asked to share his knowledge and insights related to the project. Interview questions were prepared in advance to use as necessary to lead the conversation, but the goal was to understand the issues from his perspective and his role in the project. The interviewer allowed the conversation to occur, asking pertinent questions as the conversation progressed.

Project organizational structure:

EM Dev2 was a consultant hired through a third-party IT consulting firm. He reported to the APO Solution Design Manager and was primarily responsible for the configuration/design of Event Manager and the WCL. The system had to support EDI transactions to/from the transportation carriers. The EDI transactions – EDI204, EDI990 and EDI214s—were the shipment tendering information to the transportation carriers and subsequent responses accepting/rejecting the tender and status updates regarding a shipment. Carriers could submit the transactions electronically through a value-added network (VAN) service or utilize Web-based portal to receive and transmit the transactions. Because the EM/WCL systems interfaced with other systems, EM Dev2 had to have knowledge of and work with the other technical resources wherever the systems interfaced.

HELP Desk Tickets/Go-Live Issues

EM Dev2 felt that the primary issue at go-live was related to the system performance. The version of WCL used was an older version (4.1) and used Java. It was not designed for the volume of transactions and the number of system users BBC Company interfaced with at one time. There was never a stress test that measured the system impact of so many users at one time. The QA system was not designed for that type of testing.

There is a newer version (5.1) that is based on a different platform – ABAP-- that would have better supported the performance requirements.

The testing that was done was primarily unit testing and functionality testing. EM Dev2 felt there was not enough of integration and system stress testing.

EM Dev2 indicated that the upgrade project was very difficult. BBC Company was not only performing a technical upgrade of ECC (R/3) and SCM (APO), it was also upgrading Oracle and replacing the transportation management system within the same U.S. project. “There were too many moving parts,” he said. He felt the project would have been more successful if it had been organized as 3 or 4 separate projects to provide the appropriate level of attention/focus to each one. The TMS Replacement project was a big project by itself and should have been treated as such. While he was dedicated to the EM/WCL systems, other resources had responsibilities that touched more than one of the project workstreams.

He indicated that there were a limited number of technical resources who could assist with the EM/WCL development besides EM Dev1 and him (Solution Designer and one other consultant). The other technical resources who worked on the EM/WCL systems had responsibilities that extended beyond EM/WCL to other system functionality.

EM/WCL Design Methodology

The design process began with the business requirements; however, the requirements did not provide enough detail. The business lead was involved in the design of EM/WCL early; however, that business representative left the company. The new business lead replacement was involved early in the project, but was not one of the primary system users. A meeting was held with the business users to gather more information. Based on the business user involvement later in the project, EM Dev2 felt it would have been beneficial to the project, from a design perspective, to have at least one of the primary business users actively involved earlier in the project. By the time the primary business users had an opportunity to test the new system it was too late to incorporate many of their requests for system design changes due to time limitations.

EM Dev2 indicated that most of the testing with carriers was done with one large carrier. He suggested that involving more carriers in the testing of the new system would have been helpful.

TPVS/WCL/EM Test vs Production Versions?

When asked for insights from a technical perspective regarding differences in the system that was delivered in production vs the system that was tested, EM Dev2 said he believed it was a performance issue. When asked about the “ transport” process, he did not think this was a factor.

Documentation

In response to the observation that many documents were missing or incomplete on the project's SharePoint site followed by a question of whether the technical documentation was actually stored in a different location, EM DEV2 said the SharePoint site was the location for all documentation; however, the deadlines they faced caused them to prioritize the more urgent system development over documentation. He said the project could have utilized 1-2 more technical resources, especially for the TPVS component. Issues with Load Builder and TPVS caused delays in the work related to EM/WCL. The resource responsible for TPVS was unable to focus on TPVS due to issues with the Load Builder. The "project casualty" was integrated testing. It could not be done because the other system components were not yet working.

Lessons Learned – Recommendations for implementing this system for a different company

5) Conduct carrier testing earlier in the project with more carriers
6) Get the right user(s) involved early in the project to gather user knowledge and determine design requirements.
7) Set up the project as a stand-alone project with one project plan and dedicated resources.
8) Conduct comprehensive, integrated testing.
9) Having a good business user team that did not panic during the go-live phase was helpful. The business users did a great job of prioritizing the issues and assisting with the carrier users by fielding phone calls, troubleshooting the issues encountered by the carriers, and helping to categorize the problems.

At the end of the interview, EM Dev2 was thanked for his time and his willingness to share his insights related to the TMS Replacement Project. It was reinforced that his identity would be kept confidential and that the BBC Company's name would also not be disclosed in the case study.

Interview with BusUser1:
TMS Replacement (EM, WCL and TPVS)
March 27, 2009

Overview:

A telephone interview was conducted with Business User 1 (BusUser1), who is one of the transportation planners in the Logistics department. During the SAP Upgrade/TMS replacement project, BusUser1 performed system testing and carrier training related to the WCL during the development stage of the project. In addition, he handled a large percentage of the calls from carriers during the "go-live" phase of the project. He was later instrumental in defining the business requirements and testing the solutions during the enhancement phase of the project.

The interview lasted approximately fifteen minutes. Background regarding the purpose of the case study was disclosed to BusUser1. He understood and agreed to the fact that the information he shared would be utilized and quoted in the formal paper related to the case study and that his name and the company's name would not be disclosed. The purpose of the interview was to gather his ideas, based on his experience as a business user during the upgrade/TMS replacement project, regarding the major issues and lessons learned.

An overview of the method of analysis utilized thus far was also disclosed:

- reviewed the documentation of the project's SharePoint site
- reviewed and categorized the HELP Desk Tickets created during the 6-week production support phase (go-live to hand-off as normal system maintenance)
- analyzed the HELP Desk Tickets in relation to the defined business requirement, the defect log and the enhancements that were identified for the enhancement phase following the production support time period
- interviewed EM Dev1 and EM Dev2
- this interview was another iteration in the project analysis as there were many unanswered questions from the documentation

He was asked to share his knowledge and insights related to the project. Interview questions were prepared in advance to use as necessary to lead the conversation, but the goal was to understand the issues from his perspective and his role in the project. The interviewer allowed the conversation to occur, asking pertinent questions as the conversation progressed.

Biggest Issues

The biggest issue was the lack of structured testing. It was not thorough. Every time we tried to do testing, it seemed as if there was an issue with the data or the system. There was a point where we had to go live and EM/WCL were missing pieces. Even if we'd had successful testing, we probably would have run out of time before the go-live, but could have had a better chance to identify and resolve more of the issues prior to go-live.

BusUser1 was pretty comfortable with the overall system functionality at go-live because he conducted training classes for carriers.

The TMS replacement involved APO and TPVS. Those applications seemed more "ready" than EM/WCL. Overall, he felt that the transportation issues were not as much of a problem as the issues encountered with the Load Builder application. It had major issues that had to be resolved in order to keep the business running. We had some manual workarounds we could perform.

From an overall SAP-specific viewpoint, it was difficult to get data for testing. It was never clear who was responsible for setting it up. There was a limited amount of test data. There were multiple groups using the same data. Bottom line—there was a lot of productive time lost when trying to test.

Conducting the training was very difficult because you were never certain the data would be available for each class. If another group ran a process, it might impact your data.

What would you have done differently or would you do differently if you to do over?

The system developer(s) should spend time sitting next to the business users to understand their work and the business requirements. He said he never saw the business requirements for the project. He participated in a meeting with the system developer (EM Dev2) and the project lead for the business early in the project to help identify the business requirements related to the portal tool (WCL). It was a long time (several months) before he saw the system prototype. He did not see any documentation related to the user input. There were a number of meetings where the users were supposed to see the new WCL, but the meetings were not very successful. There was always a problem with the data/system.

At the end of the interview, BusUser1 was thanked for his time and his willingness to share his insights related to the TMS Replacement Project. It was reinforced that his identity would be kept confidential and that the BBC Company’s name would also not be disclosed in the case study.

Prepared Interview Questions (if required)

Project background and purpose:

- **Looking for information on what can be learned from the implementation of TPVS and especially EM. What could be applied by others implementing these systems that would help with an efficient design, development, testing, and deployment process?**
- **Reviewed documentation on the SP site**
- **Reviewed and categorized HELP Desk Tickets (6-weeks prod support)**
- **Analyzed TMS HELP Desk Tickets in relation to defined business requirements, the defect log and the enhancements that were planned**
- **Found that there are many questions that were not answered from the documentation**

Project Structure

An RFP was issued for a third-party company to manage the Project Evolution upgrade/TMS replacement project. What company was hired? (SAP, HP, other?)

What project methodology was followed?

How was the overall project structured from an organizational perspective?

PMO (Global vs US)

Steering Committee

Project Team

What was the organizational structure of the TMS project team?

How were the project team and technical resources assigned? By skill set or by functional area within SAP (DP, SNP, PPDS, TPVS, EM)?

Were technical resources assigned to more than area of the project?

What were your roles and responsibilities for this project?

Did the organizational structure change during different phases of the project?

What was the system design process for TPVS and EM?

There were business requirements defined for the TMS system. How were they utilized in the system design process?

How were users involved in the **design** of TPVS and EM?

How were users involved in the **testing** of TPVS and EM?

At "go-live", the production EM system looked and behaved very differently from the test version of EM. There were a high number of issues related to EM reported to the HELP Desk. What kind of insights can you provide from a technical perspective as to what may have caused the differences and the issues? (HELP Desk Ticket List for Reference)

Was the SAP Solution Manager System utilized for this project?

Can you provide some background as to how the system changes were managed – movement from DEV to TEST to PROD? Some of the explanation I have heard is that the transport system caused part of the problem. Can you help me understand that process and how it may have failed?

Validate system context diagram .

Technology for EM

We are using the SAP Portal for WCL component of EM. Does that use NetWeaver?

What were the biggest challenges in designing/developing EM?

Documentation

As I reviewed the documentation on the project SP site, I found:

- Many documents missing
- Many documents incomplete

Did you and other technical resources document the project elsewhere? If so, what was the process for documentation?

Defect log: What were the criteria for entering a defect? (Many of the issues encountered during testing were not in the defect log and re-appeared in production.) How were the changes in testing documented and moved to PROD?

Lessons Learned

Based on your experience with this upgrade/TMS replacement project, what would you do differently if you were implementing a new SAP TMS system for a different company?

Design/testing

Project Management

Resources

Business Involvement

Technical

Other

Any other thoughts you think might be helpful to others considering implementing TPVS or EM?