Deutsche Bank AG

Transaction Pricing / Cost Allocation Project

A Major Qualifying Project

Submitted to the Faculty

of

WORCESTER POLYTECHNIC INSTITUTE

in partial fulfillment of the requirements for the

Degree of Bachelor of Science

by

Walter Canuto

Mehmet Emre Cekirdekci

Approved by:

_____

Prof. Arthur Gerstenfeld

January 27, 2010

Abstract

Global Cross Business Services (GCBS) at Deutsche Bank has recently commenced work to develop a new transaction pricing model for the services it provides to its clients. The goal of this project is to provide an analysis of the current cost environment within GCBS, illustrate deficiencies associated with the existing cost allocation model and list recommendations to show how costs should be allocated to clients. The Worcester Polytechnic Institute (WPI) team met its objectives through a series of structured interviews with selected managers, data analysis, and industry research.

Acknowledgements

We would like to thank our sponsors at Deutsche Bank for giving us this opportunity to work at one of the world's top investment banks. Specifically, we would like to extend thanks to Barry Zucker, William Hoffman, Sage Gajarawala, Alex Robin, Russell Packford, Arun Abraham and Berkys De Jesus.

We also would like to thank our advisor, Professor Arthur Gerstenfeld, for his constant support and supervision throughout the project. Working on Wall Street was a valuable experience for us as we conclude our studies at Worcester Polytechnic Institute.

Executive Summary

A profitable enterprise seeks continuous improvement by evaluating and incrementally developing internal operations. As the collaboration of internal departments improve, so will the final product provided to the consumer. Cost accuracy is a major concern to investment banks looking to increase profit and improve interdepartmental collaboration. Deutsche Bank's Global Cross Business Services (GCBS) is currently targeting its current internal cost allocation model and plans to implement a new model in 2010. GCBS charges clients for providing reconciliation services that reconcile information between internal departments.

Currently, internal clients are charged based on transaction volume consisting of vague cost reporting. The current environment lacks accurate, transparent and objective qualities that are required for a robust system. Vague allocation of reconciliation service charges is not substantial for both GCBS and its clients. Current service charges are heavily dependent on percentage values defined by managers instead of tangible information acquired from actual data sources. The lack of information forces managers to make subjective estimations, decreasing the model's accuracy and objectivity. Insufficient information may be a result of different factors, two of which could be applications created by users that do not track volume and clients withholding information. In many cases, the proper information required exists, although the difficulty lies in obtaining the information. As for other matters, the new pricing model should focus on building an incentive based cost environment. Clients that perform at a higher service level should be rewarded for their efforts and become an example for other less efficient departments.

The WPI Major Qualifying Project (MQP) team was invited to Deutsche Bank to commence work on the new volume-based cost allocation model. The MQP team was to investigate issues with the current volume based pricing model, compare alternatives, and recommend a solution for the new model. The project involved interviewing Deutsche Bank employees, examining relevant documents, comparing alternative pricing models and tracking data sources.

To analyze the current environment, the team examined GCBS activities and costs. The process of providing reconciliation services was examined, followed by examination of costs incurred by GCBS. A Profit and Loss statement from the previous year (2009) was pulled from COGNOS for cost information. Identifying key costs and correlations between countries was among the prime focus. The team was also concerned with correlations between costs and possible drivers such as headcount and volume. Analysis showed that 99% of total annual cost was concentrated into only 10 key categories. SOM IB, salaries, GTO IES, and IB IT accounted for the largest costs with 19%, 18%, 15%, and 15% respectively. In addition, 67% of the annual cost was generated in 6 countries. UK, USA, Singapore, Italy, Germany, and Japan were the top 6 countries; no correlation in cost behavior was identified among the 6 countries.

Once the essentials of GCBS costs and activities were understood, the team began to study possible drivers behind GCBS costs. The team was in search of links between cost trends and drivers such as headcount and reconciliation volume. As the investigation began, the team soon realized that there was not enough information to make direct connections between the two supposed drivers and cost behaviors. Instead of a whole year's worth of offshore FTE data, the team was limited to only months June through September of 2009. With only three months of information, the team could not reach unambiguous conclusions; assumptions would have to be

made. We felt that cost related to labor such as salaries or benefits must be driven by the number of employees and static data would not sustain a functional pricing model. We continued our investigation of drivers by exploring reconciliations volume as a driver of cost. Only volume information for SSR and TLM were accessible at the moment; therefore, the team had a limited view of reconciliation volume handled by GCBS. Focusing on only SSR and TLM, the team did conclude that volume should have an impact on variations in cost. We also concluded that additional drivers existed that were responsible for differences between volume and cost trends. More analysis of current and additional information would have to be conducted to uncover and validate all key cost drivers.

Having researched alternative pricing models, we felt that an Activity Based Costing model would be the basis of our theoretical model. GCBS costs would be pooled into three cost pools (Headcount Driven, Platform Driven, and Management). Reconciliation tools would also influence the cost of service. SSR and TLM reconciliations fell into their respective categories; however, reconciliations done on other platforms besides SSR and TLM would fall into a nonstrategic platform category. Service charges would then be dependent on the activities (STP, Manual Labor, or Investigation) required for the clients' reconciliations. Our theoretical model is the initial framework for the future cost allocation model. Deciding a value for specific activities within a service provision would be the next step. The model does provide a starting ground for the next individual assigned to the project.

Information from the analysis translated to several conclusions regarding costs, information, and drivers. The two important conclusions were the insecurity of information and uncertainty of cost behavior. A reliable source of information that is updated automatically into the cost model would improve objectivity and accuracy. Reconciliation and break volumes data

do not come from dependable sources, thus compromising the accuracy of client charges. Within COGNOS, the break and reconciliation volumes are determined by percentages set by managers instead of true TLM and SSR volumes. In place of estimations, clients should be charged on the true amount of reconciliation and break volume they produce. The P&L statement used to examine the cost drivers created difficulties with establishing correlations between costs and drivers. There were many noticeable fluctuations due to corrections made by the accounting department. Corrections are made when costs are incorrectly attributed to a P&L line. Corrections involved debiting the specific value from one P&L line and crediting it to another. When the P&L lines were charted, the corrections can be mistaken for an actual representation of cost behavior. The fluctuations are misleading since they are corrections and do not accurately represent the trend of GCBS costs. The P&L also included CTB costs that were unrelated with the process of reconciliation. CTB costs could have also corrupted the analysis just as the accounting corrections did. Besides the issues with the information, the analysis did provide a conceptual understanding of the GCBS cost base. We were also able to indentify key costs and regions, current deficiencies, as well as begin a creation of a future Activity Based Costing model. In the process, data sources were also identified that will be helpful in the future.

To approach the problems that were revealed, recommendations and next steps were presented. Due to possible misconception, the P&L should be stripped of the accounting corrections and CTB costs. Once the costs are fully understood, drivers can be identified and the theoretical model can be updated to consist of the proper number of cost pools. We also felt that it is important that GCBS monitor its break resolution performance by tracking monthly numbers of break resolution. To determine efficiency within GCBS, we recommended that the time required for break resolution be tracked and analyzed. Our investigation also showed that many

breaks have gone without resolution for long periods of time. We recommend that a time factor for resolution be included when calculation client charges. We found that the data sources required to create a functional model are in existence, however difficult to attain. The search for data sources and reliable information must continue and we feel this is the key to creating an effective model.

Table of Contents

1. Introduction

On May 17, 1792, the Buttonwood Agreement established the beginning of the world's largest stock exchange, The New York Stock Exchange. Compared to its origins, today's market has grown in numbers and complexity. Investment products include but are not limited to bonds, stocks, futures, options, ETFs, and mutual funds. Through the years, regulations have been adopted to govern the safety of the investors. Regulations intend to assist with creating a systematic process for conducting business. Investment service firms have matured in order to meet consumer demand and abide by market regulations. Investment banks have advanced their operations in order to remain competitive. Internal operations are always being evaluated and incrementally developed.

Cost accuracy is a major concern to investment banks looking to increase profit. Deutsche Bank's Global Cross Business Service (GCBS) is currently targeting its current internal cost allocation model and hopes to implement a new model in 2010. Currently, internal clients are charged based on transaction volume consisting of vague cost reporting. If cost can be more clearly presented to clients, then they will be more likely to accept the charges.

The WPI MQP team was invited to Deutsche Bank to commence work on the new volume-based cost allocation model. The MQP team was to investigate issues with the current volume based pricing model, compare alternatives, and recommend a solution for the new model. The project required the team to

- Interview Deutsche Bank managers and stakeholders
- Examine relevant documents (P&L reports, Landscape Document, etc …)
- Research and compare Cost Allocation vs. Transfer Pricing

- Research and identify current data sources

The MQP team completed preparatory research before its arrival at Deutsche Bank. *Standard & Poor's Guide to Money & Investing* and *After the Trade is Made* by David Weiss were read to provide an overview of capital markets and their functionalities. As best as possible, Deutsche Bank and specifically GCBS were researched for a better understanding of services and operations. Under presumptions that Activity Based Costing (ABC) will likely be the foundation for the next cost allocation model, the team decided that it was necessary to become more acquainted with its methodology. At the request of the Deutsche Bank sponsors, the MQP team acquainted themselves with Microsoft Project. MS Project assisted the MQP team with staying on schedule and completing all objectives in the allotted time. Previous MQPs were also read for guidance in capacity management and the report structure.

2. Background

This section is a review of fundamental materials researched before and after commencing the project at Deutsche Bank. The information collected helped the team members become acquainted with the work environment that they would be working in as well as providing knowledge about key subjects that were dealt with.

2.1. Capital Markets

Capital Markets are markets where individuals and organizations, including business enterprises and governments, trade securities. It includes stock markets, bond markets, commodities exchanges and "just about any physical or virtual facility or medium where debt and equity securities can be bought or sold."[1] Examples of financial instruments traded in capital markets are as follows:

- Equity instruments
- Foreign exchange instruments
- Insurance instruments
- Credit market instruments
- Hybrid instruments
- Derivative instruments

Capital Markets consist of two parts named primary market and secondary market. Primary markets, also called the new issue markets, deal with the issuance of new securities. Organizations can obtain additional funds by selling their equities to the public through an initial

[1] Tatum, Malcolm. "What is the Capital Market?" *Conjecture Corporation*. 2009. Web. 11 Nov. 2009.

public offering. The securities in primary markets can be bought directly from the shareholders which is not the case in secondary markets.[2] Secondary market, also called aftermarket, is the financial market where investors purchase securities from other investors rather than from the issuing companies themselves.[3]

2.2. Internal Markets

Internal market is a mechanism inside an organization or a group of organizations where different components trade their products/services among each others. The components (e.g. different departments) of the same organization charge each other certain prices for products and services they provide. The financial statement of each department illustrates internal sales and purchases in addition to the externals.

2.3. Deutsche Bank AG

Deutsche Bank is one of world's leading investment banks. Headquartered in Frankfurt, Germany, the bank currently employs 78,896 employees and operates in 72 countries including USA, Canada, England, Japan, Russia, Singapore and Australia. The bank is also growing in expanding markets such as Middle East, Asia, Latin America and Eastern Europe. A variety of financial products and services offered by Deutsche Bank includes sales, trading, and origination of debt and equity; mergers and acquisitions (M&A); risk management products, such as derivatives, corporate finance, management, retail, fund management, and transaction

[2] "Primary Market." *MapXL Inc*. Web. 10 Nov. 2009.
[3] "Capital Markets." *Welcome to Investopedia.com*. Web. 18 Jan. 2010. <http://www.investopedia.com/terms/c/capitalmarkets.asp>.

banking. Deutsche Bank is listed on both the Frankfurt and New York stock exchanges and its stock is traded under the symbol DB. [4]

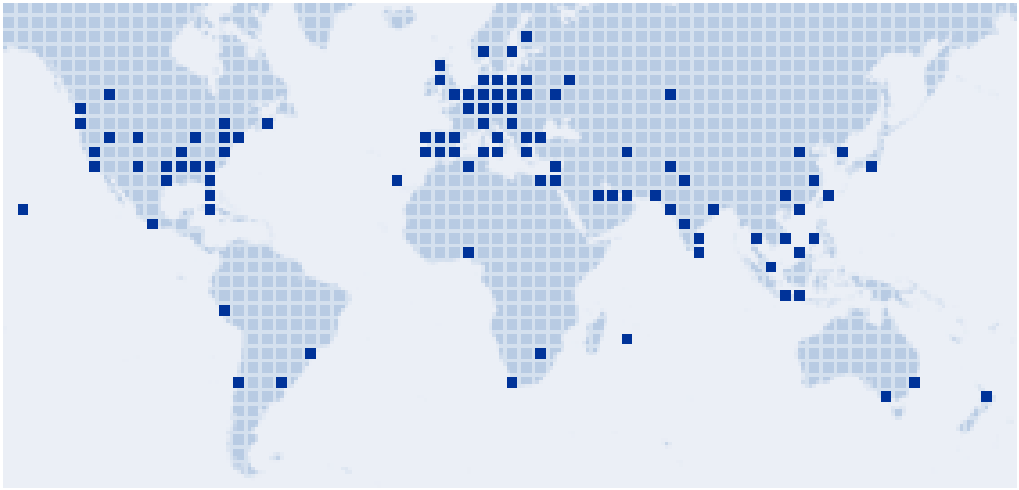

Figure 1: Deutsche Bank Global Network[5]

2.3.1. Global Cross Business Services (GCBS)

Global Cross Business Services is a division of Deutsche Bank within Operations and responsible for three distinct processes: Reconciliations, Instrument Static Data and Local Regulatory MIS/Client Audit Confirmations. Specific duties related to each process are included below.

[4] "Deutsche Bank -." *Wikipedia, the free encyclopedia*. Web. 18 Nov. 2009. <http://en.wikipedia.org/wiki/Deutsche_Bank>.
[5] "Deutsche Bank - Global Network." *Welcome to Deutsche Bank!* Web. 18 Oct. 2009. <http://www.db.com/en/content/company/global_network.htm>.

Reconciliations	1. Reconciliation of nostro, internal and depot accounts on the SSR application 2. Reconciliation of trade, position, balance and P&L on the TLM application 3. Other reconciliations (FO/SL, BO/GL, Inter System Rec) 4. Control and Administration functions (SSR and TLM) 5. Break investigation & chasing 6. Inward/Outward facing client relationship 7. Management / Supervisory
Instrument Static Data	1. The set-up and maintenance of security instrument static data on the front office and back office application of Deutsche Bank 2.Creating DB 'golden source' of static depositary
Local Regulatory MIS/ Client Audit Confirmation	1. The performance of country specific data required by local regulators 2.The performance of 'audit confirmations' on behalf of clients and their auditors 3. Control & SOx For GCBS

Figure 2: GCBS Functional Coverage

Currently, about 30% of GCBS operates either onshore or nearshore. GCBS is distributed throughout 18 countries and have clients in 43 countries worldwide. Management, CTB, Control and Administration functions, and Client/Vendor Relationship Management are handled at the onshore/nearshore locations. The other 70% of locations reside offshore and are responsible for the majority of the Reconciliations & Break Investigations, Security Instrument Static Data, and Local Regulatory MIS/Client Audit Confirmations.

GCBS has future plans of increasing offshore involvement as well as modifying the regional functional coverage. The onshore headcount will decrease to 10% and focus on Management, Client Relationships, and SME related functions. Reconciliation, Resolution Investigation, Reporting, Client/Vendor Relationship Management, Local Regulatory MIS/Client Audit Confirmation, CTB, and Security Instrument Static Data will be handled by the offshore and nearshore locations. The offshore headcount will increase to 80% and the nearshore headcount will drop to 10%.

Reconciliations

"The key purpose of the Global Cross Business Services (GCBS) is to act as an independent control function within Operations in order to mitigate risk and enhance efficiency within the transaction processing environment."[6] To increase the integrity of Deutsche Bank's system, books, and records, GCBS provides reconciliation services to internal departments. Reconciliations involve reconciling information differences between two entities regardless if the information is internal or external and system generated or not. Reconciliation examples are provided below.[7]

Nostro (cash) reconciliations ensure that expected cash, as reported on the Bank's books and records, is received within the appropriate accounts on the contracted settlement date in order to protect the Bank's underlying cash asset base.

Depots (stock) reconciliations ensure that the Bank's stock assets, as reported on its stock ledger, are received within the appropriate accounts on the contracted settlement date in order to protect the underlying asset base.

Control/suspense/wash accounts hold items that are recorded on a temporary basis pending the receipt of further information, before they are posted to balance sheet or P&L accounts.

Inter-system reconciliations are defined as the reconciliation of any two sets of related data between any two systems within the same DB entity.

[6] "Global Cross Business Services." *Deutsche Bank*. Web. 1 Nov. 2009.
[7] "Global Cross Business Services." *Deutsche Bank*. Web. 4 Nov. 2009.

Intercompany reconciliations are defined as the reconciliation of any two sets of transaction data between the same DB entities (intracompany) or different DB entities (intercompany). Intercompany exceptions exist where DB entities have not agreed the economic terms to a trade prior to value date for cash trades or prior to expiration date for derivatives. The purpose is to mitigate operations' and regulatory reporting risk.

FOBO are the reconciliation between Front Office to Back Office Systems.

BOBO are the reconciliation between Back Office to Back Office Systems.

FOGL are the reconciliation between Front Office to General Ledger.

FOSL are the reconciliation between Front Office to Sub Ledger.

Reconciliation Tools

Global Cross Business Services (GCBS) currently uses a number of different software tools to complete reconciliations. The two major reconciliation tools used by GCBS are SmartStream (SSR) and the Transaction Lifecycle Management (TLM). Reconciliation tools are responsible for matching information from two sources. Information that reconciliation tools cannot automatically match, known as break, will require GCBS manual labor for resolution. A break investigation and resolution consumes more time and resources thus creating more labor cost. The goal is to create as much straight through processing (STP) therefore decreasing GCBS and Deutsche Bank costs.

SmartStream (SSR), developed by SmartStream Technologies Limited, has been used by Deutsche Bank for the reconciliation of nostro, depot and internal accounts since 1998. The application has been updated continuously and GCBS currently uses the 7.621 version.

The Transaction Lifecycle Management (TLM), developed by SmartStream Technologies Limited as well, is Deutsche Bank's strategic reconciliation tool and performs reconciliations of cash and security transactions. TLM is currently used to support Deutsche Bank's broader GCBS architecture. The aim of this architecture is to use a common IT platform across business. This initiative is considered to reduce costs and prevent localized development "while creating a strategic, low cost, and scalable enterprise-wide model capable of servicing the entire Bank."[8] An important step of this initiative is to migrate all reconciliations off Smartstream to TLM by 2010 which will result in cost and complexity reduction.

2.3.2. Landscape Document

The objective of the Landscape document is to illustrate the reconciliation activities performed inside the bank. Reconciliation information is entered into a sizable spreadsheet, which assists in organizing the information. Each row in the spreadsheet represents a reconciliation and each column represents a reconciliation feature. Reconciliation tool (e.g. SSR), reconciliation type (e.g. BOBO), location (e.g. Europe), and respondent are a few of many columns within the document. By properly filtering the information, all GCBS reconciliations can be identified. The document can also be used to create pivot charts/tables to help understand the reconciliation activity within Deutsche Bank. The information in the Landscape document is vital for GCBS as it helps GCBS keep track of reconciliations conducted. Nevertheless, the landscape document is a static data document and needs to be updated manually.

[8] "Global Cross Business Services." *Deutsche Bank*. Web. 4 Nov. 2009. <http://ibo.gto.intranet.db.com/ibo/cross_operations/GCBS/StrategyBusinessArchitecture/GCBS_Applications.htm>.

2.3.3. COGNOS

Cognos is the operational planning, budgeting and forecasting tool used by GCBS. During the 7 weeks on project site, the WPI team acquired the necessary cost information from Cognos. This information includes GCBS's profit and loss statements, and regional costs.

2.4. Pricing Models

All types of organizations incur cost as a result of the products they produce or services they provide. Even though direct costs of products or services can be traced to individual cost objects (e.g. products, services, activities or departments) within an organization, indirect costs cannot be easily traced and therefore need to be allocated. Cost allocation is the process of assigning indirect costs to cost objects. By allocating costs to cost objects, organizations can determine the cost of their products or services and use this information for decision making purposes. Broadly, there are two types of cost allocation methods: Traditional cost allocation and Activity Based Costing.

Traditional costing systems allocate indirect costs to cost objects on the basis of volume such as labor hours, machine hours or the number of items produced. This approach, therefore, assumes that all costs are proportional to production volume.

Activity Based Costing (ABC), developed in 1980s by Harvard University professors Robert Kaplan and Robin Cooper, is an alternative to the traditional accounting. Contrary to the traditional cost allocation systems, ABC takes into consideration the fact that there are many factors other than production volume that drive cost. ABC proposes that activities are the real cause of indirect costs. It identifies activities within an organization and assigns the cost of each activity to the products/services to the extent that the product/service uses the activity. This way, ABC helps organizations charge their products and services more accurately and is less likely

than traditional way of accounting to undercharge and overcharge products and services. For further explanation on Activity Based Costing, refer to Section 4.2.2.

Transfer pricing is the charge of internal departments for the exchange of goods or services. GCBS offers a reconciliation service to different departments in the bank. When reconciliation is performed, it requires Deutsche Bank employees, resources, and time, which all incur a cost. Since GCBS does not produce any revenue, it must charge the departments which make use of the reconciliation service. The transfer price is the charge that GCBS sets for departments. There are a few alternative methods for calculating the transfer price: Actual Cost, Variable Cost, Standard Cost and Negotiated Cost. Actual Cost Based sets the charge to cover the full cost, Variable Cost Base charges out only the variable cost, Standard Cost considers an estimate of actual cost, and Negotiated Cost involves negotiations between departments. Each alternative consists of unique features as well as drawbacks. For further detail regarding the alternatives, refer to section 4.2.3.

2.5. Microsoft Project

In efforts to fully utilize resources and time, project managers have familiarized themselves with project management software such as Microsoft Office Project. The constant flow of information within investment banking operations is vital to its business operations. It has become essential for management to create projects to utilize the information in order to improve services. Projects can be geared towards improving bad practices or building on current successful processes. Usually, a project concentration can be easy to spot although managing a team to successful completion of a project may be more cumbersome.

Developments associated with ease of use, power, and flexibility have transformed Microsoft Project 2007 into a more efficient and effective project management tool. Project managers stay informed and in control due to MS Project's capability of:

- Developing Plans
- Assigning Resources to Tasks
- Tracking Progress
- Managing Budget
- Analyzing Workload

Before beginning work within MS Project, managers build a collection of tasks listed in a specific outlined structure. The collection of tasks is usually referred to as the Work Breakdown Structure (WBS) and is crucial to creating a project's lifetime map. The WBS is constructed of task groups requiring completion to reach an end objective. A project organization and scope should be easily observed from the WBS. Once the WBS is completed, schedules based on task duration and precedence are created onto the WBS using MS Project.

Along with the project management features, users are provided other advantages when using MS Project. Advantages regarding project adaptability and communication are significantly important to managers. By creating predecessors, users can easily update changes to the project plan without having to rework the whole plan. To easily present the project plan to other employees, MS Project offers many visual reports such as pivot tables, charts and graphs. The most commonly used visual representation would be a Gantt chart. With the tools offered by MS Project, managers can create a detailed plan for sizable projects as well as a communication medium. Appendix E provides screenshots of our WBS and Gantt chart on MS Project.

2.6. Generating Capacity through Identification of Task Drivers – MQP 2006

In 2006, a WPI MQP team was assigned to investigate and analyze the day-to-day activities of Client Service Representatives (CSR) over six weeks. Prior to 2006, two MQP teams had visited Morgan Stanley for the similar reason but were unable to effectively complete their studies. The 2006 team based their focal point of study on recommendations made by the two previous MQP teams. As a result, the 2006 team developed a time and method study. The time study focused on recording the time needed for completing tasks and the method study focused on how specific tasks should be completed. To record information for both studies, the team members decided to use a Day-In-The-Life-Of (DILO) time study.

The idea was to essentially collect as much information that was permitted in their six week horizon, analyze the information, then hand over the information to the Morgan Stanley Product Development Department for further analysis. An Excel spreadsheet was created for CSR to enter information regarding each and every activity that they took part during a workday. The team met with each CSR the day before their observation day to explain the content of the Excel spreadsheet. In addition, the CSR would forward the team all the emails they sent and received on the observation day. If the team felt that there were any discrepancies with the information provided by the CSR, a follow up meeting was scheduled.

At the end, the team was able to observe 12 different CSRs each handling nearly 11 accounts. After data collection, the team began its analysis and concerns grew towards email administration. A CSR spent 10% of the day reading and sorting through emails. Another problem symptom was multiple CSRs receiving unnecessary emails from multiple mailing lists. The team concluded that filtering and sorting emails may be helpful in decreasing the time spent on emails. Email filtering software and the possibility of server modifications were suggested.

The lack of post-implementation evaluation of automated process was another issue that the team came across. Automated processes are implemented so that a CSR could spend less time manually completing certain tasks. However, the team noticed that the automation process usually raised more questions rather than answers for the CSRs. The team suggested standardizing a pre and post examination of automation.

As for DILO method of study, the team suggested that an automated way of conducting the DILO study would be beneficial. CSRs expressed that more often than not they were more concerned about how to complete the DILO spreadsheet instead of what actions they were writing down. Investment banking is too fast paced for information to be collected manually as well. By automating the process, they could collect more precise information from more CSRs.

3. Methodology

The methodology was determined according to the respective priorities of our objectives. Our project consists of four primary objectives with different priorities. The plan was to start with high priority objectives and continue with the medium and low priority objectives as the project progressed. At the completion of the 7 weeks, there was a presentation to Deutsche Bank's GCBS with an analysis of the current cost model, research of alternative methods, and recommendation to a new cost allocation model.

3.1. Prior Knowledge

Before arriving at Deutsche Bank, the team became familiar with relevant information regarding the project. In order to begin work on arrival, the team researched alternative pricing models. Articles were read and a meeting was held with an accounting professor on campus. Along with pricing model research, the team read over previous MQPs to become acquainted with the structure of the report. Capital markets and financial institutions were also researched.

3.2. Objective 1 – Problem Statement

The first objective was to create a problem statement that accurately described the need for and issues surrounding volume based pricing in GCBS (High Priority). In order to achieve this high priority objective, we first examined the current actual cost environment and interviewed appropriate GCBS managers and stakeholders. Deficiencies in the current model came through the various meetings.

The managers interviewed were:

- **William (Bill) Hoffman** – *(Global CTB Programme Manager)*: Bill initially provided the MQP team with an overview of GCBS and the project. Bill also provided the team with project guidance in the weekly progress meetings held every Wednesday.
- **Sejal (Sage) Gajarawala** – *(Global Strategy & Business Architecture)*: Sage continued the GCBS introduction by presenting and examining the Landscape document with the team. Sage was contact number one for any information regarding the systems used by GCBS (Landscape document, Volumes data, SSR and TLM information).
- **Alex Robin** – *(GCBS Business Manager)*: Alex assisted the team in the completion of their third and fourth objective. Questions pertaining to P&L statements, FTE analysis, key costs and drivers were directed to Alex. The team held conference calls with Alex every other day and engaged in person meetings when Alex visited the US in November 2009. Alex was also involved in the weekly progress meeting on Wednesdays.
- **Russell Packford** – *(Global COO & Regional Head of UK)*: Working with Bill, Russell helped guide the team towards completing the project. Russell provided the team with essential information and ideas. Russell also took part in the weekly progress meetings.

- **Arun Abraham** – *(Vice President of Intra- CFO/Finance COO Office)*: Introductions to ACORN (current charging tool) and COGNOS (reporting tool) were provided by Arun. The team directed questions regarding the cost environment, cost allocation, and transfer pricing to Arun.

Next, we examined the GCBS Profit and Loss Statement (P&L) and the Landscape document (LD) to help identify key cost and drivers. From the P&L, the team recognized the areas where the greatest costs are incurred by GCBS. Cross examination of the P&L and the LD provided the team with a sense of possible drivers. Further investigations were done to identify the drivers of key costs.

Based on examination of the current cost allocation model and the information we got from the interviews, we provided an analysis which includes key costs and possible drivers plus demonstrated deficiencies in the current allocation model.

3.3. Objective 2 – Comparison of Alternative Pricing Models

The second objective was to provide a comparison between a Cost Allocation and a Transfer Pricing model (High Priority). The report is structured to present the team with background information as well as provide GCBS with a future reference. To achieve the objective, a comprehensive research of each model was conducted and advantages & disadvantages along with the unique features were identified. The project analysis also answers the following questions:

1. In an internal market, what are the advantages of a 100% cost allocation model?
2. How would a Cost plus Margin model apply in an internal market?

3. How would retained earnings be tracked and spent? Is there any precedence for this in Deutsche Bank?

Research commenced before the team arrived at Deutsche Bank and continued once the team started working at GCBS to make sure that the high priority objectives were fulfilled on time. Sources of research information were the internet, DBwiki, interviews, and the *Science, Industry, and Business Library* in New York. Once an initial draft was completed, it was emailed to Professor Fabienne Miller for review. She returned the document and the team made necessary changes according to her recommendations.

3.3. Objective 3 – Volume Based Driver for Cost Base

The 3rd Objective was to develop volume-based drivers for a segment of the GCBS cost base (Medium priority). The team identified volume-based drivers and then mapped the GCBS cost-base to those drivers. The complexity of the third objective required the team to complete the objective in multiple steps.

For the first exercise, the team examined the GCBS P&L and set drivers, metrics, and contact information for each line. The exercise aimed to construct a conceptual understanding of GCBS cost base. The second exercise involved the team identifying and sourcing metrics for activity types. In essence, the team proposed three options, including pros and cons, for grouping the reconciliations done by GCBS. Following the grouping, the team made observations regarding the global distribution of full-time employees (FTE) and regional cost.

To understand the cost behavior, the monthly GCBS transaction costs were examined and compared to the Landscape document. The transaction cost information was then cross examined with reports from the COGNOS system to check for soundness. Examinations of fluctuation of

key costs within different regions were also carried out in order to recognize cost behavior. Since information and time were limited, the team finished the project by creating a theoretical cost allocation model. The model required the team to map the GCBS cost base (both indirect and direct cost) to cost pools and later map the cost pools to the specific activity types.

3.4. Objective 4 – Identification of Data Sources

The 4th Objective was to identify data sources required to run a volume-based pricing model and determine their existence (Low Priority). Since this was a low priority and complex objective, we focused more on the objective in the second half of the 7 week period to ensure that we were familiar with the existing pricing model and costing procedure. As the project progressed, the data sources were however revealed. The team presented GCBS managers with a list of all the information that was acquired throughout the project along with where the information could be found. We determined what sources of data are required to run the theoretical cost allocation model. As our second step, we looked to see if any of those data sources actually existed. If so, we attempted to determine how to gain access to those data sources.

4. Analysis and Results

4.1. Problem Statement

The current GCBS cost allocation model consists of issues that require further analysis and resolution. The current environment lacks “accurate, transparent and objective” qualities that are required for a robust system. Vague allocation of reconciliation service charges is not substantial for both GCBS and its clients. Current service charges are heavily dependent on percentage values defined by managers instead of tangible information acquired from actual data

sources. The lack of information forces managers to make subjective estimations, decreasing the model's accuracy and objectivity. The new pricing model should focus on building an incentive based cost environment as well as resolving current issues.

Currently, GCBS recovers 100% of costs by charging its internal clients based on transaction volume throughput, reconciliation break volume and FTE (full-time employee) effort required. Theoretically, a client (e.g. Client A) is billed depending on the following 3 factors:

- Labor: FTE effort required to fix "X breaks" for Client A
- System: System (e.g. TLM) usage to reconcile "X transactions" for Client A
- Management: Management effort required to oversee "X transactions" for Client A

The total cost allocated to Client A is then calculated by adding up labor, system and management costs for all reconciliations performed for Client A. The followings are deficiencies associated with the approach explained above:

Accuracy: The practicability of the GCBS's cost allocation methodology depends on the availability as well as accuracy of transaction volume throughput and break volume because system and management component of client's charge is driven by transaction volume throughput and labor component of a client's charge is driven by break volumes. Nevertheless, GCBS does not have volume data for all reconciliation tools. Even though monthly SSR and TLM volume data are available, volume data for other reconciliation tools still need to be acquired from the IT groups within Deutsche Bank. Additionally, volume and break information in COGNOS are not accurate. Due to the lack and insecurity of information, GCBS managers have a great deal of control over client charges and often make educated guesses in order to

determine how much a client should be charged. This procedure, in turn, yields inaccurate cost allocations.

Objectivity: Since current service charges are not based on sufficient data but rather based on the subjective estimations of managers, some clients are overcharged whereas some others are undercharged, decreasing the model's accuracy and objectivity.

Transparency: A transparent cost allocation model should make sure that clients can understand the nature of their charges. Nevertheless, vague allocation of costs and the model's proneness to manipulations make it hard for GCBS to explain charges to clients.

In addition to these problems, the current cost allocation model does not create appropriate incentives promoting straight through processing (STP). Increased STP means lower labor cost. Therefore, if clients are rewarded for straight through processing, GCBS costs will decrease substantially. The new cost allocation model should eliminate current issues and encourage clients to evaluate the benefits of services for which they are being charged. Client charges should be based on a clear methodology rather than on percentage values set by managers.

4.2. Costing Model Comparison

4.2.1 Cost Allocation

In today's complex and competitive business environments, many firms consist of multiple departments/divisions and the common resources such as information technology and human resources are shared among those divisions. Failure to allocate costs to departments could result in overconsumption of resources as well as making resources seem free even though resources never come with zero cost. Cost allocation is the process of assigning indirect costs to

a cost object such as a product, services, activity or a division of an organization for which the management requires a separate cost measurement. For example, a firm might allocate the cost of an IT system to each department in the firm that uses the system. The primary purposes of cost allocation are:

1. To provide information necessary for decision making
2. To help control cost
3. To reduce the unnecessary use of resources
4. To calculate the costs of products and services for financial reporting purposes and for determining cost based prices
5. To encourage clients to evaluate the benefits and costs of the products/services for which they are charged
6. To help justify prices charged to customers for products and services
7. To help determine the optimal resource utilizations

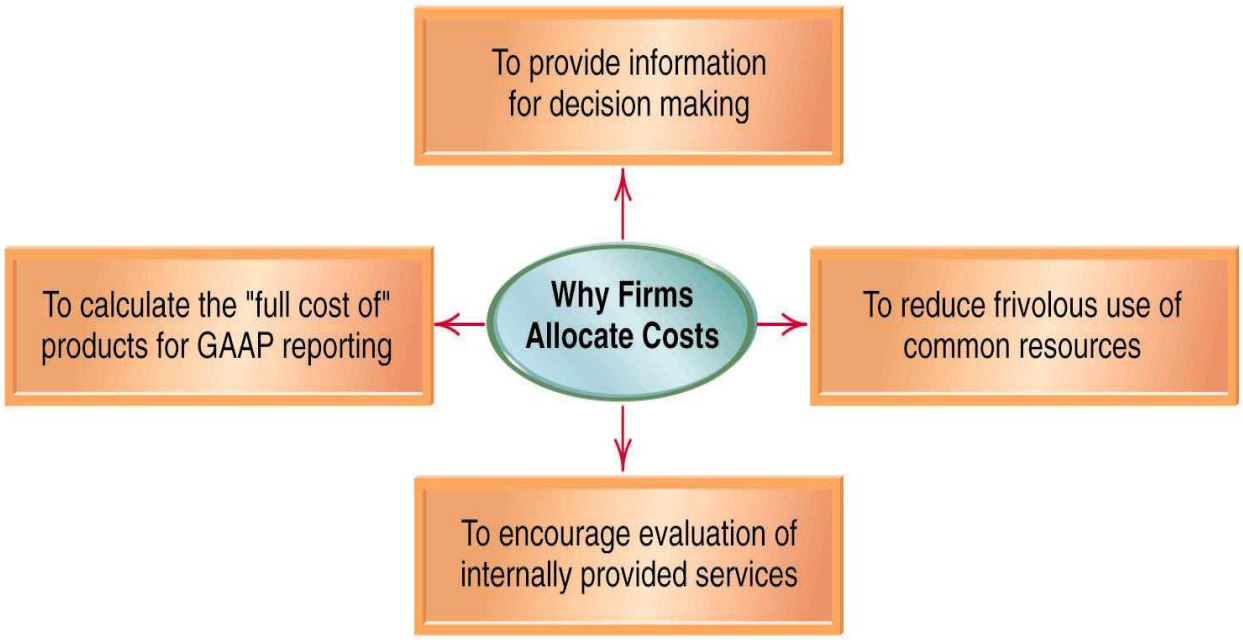

Figure 3: *Purposes of Cost Allocation*[9]

Direct & Indirect Costs

Direct costs are costs that can be traced directly to a cost object. For example, labor cost or material cost for a specific activity can be classified as direct costs. Conversely, indirect costs are not related to a particular activity and incurred in a joint usage. Therefore, they are allocated to cost objects by using a cost allocation method. The costs of general clerical and maintenance activities, depreciation, IT systems or executive director's salary are some examples of indirect costs. It should be noted that a direct cost in one situation could be an indirect cost in another or vice versa depending on the cost environment. For instance, the maintenance cost of a specific project is a direct cost while general maintenance costs are handled as indirect costs.

Process of Cost Allocation

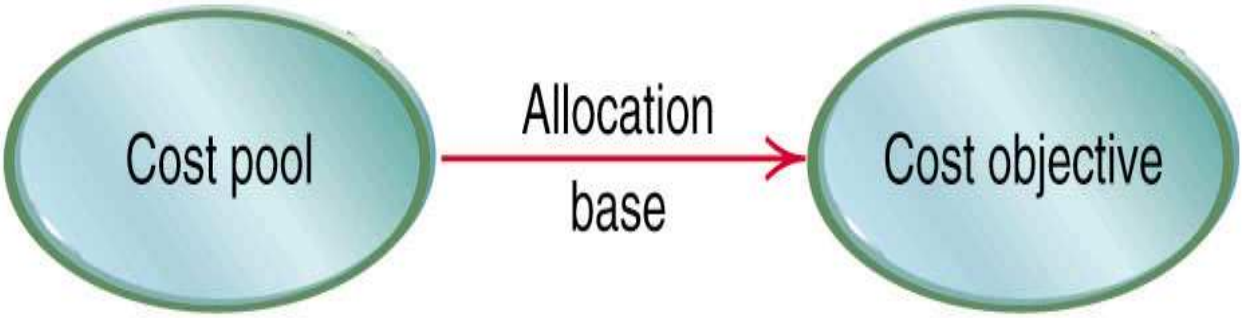

Figure 4: Allocation of cost to cost objectives[10]

1. *Determining the cost objects:* As a first step, the cost objects that will receive the allocation should be determined. Cost objects could be any item that requires a separate cost measurement. Examples of cost objects are customers, products, services or specific operations for which a separate cost measurement is performed.

[9] Jiambalyo, James. "Managerial Accounting." 31 Oct. 2003. Web. 11 Nov. 2009. <http://elearning.najah.edu/OldData/pdfs/ABC3.ppt>
[10] Jiambalyo, James. "Managerial Accounting."

2. *Accumulating Costs in Cost Pools:* Individual costs associated with cost objects are accumulated in cost pools. Examples of cost pools are activities and departments.
3. *Selecting an allocation base to link the cost pools to the cost objectives:* Allocation base is the basis used to link the costs to cost objects. The cost of an IT system could be assigned to departments within a firm by using computer hours as an allocation base.

Allocation of Support Department Cost

Support departments are departments that provide services to operating departments. Unlike operating departments where production occurs or services are provided, support departments do not produce goods but yield indirect activity. Therefore, the costs of those activities need to be allocated to the departments using those services. There are three methods for allocating the costs of support departments: Direct method, Step-down method and Reciprocal method.

1. ***Direct Method:*** The direct method allocates the costs of support department services directly to the operating departments that receive the service. This method does not allocate the cost of services that support departments provide to each other. The advantage of the direct method is that it is simple and straightforward. On the other hand, this method does not reveal the actual resource consumption because services to other support departments are ignored. As a result, management is provided inadequate information to identify process improvements and cost reduction opportunities. [11]
2. ***Step-down Method:*** Unlike the direct method, the step-down method allocates costs of support departments to both production and support departments. The allocation usually

[11] Oliver, Lianabel. *The Cost Management Toolbox A Manager's Guide to Controlling Costs and Boosting Profits*. New York: American Management Association, 1999. Print.

starts with the departments that provide services to the largest number of other departments and ends with the ones that render service to the least number of other departments. Another alternative is to start allocation with the most costly service department. The Step-down method is a widely used method and provides management with more accurate information compared to the direct method because it takes into account the intermediate services. [12]

3. ***Reciprocal Method:*** The reciprocal method recognizes the mutual services among support departments. "It allows the incorporation of interdepartmental services into the cost allocation model." [13] Even though the reciprocal method is very accurate, it is more complex than the methods explained above and requires handling of simultaneous linear equations. [14]

Problems with Cost Allocation

Accuracy: The accuracy of cost allocations has been the subject of endless management discussions. Because allocations of costs are inherently arbitrary, it is very hard to make 100% accurate allocations. Managers often make educated guesses to allocate indirect costs to cost objects.

Trust: Clients may think that the costs are not accurate and they are overcharged.

Time: Cost allocation process is very time consuming. As organizations get more complex, the time it takes for allocating indirect costs increases. [15]

Too Few Cost Pools: Even though it is simple and easy to implement, the use of too few cost pools may not yield accurate results. The accuracy of allocations is usually higher when there are more cost pools. On the other hand, implementation of more cost pools incurs cost. It is the

[12] Oliver, Lianabel. 205.
[13] Oliver, Lianabel. 205.
[14] Oliver, Lianabel. 206.
[15] "Problems with Cost Allocation." *OverheadCAM.com OverheadCAM Cost Allocation Software Component*. Web. 29 Oct. 2009. <http://www.overheadcam.com/Problem.html>.

management's responsibility to decide whether the benefits received from the use of more cost pools outweigh the cost of collecting information and implementing additional cost pools.

4.2.2. Activity Based Costing

In today's complex and competitive business environments, costing accuracy is crucial for companies to make strategic decisions and achieve success. Therefore; companies need to adopt elaborate cost accounting systems that can accurately allocate costs to their products and services.

Traditional costing systems which were developed around 1870-1920 and used until the 1990s by almost all companies do not accumulate costs of activities or processes and rely on arbitrary allocation of indirect costs. Such systems could work well and lead to accurate product and service costs if a company produces a few products and the direct material and labor costs constitute a very high percentage of the total cost. Actually, this was the case when the traditional costing systems were first designed. "The industry was labor intensive, the product variety was small and the overhead costs in companies were generally very low compared to today"[16]. Therefore, traditional costing systems were able to achieve a relatively high level of accuracy of product and service costs.

On the other hand, as companies grew and their operations became much more complex, they needed to implement new costing systems that "improve the accuracy of costs and thereby enhance the value to managers who use this information for decision-making purposes." [17]

Activity Based Costing (ABC) is an alternative to the traditional costing systems. Unlike the traditional way of accounting, ABC identifies activities within an organization, department or

[16] "Activity-Based Costing (ABC)." *Management and Leadership*. Web. 11 Nov. 2009. <http://www.emblemsvag.com/abc.htm>.

[17] T., Horngren, Charles. *Introduction to management accounting*. 13th ed. Upper Saddle River, NJ: Prentice Hall, 2005. Print. 140.

plant and "assigns the cost of each activity to products and services according to the actual consumption by each. In this way, the organization can precisely estimate the cost of its individual products and services for the purposes of identifying and eliminating those which are unprofitable and lowering the prices of those which are overpriced."[18] ABC approach is appropriate when:[19]

- The products are diverse
- Overhead costs are relatively high
- Production volumes vary significantly
- Managers want a better understanding of their cost structure

Traditional cost accounting systems allocate overhead costs to products by using labor or machine hours as allocation bases. This approach assumes that all costs and production volume are directly proportional. Nevertheless, this is not always the case. Let's suppose that a company manufactures two products: Product A and Product B. Product A is a low volume good and requires many activities such as additional engineering, finishing, and inspection etc. Product B, on the other hand, is a high volume good that does not require as many activities. If the company that manufactures Products A and B used traditional costing systems, Product B would receive most of the overhead costs because it demanded more machine hours and its production volume was greater than that of Product B. This approach ignores the fact that Product A requires more attention and activities and miscalculates a product's true cost of manufacturing overhead.

[18] "Activity-based costing -." *Wikipedia, the free encyclopedia*. Web. 20 Nov. 2009. <http://en.wikipedia.org/wiki/Activity-based_costing>.
[19] Oliver, Lianabel. 206.

Activity Based Costing takes into consideration the fact that additional engineering, finishing and inspection are activities and consume resources, which in turn generates cost. Therefore, ABC allocates the cost of those activities to the products that demand those activities. If the above company used activity based costing, the cost of each activity would be assigned to products to the extent they demanded them. In this case, Product A would receive more overhead compared to Product B because it demanded more activities.

The figure below shows the relationship between products/services and the resource they consume.

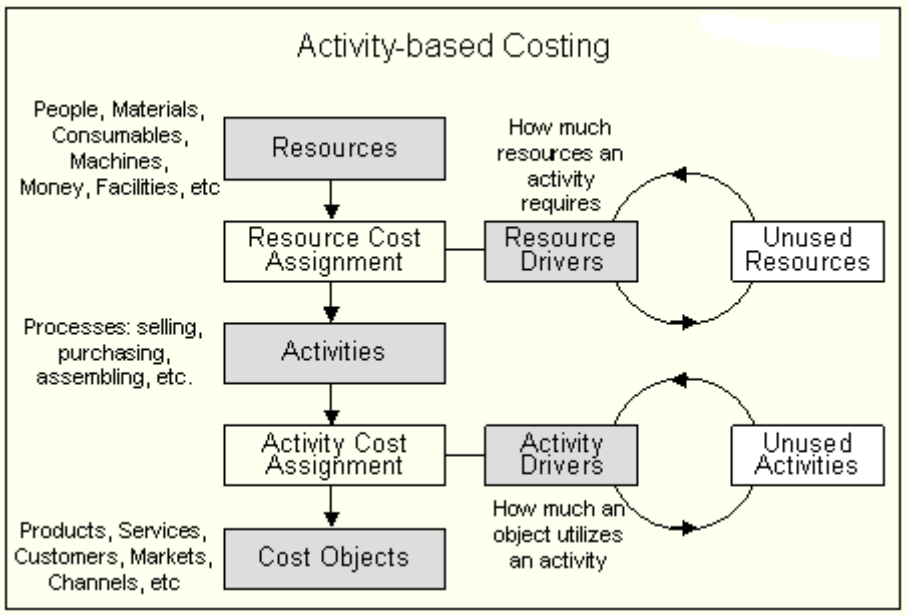

Figure 5: Activity Based Costing Overview[20]

Activity Based Costing is carried out in four essential steps. First, the major activities that cause overhead costs to be incurred need to be identified. Activities are the processes performed by machines or people and change from one organization to the other; therefore, it is vital for an organization to accurately identify its own activities. Once the activities are identified, the costs

[20] "Activity Based Costing." *12manage - Management Encyclopedia and Network*. Web. 11 Nov. 2009. <http://www.12manage.com/methods_abc.html>.

of activities are grouped into cost pools. Determining the number of cost pools is also really important: Too few cost pools may not yield accurate results while using too many cost pools makes the system very complex and hard to implement. The third step is determining the cost drivers. Cost drivers are factors such as labor hours, machines hours or number of transactions that have the effect of changing the level of total cost.[21] Clear identification of cost drivers is significant for accurate allocation of costs to products and services as they are used as allocation bases. The final step of ABC approach is assigning costs to cost objects (e.g. products and services) using the cost drivers.

Activity Based Costing is much more complex than the traditional costing systems. Identifying the activities in the organization and allocating the cost to products and services based on the consumption by each is a hard and time consuming process. On the other hand, companies benefit from ABC in the long run. It helps companies determine the true contributors to financial performance and help distinguish between profitable and non-profitable products/services and customers. Therefore, management can understand where the company "makes a profit and which areas have great potential for cost reduction". [22]

4.2.3. Transfer Pricing

Commonly within organizations one division charges another for providing a product or service. The dollar amount of the interdivisional exchange is known as the transfer price.[23] Service charge clarity, incentive based costing system and a metric for service quality are benefits of a properly implemented transfer pricing model. Charges incurred by transfer pricing

[21] *Basic Cost-Management Concepts*. McGraw-Hill, 2006. Print. Chp3.
[22] "Activity based costing (ABC) definition." *BusinessDictionary.com - Online Business Dictionary*. Web. 29 Oct. 2009. <http://www.businessdictionary.com/definition/activity-based-costing-ABC.html>.
[23] Vaysman, Igor. *A Model of Cost-Based Transfer Pricing*. Review of Accounting Studies, 1996. Print. 1.

are expressed through an accounting system of credits and debits; no exchange of real currency occurs.

Complications with internal pricing are likely to occur since service providers (sellers) would like to price high while service users (buyers) would like to pay low charges. It is imperative for managers to set reasonable transfer prices that could measure internal performance as well as prevent conflict. Both sellers and buyers should also act in the best interest of the entire enterprise regardless if it implies seeking third party support. However, managers of all levels should cooperate to find a solution for rightly setting charges for internal products/services. Considerations when setting transfer prices are[24]:

1. *Goal congruence*. Will transfer prices promote the goals of the company as a whole? Will it harmonize the divisional goals with organizational goals?
2. *Autonomy*. Will the transfer price preserve autonomy, the freedom of selling and buying division managers to operate their divisions as decentralized entities?
3. *Performance evaluation*. Will the selling division receive enough credit for its transfer of goods and services to the buying divisions? Will the transfer price hurt the performance of the selling division?
4. *Other factors* such as minimization of tariffs, income taxes, and observance of legal restrictions.

Depending on an organization's business structure, objectives and resources, different strategic approaches exist for implementing a transfer pricing model. The three most common methods are Cost-Based Pricing, Market-Based Pricing, and Negotiated Pricing.

[24] Shim, Jae K. *Schaum's outline of theory and problems of managerial accounting*. New York: McGraw-Hill, 1998. Print. 186.

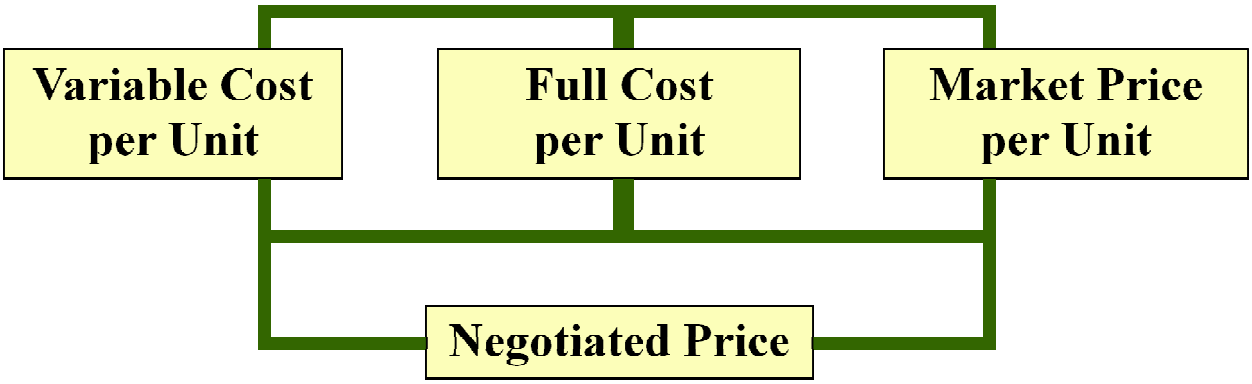

Figure 6: Transfer Pricing Models

Figure 6 provides a visual of the relations between three alternative transfer pricing models. Variable and Full Cost are alterations to the Cost-Based Pricing. Market-Based and Cost-Based Pricing are independent whereas the Negotiated method considers many factors from the other two methods. Methods should be tailored for an organization in order to improve the success level of implementation. Each method will be discussed more thoroughly below.

Cost-Based Transfer Pricing

Many firms handle their intracompany trade with a Cost-Based Transfer pricing model although the model is ambiguously defined. The underlying idea of Cost-Based Pricing is to choose a transfer price based on the costs associated with providing the product/service. Applications of Cost-Based models are open to many interpretations as a result of vague explanation of models in textbooks; however, it is a common method. If an organization agrees to a Cost-Based model, it would then select from three variations: Actual (Full) Cost-Base, Variable Cost-Base, Standard Cost-Base, and Cost Plus. The levels of cost uncertainty and information symmetry are heavily considered in the variation selection[25]. Cost uncertainty refers to the volatility of cost and information symmetry involves how well information is known between parties. Cost Actual, Variable, and Standard Cost-Based pricing methods present

[25] Pfeiffer, Thomas. *Cost Based Transfer Pricing*. 1999. Print. 2.

alternative production cost measurements when calculating the transfer price. Cost Plus supplements the calculated production cost with an additional percentage markup.

Actual (Full) Cost-Base would present accuracy and flexibility; however, the cost and resources to collect necessary information may be significantly higher. Calculations for actual cost transfer price would be based on the complete and actual cost of production, estimates would not be satisfactory. All up to date variable and fixed costs would be built in the transfer price when the contribution exchanges are made. The service provider would set the transfer price at the full cost of providing the service in efforts to cover the cost of operation. On the other end, the buyer may face a higher price than desired although it may still be less than an external price. Organizations consisting of high levels of cost uncertainty along with symmetric cost information among divisions are likely to utilize an Actual Cost approach.

Variable Cost-Base differs from the Actual Cost-Base since it only considers the variable production costs. The seller offers the buyer a product/service at the variable cost of production. Under a variable cost approach, the buyer of the service is pleased by the lower price; however, the seller may not be able to recoup all its expenses from providing the service.

Standard Cost is a predetermined cost of producing a good or service where all factors are presumed to be normal (no special considerations are made).[26] Within the Standard-Based model, standard production costs would be used to calculate the transfer price instead of the actual or variable cost. Standard Cost provides incentives for low cost volatility divisions and would be easier to calculate. There is also a variation of standard cost known as reported standard cost which considers reported instead of estimated cost data. When high levels of cost

[26] Edmond, Thomas P. *Fundamental Managerial Accounting Concepts*. Irwin McGraw-Hill, 2000. Print. 320

uncertainty and asymmetric information exists, reported standard costs provide an accurate transfer price.

Cost Plus incorporates a percentage increase to one of the previously stated methods. Actual or Variable Cost-Based are calculated with an arbitrary markup made to the calculation. Markups are commonly set by the selling division or they can be negotiated among divisions. More likely than not the Cost Plus method is joined with the Variable Cost-Base method to cover some of the losses incurred by the seller. Cost Plus could also be supplemented with Actual Cost-Base method if the transfer price is still reasonably below external prices.

Advantages

- Simplest form of transfer pricing
    - No need for extensive amount of information research
- Reduced implementation and running cost
- Dependant mainly on cost information
- Useful when buying and selling managers are unfamiliar with each other's businesses

Disadvantages

- No incentive for selling division if there is no profit margin
- Charges are not accurately based
    - Cost Plus and Actual Cost – Possibility of overcharging buyer compared to external price
    - Variable Cost – Seller runs the risk of suffering losses
- Not a suitable measure for division performance

Market-Based Transfer Pricing

Organizations may base their transfer price on market prices if a competitive market exists for the product/service. Market-Based pricing sets a price that would be charged if the contributions were sold to external buyers. Since managers have no control over external prices, market prices are believed to be the most objective measure for internal transaction charges[27]. The success of the model is dependent on whether or not the buying division is willing to pay the market price.

In a case where the selling division cannot provide all the necessary goods, the buying division could purchase the goods/services from outside vendors at the same price. The selling division could also provide their additional products/service to outside clients. Market-Based pricing establishes a competitive environment where managers have more options. A variation of the Market-Based Pricing exists where managers set transfer pricing to adjusted external market prices. Referred to as the Adjusted Market-Based Pricing, the method permits managers to provide intracompany discounts in order to attract buying divisions. Selling managers must be cautious of not setting discounts too high or else they will incur losses.

Advantages

- Promotes efficiency and fairness
- Commonly used throughout business organizations
- Possible performance measurement

Disadvantages

- Dependent on competitive market as well as independent divisions

[27] Antic, Ljilja. *Criteria for Evaluating Tranfer Pricing Methods*. Economics and Organization, 2000. Print. 66.

- Market prices may not be available

Negotiated Transfer Pricing

When no external market exists for a product/service, negotiations between divisional managers will be held to set transfer prices. Negotiations instill fairness and profit possibilities for both parties. More importantly negotiations commonly results in lower transfer prices compared to external markets. The two divisions will most likely set an upper and lower limit for transfer prices to ensure that no parties are over/under-charged. The upper limit would be set by the buyer and the lower limit by the seller. More information is collected afterwards and a transfer price is selected which falls within the range.

Advantages

- Resolution of pricing conflict
- Ensures fairness and cooperation
- Effective when no external market exists

Disadvantages

- Takes a considerable amount of time

4.2.4. Advantages of a 100% Cost Allocation Model in an Internal Market

In an internal market, 100% cost allocation ensures that the full costs of a project or service are allocated to internal clients that benefit from that particular project or service. By allocating the full costs of its services to other departments within the same firm, each department could recover its total costs. The cost of each service consists of two elements: The direct costs associated with that service and a proportion of the department's overhead costs. The

departments of a firm should make sure that they could explain their clients how they have calculated the costs mentioned above.

Currently, GCBS is charging its clients for the reconciliation, instrument static data and audit confirmation services. Similarly, GCBS is being charged by several other departments within Deutsche Bank for the services it receives. Full cost allocation brings along significant advantages for GCBS and Deutsche Bank as a whole.

1. From a decision making standpoint, full cost allocation helps GCBS and Deutsche Bank measure the opportunity cost of using the bank's resources. If the cost of using bank's resources exceeds the benefits received from them, GCBS and DB may need to hire outside firms to provide services. (e.g. reconciliation services)
2. Full cost allocation encourages GCBS and other departments within Deutsche Bank to evaluate the benefits of services they are charged for.
3. Allocation of costs by individual departments including GCBS gives Deutsche Bank a full understanding of the costs of the services they support. Deutsche Bank can benefit from full cost information for financial management and strategic planning purposes.
4. Full cost allocation provides GCBS and Deutsche Bank with the information necessary for external reporting. It reduces the time needed to analyze costs.

4.2.5. Cost plus Margin in an Internal Market

When restructuring the cost environment, GCBS may wish to explore the possibility of a Cost plus Margin approach for their services. Cost plus Margin involves setting a markup to an already calculated transfer price. Assume GCBS decides to implement Cost plus Margin and it costs GCBS €10 per reconciliation. GCBS wishes to make a profit from providing the service so

it will price the service at €12 per reconciliation thus recovering the cost and making a €2 profit per unit reconciliation volume.

GCBS currently provides the reconciliation service by employing 17 reconciliation systems. The majority of the reconciliations are done on SSR, TLM, and End User Developed Application (EUDA). To better utilize resources, GCBS plans to decrease the number of reconciliation systems until TLM and IRT handle the majority of the transaction volume. With the right approach, Cost plus Margin would help decrease the number of reconciliation systems. Any client that requires the use of nonstrategic systems (all systems except SSR and TLM) will be charged a markup onto the unit service fee. The markup will encourage clients to transfer their reconciliations over to one of the strategic systems.

Retained earnings are the profits made after total costs have been recovered. Currently GCBS service charges aim to recover cost, although circumstances may change in the future. In the near future, GCBS may insist on charging clients a markup for conducting reconciliations on a nonstrategic system which may result in accrued retained earnings. Retained earnings would be monitored on the COGNOS system and spent according to GCBS goals. The markup may be set equal to the cost of converting clients from nonstrategic systems to TLM or SSR, thus eliminating retained earnings.

Considering that GCBS is a part of a bigger enterprise, attempting to make substantial gains on internal clients would result in detrimental losses for the bank as a whole. Instead, when appropriate, GCBS may provide their reconciliation services to external clients requiring an advanced method for managing retained earnings. COGNOS could continue to monitor the earnings and spending would still be dependent on GCBS objectives.

As a recommendation, the bulk of retained earnings should concentrate on the research and development of the GCBS division. Funding break research, GCBS can properly attune reconciliation process to produce more STP, therefore decreasing costs and increasing profits. Ultimately it rests on the management to decide how the additional profits would be spent, while considering the effects of the whole enterprise.

4.2.6. Comparison of Cost Allocation vs. Transfer Pricing

The methods discussed share the same objective of quantifying an internal exchange of contributions, although the means of achieving their objectives are slightly different. Determining cost drivers have always been a difficult task; therefore, pricing models have been created in attempt to mitigate the issue. Different pricing models are built to understand cost and properly set a numerical value for a product/service. Although different, hybrids exist that merge the two methods as a result of their close similarities. The hybrids are commonly built inside the company and are tailored for specific usage.

An updated ABC approach to cost allocation seeks to connect costs with cost objectives when sufficient information exists. The basis of the ABC method is to allocate cost based on the usage of specific activity drivers. By relating a cost to an activity, the activity can then be related to an activity driver. What the method lacks is a significant distinction between fixed and variable costs, which is highly considered when determining a transfer price.

The major difference between the models is that "cost allocation is based on ex post average observed costs, while transfer prices are based on ex ante calculation of marginal cost".[28] Transfer pricing looks to set service unit prices for user, whereas cost allocation involves

[28] *Game Theory and Business Applications (International Series in Operations Research & Management Science)*. New York: Springer, 2001. Print. 62.

distributing total cost among users of the service. Transfer pricing is appropriate when the service provider plans to offer the service to external markets in the future. The division can calculate per unit cost of the service allowing them to establish an external price, breakeven points, and potential profit margins. It should be mentioned that firms may choose to use predetermined overhead costs in order to allocate costs beforehand. Using predetermined overhead costs do bring more risks of over/under allocating costs.

If the division is only concerned with recovering its cost for providing the service, a cost allocation approach is better suited. The total cost is determined by some method (possibly ABC analysis) and then allocated to service users by a metric (volume, service usage, etc). The objective for the service providing division is to recover 100% of their cost by charging departments independently for the service usage.

In the case of Deutsche Bank's GCBS division, a cost allocation method is currently in place. The model allows the division to cover its cost; however, improvements can be made to the current system. As long as the division continues to not provide its services externally, a cost allocation model is suitable. It is important to remember that both methods are structured to improve decision making, control cost, allocate resources, and to clarify charges to clients. "The underlying cost techniques are identical".[29] There are instances where an ABC method is intertwined with a transfer pricing model.

[29] Smullen, John. *Transfer Pricing for Financial Institutions*. Grand Rapids: Woodhead, 2001. Print.56.

4.3. Developing Volume Based Drivers for a Segment of the GCBS Cost Base

As explained in Section 2.3.1, reconciliations are one of GCBS's main functions. This section aims creating a theoretical activity based costing model for GCBS's reconciliation segment.

4.3.1. Identification of Activities

The first step of building an ABC model is identification of activities. In order to identify major reconciliation activities, the WPI team decided to examine GCBS's current reconciliation operating model. The operating model consists of 7 steps and illustrates how manual and auto reconciliations are performed.

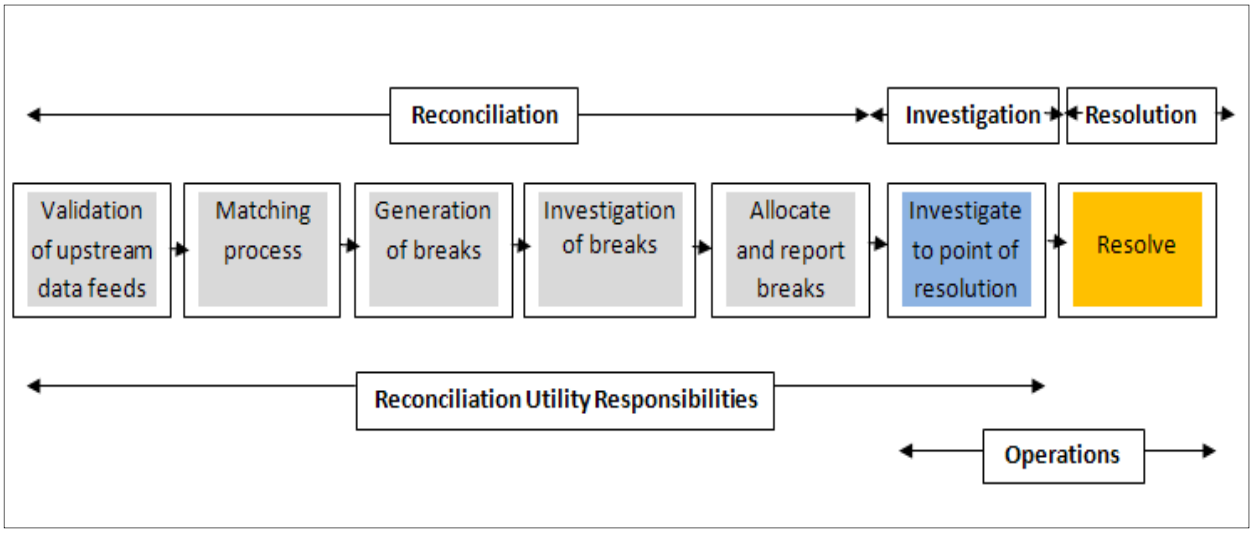

Figure 7: Reconciliation Operating Model

1. **Validation of upstream data feeds:** GCBS first ensures that all necessary files have been submitted completely by the clients for matching process. All information being sent to the reconciliation tools (e.g. SSR and TLM) should be in correct format.
2. **Matching Process:** SSR, TLM and other reconciliation tools performs auto matching and match the information from two sources: For example, in order to perform FOBO reconciliations, the reconciliation tools reconcile information from the front and back offices.

3. **Generation of Breaks:** If reconciliation tools cannot match information from two sources, breaks are generated.
4. **Investigation to determine ownership of breaks:** Once breaks are generated, GCBS needs to investigate the ownership of breaks: Is the break caused by the front office or the back office? Even though investigation process is a part of GCBS's reconciliation operating model, some clients may choose to investigate their own breaks.
5. **Allocate and report breaks:** Breaks are appointed to respective clients.
6. **Investigate to point of resolution:** Breaks are fixed manually and resent through the reconciliation tool.
7. **Resolve:** If transactions sent to the reconciliation tool match, reconciliation process is completed. If not, steps need to be repeated.

After examining the operating model, the WPI Team identified 3 major activities needed for a reconciliation to be completed: Straight through processing, manual matching and investigation.

- ***Straight Through Processing (STP):*** STP is identified as a major activity for two very important reasons: First, all transactions have to go through a reconciliation tool and most transactions are reconciled automatically by the reconciliation tools. Second, GCBS aspires to match all transactions automatically through those IT platforms in the near future; therefore, platform driven costs constitute a key portion of the total reconciliation costs.
- ***Manual Matching:*** Transactions that fail to be matched by the reconciliation tools need to be matched manually by GCBS's full-time employees. Manual matching is vital in order to complete reconciliations. In addition, labor cost is one of GCBS's major costs.

- ***Investigation:*** Investigation is essential to find the ownership of breaks. It allows GCBS to accurately allocate breaks to respective clients. Similar to the manual matching process, investigation also requires manual labor and is a costly process.

4.3.2. GCBS Costs

Following identification activities in the reconciliation process, the team continued its analysis by examining costs incurred by GCBS. Profit and Loss statement from the previous year was pulled from COGNOS and studied by the team. Analyses of costs focused on identifying key costs and cost correlations between different countries. Once the team understood the costs, it could then begin to understand the drivers behind the costs.

Key Costs

The first P&L statement examined consisted of all direct and indirect costs within the year of 2009. Months January through September were actual costs; however, months October through December were forecasted costs. Each line on the P&L represents an area where GCBS incurs costs; a total of 115 lines exist of which 51 are direct and 64 are indirect costs. Appendix A shows GCBS's profit and loss statement for 2009. Some of the lines on the P&L were relatively minor compared to the larger lines such as Salaries and Overtime. It would be more advantageous for the team to focus its time examining only the key costs, instead of all 115 P&L lines. From all the P&L lines, only those with an annual total greater than €1 million would be heavily analyzed. Ten P&L lines remained and accounted for 99.36% of the total GCBS cost. The key costs as well as their values are as follows:

1. ***Salaries and Overtime*** €5,799,680.50
2. ***Benefits*** €2,037,321.89
3. ***Occupancy Expense*** €1,412,121.37

4.	***Rental, Lease, and Maintenance of IT***	€1,944,006.92
5.	***Offshore Consultants***	€1,843,369.57
6.	***IT Sys Consult Excl Offshore & Agency/Con***	€1,751,565.52
7.	***IB IT (Investment Banking)***	€4,689,862.83
8.	***PCB IT (Personal & Corporate Banking)***	€1,036,071.94
9.	***GTO IES - RTB/CTB***	€4,828,017.84
10.	***SOM IB***	€5,870,984.02
	Total Key Cost	**€31,213,002.41**

The costs that have been underlined are the indirect costs. Although the key costs were identified, problems surrounded the understanding of the costs. Offshore Consultants, IT Sys Consult Excl Offshore, IB IT, PCB IT, GTO IES, and SOM IB were unclear to the team and later created difficulties in understanding their drivers. The key costs did provide the team with an interesting view of total cost and a conceptual understanding of the GCBS cost structure. Figure 8 is a visual representation of the distribution of GCBS cost among P&L lines.

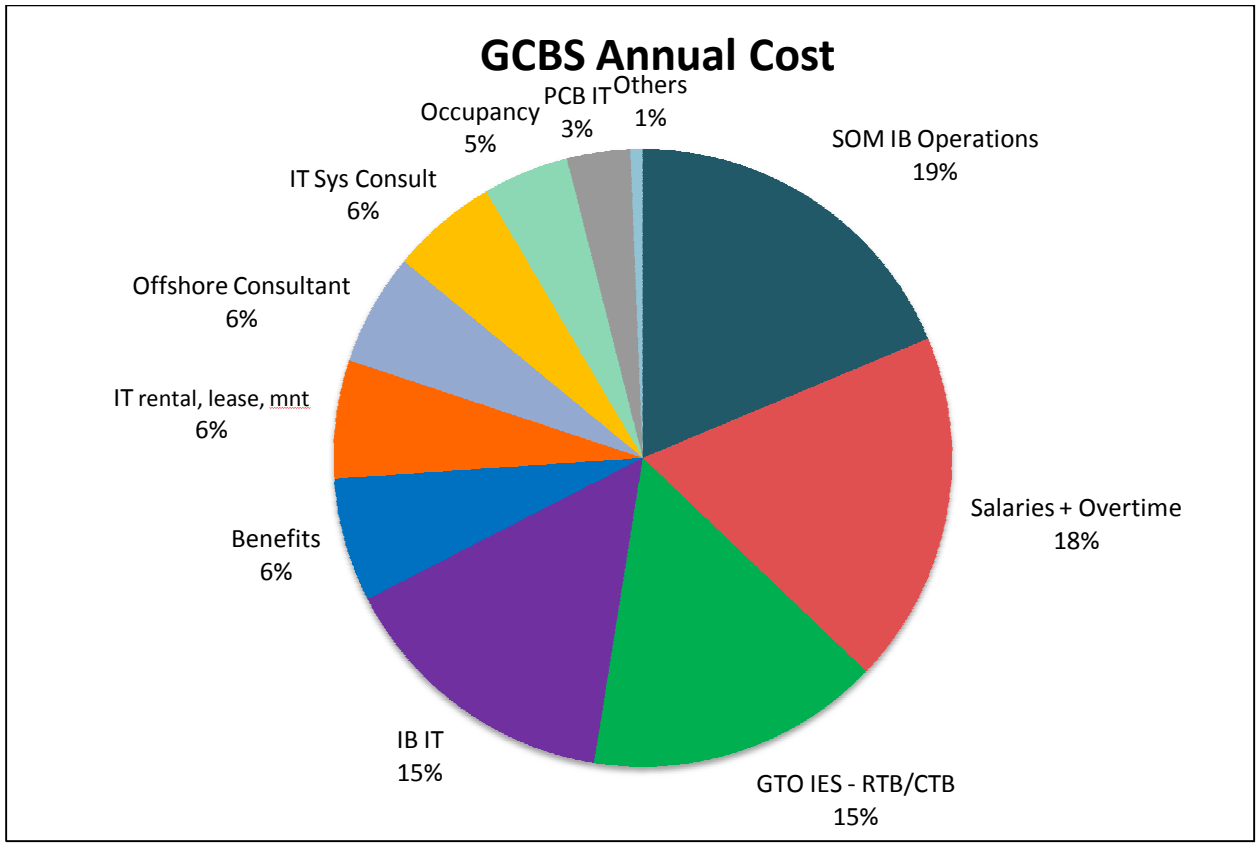

Figure 8: Pie chart of GCBS Costs

The team also noticed that 67% of GCBS cost rest in six countries. The six countries were Great Britain, USA, Singapore, Italy, Germany, and Japan. Each of the six countries has an annual cost that exceeds €800,000. The annual total of the six countries sums up to nearly €21 million; GCBS's total annual cost is €31 million. A visual representation of the regional division of cost is presented in Figure 9.

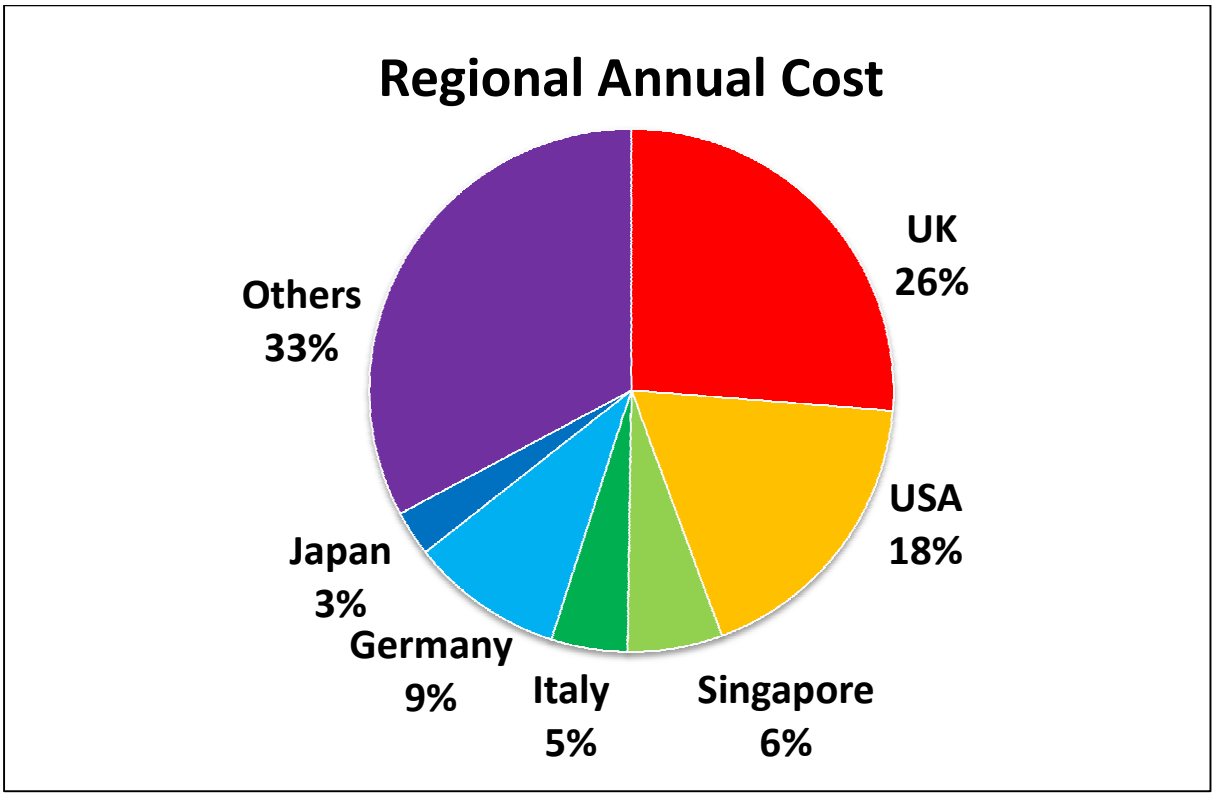

Figure 9: Regional Breakdown of GCBS's Annual Cost

Regional Cost Behavior of Key Costs

Of the key P&L lines, interest rose to see if the costs significantly varied throughout the year from region to region. If cost trends were similar between regions, then it could be assumed that the drivers were the same regardless of location. The team began by organizing regional transaction cost data for the months June-September. Using Excel, the team created pivot charts for the regions in search of cost behavior trends. From the exercise, the team realized that little to no fluctuations in the 4 month period existed within several regions. It led the team to believe that costs are steady and reconciliation volume either remained steady or was not a significant cost driver.

Further analysis was performed on cost data from the COGNOS system to verify findings. COGNOS supplied the team with actual regional cost data for the entire year. A spreadsheet was created to capture key costs followed by pivot charts to examine trends within regions. The charts shown in Appendix C proved the previous finding false; regional cost did fluctuate throughout the year.

From the analysis, the team concluded that the key costs (except salaries and occupancy) behaved differently between countries. The graphs show that for most countries there are not universal trends for cost. Intriguing insight into certain cost behaviors were recognized as the following:

1. Figures 20 and 22 represent the monthly cost of salaries and overtime as well as occupancy, respectively. Besides USA "May" spike on salaries and overtime chart, all other countries remain steady. The occupancy expenses remain steady throughout the year for all countries. The countries in the PCB IT chart (Figure 27) also shares similar trends in cost throughout the year. The costs remain steady until an uptick during September.
2. Monthly IT Sys Consult Excl Offshore costs are shown on Figure 25. Great Britain accounts for €929,388.76 of the total €1.06 million. Besides the €117,818.43 uptick in Singapore, no other country significantly contributes to this particular key cost.
3. In Figure 26, Great Britain again leads the group with €1.6 million of the total €2.67 million IB IT cost. Besides some fluctuations between January and March, the costs are relatively steady for the remainder of the year.
4. In Figure 29, all the countries have relatively steady SOM IB costs throughout the year, except Great Britain. The highest degree of fluctuation also comes from Great Britain.

5. Figures 21 and 24 represent monthly cost of benefits and offshore consultants respectively. There is no particular trend that is similar among the different countries. The costs do fluctuation; however, they do so independently.
6. The monthly GTO IES costs are shown in Figure 28. Germany and Italy are at the bottom of the chart with steady costs. Up above Singapore, Great Britain and USA generate the highest cost. They also seem to fluctuate independently.

From the observations, the team would be able to make some assumptions about cost behavior among regions.

- PCB IT, occupancy expenses, salaries and overtime are the only cost which share trends throughout the year and countries.
- Countries may have different trends in costs; however, the cost drivers may still be the same.

In building the theoretical model, it will be important to remember both the assumptions, especially the second. If different numbers of reconciliation volume were traveling through each country, then they would incur different costs. To identify specific drivers, more information and analysis would be needed. As for identifying cost behavior, the charts provided the team with a direction in pooling costs.

4.3.3. Cost Drivers

Headcount

Having grouped the reconciliations, the team would now begin to identify key drivers of cost. The GCBS Profit and Loss statement had provided the team with a number of costs which

were incurred throughout the year. Within this particular part of the analysis, the team intended to find correlations between the number of GCBS full-time employees (FTEs) and GCBS costs.

Originally the Landscape document provided the team with FTE distributions, although there were concerns that the static data were unreliable. Luckily, GCBS had created a regional distribution of FTEs that could be used instead. From the regional distribution, the team was able to table the FTEs specifically involved in reconciliations for each country. When compared to the Landscape document, the team noticed that the Landscape document had over allocated core reconciliation FTEs by nearly 133. The number of FTEs in the Landscape document is 334.89 whereas the number of FTEs in the regional distribution data is only 202.3. The difference in FTEs could have resulted with inclusion of TCS (outsourced FTEs) in the Landscape document. Although slightly insignificant to the driver analysis, it was a reminder that the Landscape document requires constant updates and may not be a reliable data source. It was decided that the regional distribution of FTEs would be more accurate for the analysis.

While calculating the FTE numbers for different regions, the team recognized the problems below associated with the regional headcount distribution data:

- The data didn't include offshore FTE information for some regions for the January'09 – May'09 time period.
- The data contain 12-month onshore FTE information for European countries (except the UK) whereas the onshore FTE information for the UK, APAC (Asia and Pacific) and Americas covers only the Jan'09 - Sept'09 time period.

Due to the reasons stated, the team decided to focus on FTE information for the June'09 – Sep'09 time period because all regions have adequate FTE information (both onshore and offshore) for that particular time period.

Once the FTE numbers were calculated and arranged, the team continued by comparing them with regional cost data from COGNOS. From the COGNOS system, the team acquired regional breakdown of annual costs. The team made an attempt to correlate the regional FTEs and regional cost by charting FTE numbers against key direct and indirect costs.

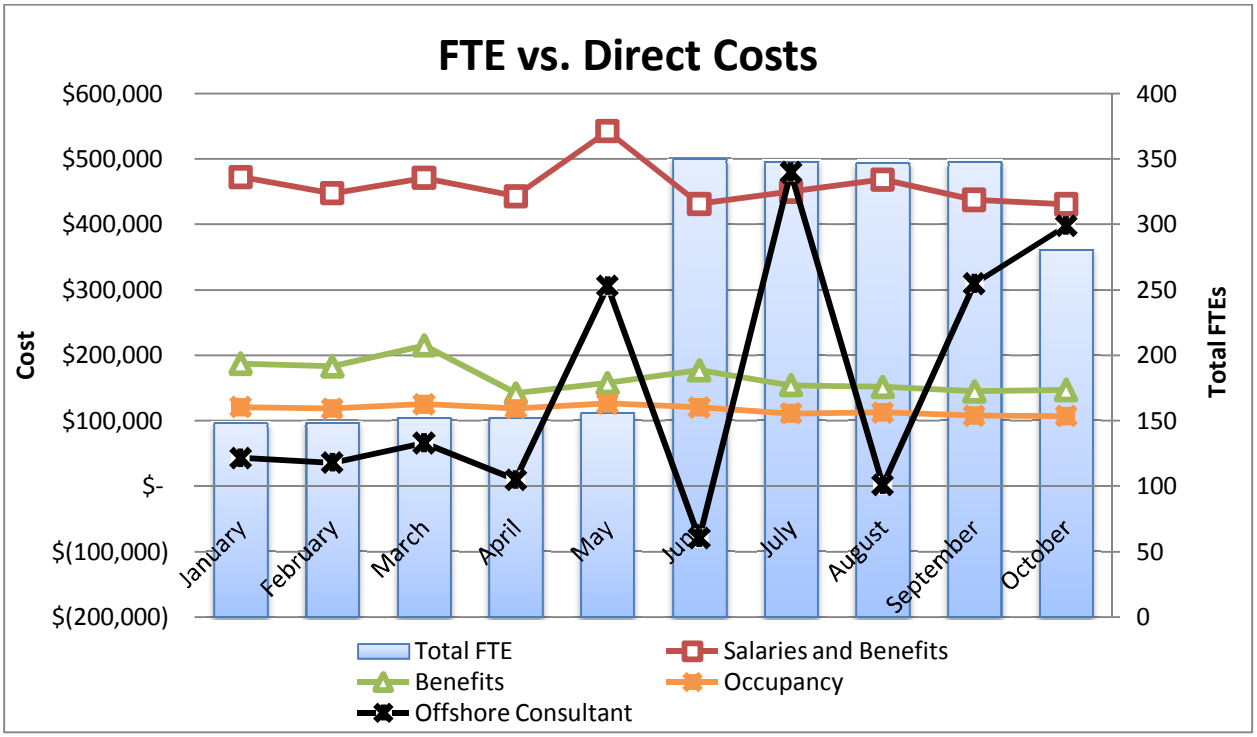

Figure 10: FTEs vs. Key Direct Costs

As seen in the second half (June-Sep'09) of Figure 10, there is a correlation between FTE numbers and the three direct costs, namely Salaries, Benefit and Occupancy expenses because FTEs (blue bars) and these direct costs (red, green and orange lines, respectively) behave similarly. In fact, it was an expected result, since more FTEs mean more salaries and benefits and less FTEs indicate less salaries and benefits. On the other hand, the black line which

symbolizes offshore consultants fluctuates from June to September even though FTE numbers stay constant. Similarly, IT System Consultancy cost in Figure 30 in Appendix D follows a completely different trend than FTE numbers. Insufficient FTE data and the fact that fluctuations may be due to accounting corrections make it hard for the WPI team to conclude whether headcount is a driver or the only driver of offshore and IT consultancy costs. It is possible that offshore consultancy and IT consultancy costs are driven by other cost drivers. The team decided that more data need to be examined to reach an unambiguous conclusion.

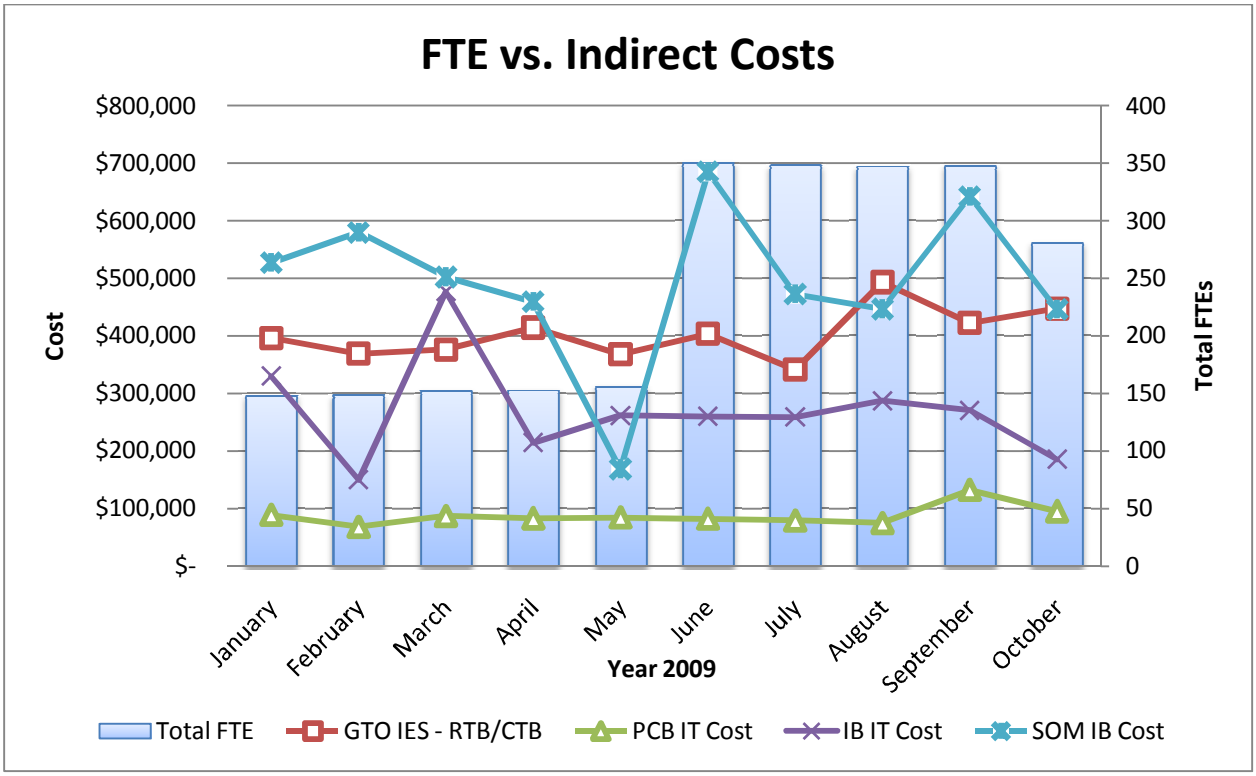

Figure 11: Total FTEs vs. Key Indirect Costs

Having charted FTEs against key direct costs, the team conducted the same analysis for GCBS's key indirect costs. In Figure 11, FTEs are charted against key indirect costs. Due to insufficient FTE data for the first five months of 2009, the team again focused on the June-September'09 period. As Figure 11 illustrates, FTE numbers stay constant (around 347) during

that 4 month time period. PCB IT and IB IT costs seem to follow similar trends as FTEs. In contrast, SOM IB and GTO IES costs behave different from the FTE data.

Figure 11 left the team with the idea that PCB IT and IB IT costs could be correlated to FTE numbers because their behavior looked similar. Therefore, the team decided to examine the PCB IT – FTE and IB IT – FTE relations in individual major cost regions including USA, UK, Germany and Singapore to see if there is actually a correlation. The team also inspected the GTO IES and SOM IB behaviors in these cost centers to see possible correlations with FTE data which could not be seen in the aggregate data (Figure 11). Nevertheless, after comparing the behaviors of key indirect costs with FTE data in those cost regions, the team concluded that it is difficult to notice a clear correlation. The analyses conducted in this section led the team to the conclusions stated below:

1. Costs related to labor are driven by headcount.
2. 4 months of FTE data are not sufficient to notice correlations between key indirect costs and FTE numbers; therefore, more data need be collected and analyzed to reach a clear conclusion.
3. Static data will not sustain a functional pricing model

The third conclusion was reached from conversations with GCBS managers regarding the exercise. An effective pricing model will require monthly updates for cost and volume data; static data will be insufficient.

Volume

Straight through processing (STP) was the first activity identified by the WPI team. The team determined that GCBS cost could be correlated to the number of transactions (volume)

passing through reconciliation tools in order to be auto matched. If variations in monthly volume resulted in similar variations in certain cost behaviors, then the team would conclude that volume and those costs were correlated, indicating that volume is a cost driver.

In order to reach a conclusion, the team needed to analyze GCBS's monthly volume and cost data for different reconciliation tools to see how volume and costs behave with respect to each other. Unfortunately, the team had problems acquiring the necessary data sources needed:

1. GCBC had monthly volume data for two reconciliation tools only: SSR and TLM. However, the cost data acquired from COGNOS do not distinguish between costs associated with specific reconciliation tools. Therefore, comparing monthly volumes of SSR and TLM with the cost data that belong to "all" reconciliation tools rather than SSR and TLM would not yield 100% correct results.
2. In addition to the above problem, GCBS's cost data include costs incurred by all GCBS functions including reconciliations, client audit confirmations and instrument static data whereas the team was only interested in costs incurred by reconciliation processes. However, the team decided that such an analysis should still give an idea whether monthly transaction volume and certain GCBS costs are correlated.

Upon acquiring the monthly volume and cost data for the two reconciliations tools and key indirect costs, respectively, the team examined how volume and cost vary with respect to each other throughout the Jan'09 – Sep'09 time period. Table 1 summarizes these results over the specified time period.

		Key Indirect Costs			
	Volume	IB IT	PCB IT	GTO IES	SOM IB
Jan	98,064,930	346,947.30	89,250.92	400,951.31	547,214.62
Feb	93,631,421	534,418.90	68,430.00	374,321.56	599,997.10
Mar	110,183,359	693,672.11	87,483.33	381,852.24	524,887.55
Apr	109,663,862	356,697.87	83,340.93	419,945.66	455,534.59
May	114,481,596	438,892.26	84,886.35	373,442.70	168,935.67
Jun	124,642,988	403,346.17	82,524.90	409,123.64	685,016.13
Jul	127,188,031	358,768.89	79,612.27	346,186.18	472,649.93
Aug	124,307,272	387,734.36	76,716.77	507,766.13	446,778.31
Sep	135,611,985	403,274.90	127,651.57	430,708.04	650,883.64

Table 1: Monthly Volume (SSR and TLM only) and key indirect costs

In order to see the variations in volume and cost numbers more clearly, the team conducted two analyses. First, % changes in volume and cost from one month to another is inspected. Second, the team charted volume against key indirect costs to see the respective trends. Table 2 summarizes the results of the first analysis.

	% Volume	% IB IT	% PCB IT	% GTO IES	% SOM IB
Jan					
Feb	-4.74%	35.08%	-30.43%	-7.11%	8.80%
Mar	15.02%	22.96%	21.78%	1.97%	-14.31%
Apr	-0.47%	-94.47%	-4.97%	9.07%	-15.22%
May	4.21%	18.73%	1.82%	-12.45%	-169.65%
Jun	8.15%	-8.81%	-2.86%	8.72%	75.34%
Jul	2.00%	-12.43%	-3.66%	-18.18%	-44.93%
Aug	-2.32%	7.47%	-3.77%	31.82%	-5.79%
Sep	8.34%	3.85%	39.90%	-17.89%	31.36%

Table 2: Monthly GCBS Indirect Costs and Respective % Changes

Let's examine some specific lines in the table above:

- In June, volume increases by 8.15% and GTO IES goes up by 8.72%, indicating that there could be a positive correlation between the two. Nevertheless, in July, even though the volume continues going up (by 2.00%), GTO IES cost drops drastically by -18.18%, contradicting the previous finding.

- From February to May, volume and PCB IT cost behaves similarly. However, In June and July, volume increases while PCB IT cost decreases.
- In April, a decrease in volume is followed by a decrease in all key costs except GTO IES.
- In March, an increase in volume is followed by an increase in all key costs except SOM IB.

Figures 12 and 13 are a visual demonstration of the % analysis explained above. The results that the team acquired from those graphs are the same as the ones acquired from the percentage change analysis. In certain months, volume and some of the key indirect costs such as PCB IT and GTO IES behave in a similar fashion whereas these similarities do not last for the entire 9 month period. Direct costs seem to have completely different trends from volume data.

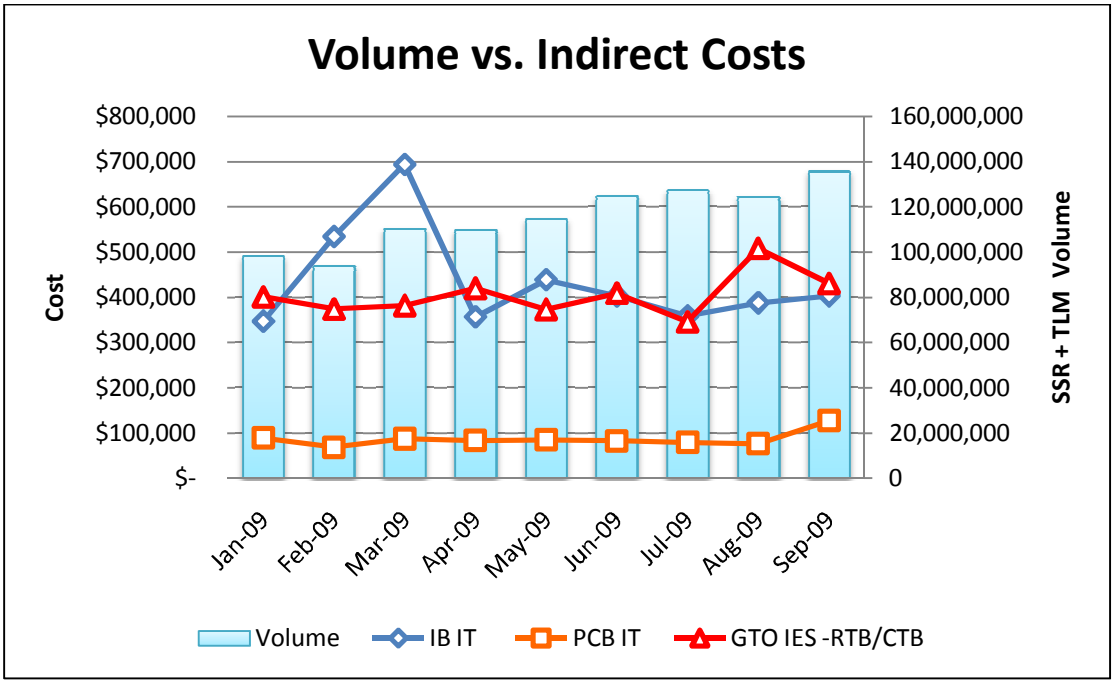

Figure 12: Volume vs. Indirect Costs

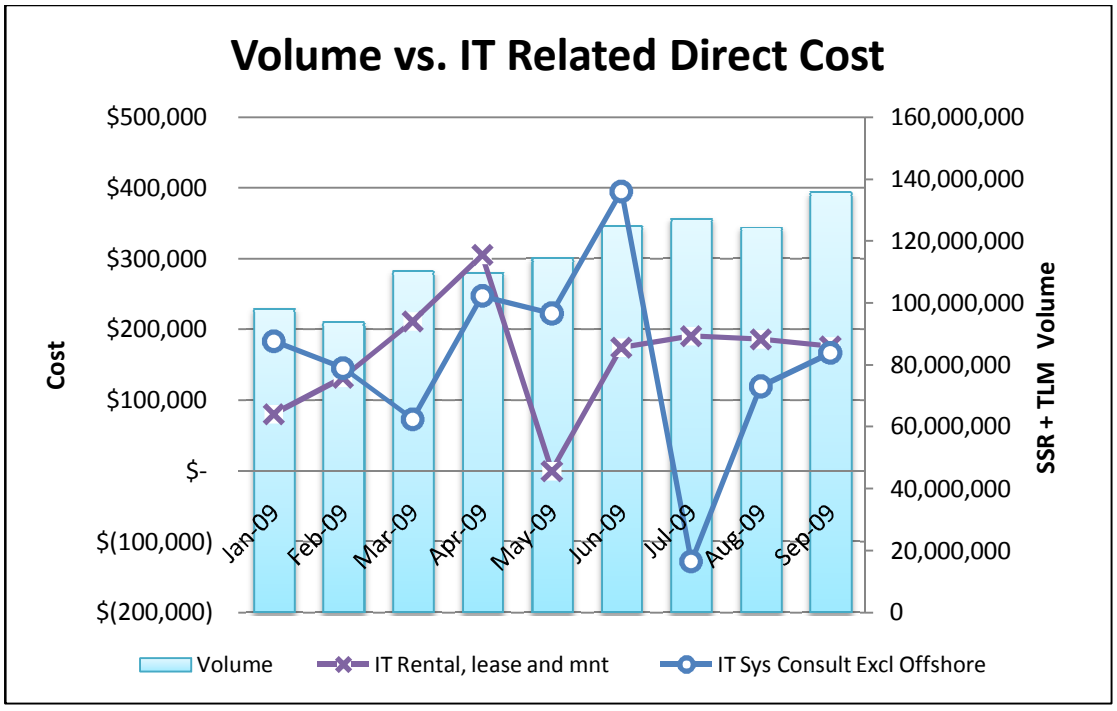

Figure 13: Volume vs. IT Related Direct Costs

The two analyses conducted in this section led the team to the conclusions below:

1. With given data, it is hard to notice a clear correlation between volume and key costs.
2. The fact that volume data belong only to SSR and TLM make it hard to identify correlations. Since SSR and TLM are not the only reconciliation tools used by GCBS, volume data from all these tools need to be charted against key costs to identify possible correlations.
3. Volume should have an impact on variations in cost and be a driver of platform driven cost (STP cost); however, there could be additional drivers that drive the trend dissimilarities between volume and cost numbers shown in Table 2 and Figures 12 and 13.

Number of Breaks

If all reconciliation process was performed by reconciliation tools automatically, there would be no need for manual matching and break investigation by full-time employees. Nevertheless, as explained in section 4.3.1, breaks are generated when reconciliation tools cannot match information from two sources (e.g. front office and back office) and FTEs are required to investigate the ownership of breaks and match information from those two sources. This is an evidence that number of breaks is a driver of manual matching and investigation costs. As the number of breaks goes up, more FTEs will be needed for investigation and manual matching processes, resulting in an increase in labor cost.

4.3.4. Cost Pools

Working along with Alex Robin, the team chose to separate GCBS costs into three cost pools. The following cost pools were decided:

- Headcount driven
- Platform driven
- Management

Depending on the nature of the cost, it would be placed into one of the three cost pools. A description of each cost pool and reasons for creating only three cost pools are clarified in this section.

GCBS labor, IT, and overhead expenses were the bulk of the cost linked to reconciliation activities; therefore, the team decided to create cost pools resembling those expenses. The headcount driven cost pool aims to include costs incurred as a direct result of headcount existing. For instance, costs such as salaries and offshore consultants are driven by the number of employees involved in the reconciliation process. Costs that are driven by headcount and not

directly involved with the reconciliation process are included in the management cost pool. Occupancy, furniture and equipment, and travel costs would be included in the management pool. The remaining costs are those driven by the IT systems used for reconciliations. The platform driven costs would include IT costs such as IB IT, PCB IT, and other IT costs sharing similar qualities.

The cost pools were created with two considerations in mind: The level of information available and the transparency of the model. It is important to remember that the team was setting a foundation for a new model in an environment where it is unclear if all information required to run the model existed. The suggestions in creating the new model are based on assumptions and discoveries made throughout the project. At this moment, acknowledgement and understanding of GCBS costs are inadequate to correctly build a model that could accurately allocate costs. Due to the uncertainty of costs, the team created only three cost pools to limit the number of assumptions made when grouping costs into pools. Although a cost allocation model with only three cost pools could potentially allocate cost at a lower degree of accuracy, creating a model with more cost pools and assumptions would only decrease accuracy further.

Considerations regarding the model's transparency were also an influential matter when creating costs pools. The team suggested that clients be charged depending on their level of STP, manual matching, and investigation for reconciliations. With cost pools that can be correlated to charges, the team could easily map the cost pools to activities. For example, STP volume requires no manual labor and creates only IT costs; therefore, the platform driven cost pool is associated with STP charges. The other cost pools are also easily associable with charge activities, thus creating transparency through the model.

4.3.5. Grouping Reconciliations

The latest version of Landscape document illustrates that GCBS is currently conducting 300 reconciliations. This part of the analysis demonstrates how those reconciliations could be grouped into different categories. Using the Landscape document as a reference, the WPI Team explored different approaches to reconciliation categorizations and came up with 3 options for grouping reconciliations: grouping by 'region', 'reconciliation type' and 'reconciliation tool.' To decide on grouping options listed above, the WPI team considered three important details:

- The availability of transaction volume and cost data,
- The level of complexity ,
- The ease of obtaining metrics for a specific grouping option.

As explained in section 2.3.2, the Landscape document lists all the reconciliations performed by GCBS and various other departments within Deutsche Bank. Currently, 2804 reconciliations are listed in this document. By filtering the document, the WPI team attained 300 reconciliations completed by GCBS. The next step was to find options for grouping those reconciliations. The team had different alternatives as the Landscape document consists of 117 columns. Some of those alternatives were grouping reconciliations by DB Business Line (e.g. Debt Securities, Derivatives), Business Area (e.g. Operations, Transaction Management Group), and Product Type (Cash, Equities or Fixed Income). Those alternatives were eliminated due to the following reasons:

- DB Business Line includes a category called "Shared" which indicates that some of the reconciliations were shared by different DB Business Lines. It would be too time consuming and costly to track those reconciliations to individual business lines that share

them. Additionally, it is potentially very difficult if not impossible to obtain volume and cost data for different business lines.

- Business Area was not thought as an option either because it has only two entries, operations and transaction management group, which would result in a very simple and inaccurate cost model. Similarly, GCBS does not collect monthly volume data numbers for different business areas.
- Because there are 42 different products, grouping reconciliations by product types would make the system too complex and cause arbitrary allocation of costs due to lack of data required to divide costs among service provision types.

Option 1 – Grouping by Regions (Countries)

Grouping GCBS reconciliations by regions is the first option that the WPI team came up with. The most significant reason for this choice is that GCBS has cost data for countries (e.g. Brazil, USA, and Germany) and regions (e.g. Asia, Americas and Europe). Therefore, a possible breakdown by regions would help the management to acquire cost data easily. By creating a pivot table in the Landscape document, the team acquired the number of reconciliations taking place in each region, the number of full time employees (FTE) required for reconciling breaks in those regions and the total monthly volumes. The team also added a column listing annual costs associated with each region. As seen in Figure 17 (Appendix B), the annual cost column misses cost values for some regions. This fact made the team realize that the Landscape document lacks cost information for certain regions. Fortunately, the WPI team was able to acquire cost data associated with all regions as a separate spreadsheet. Listed below are advantages and disadvantages of grouping reconciliations by regions:

Advantages:

- Monthly cost data are available for regions.

Disadvantages:

- Clients could potentially be over/under-charged depending on the region their reconciliations are conducted.
- As the yellow highlighted cells indicate in Figure 17, volume data are not available for 12 regions. However, the clients are currently being charged based on their transaction volumes. If no volume data are available, then it would be hard to conclude if volume has actually an impact on the cost variations.

Option 2 – Grouping by Reconciliation Types:

The WPI team figured that charging the clients based on the service (reconciliation type) they receive rather than the region they are assigned to would yield more accurate transaction prices which would prevent clients from being over/under-charged. Therefore, the team decided to group reconciliations by reconciliations type. Figure 18 in Appendix B shows 21 reconciliation types and the total number of occurrences of each reconciliation type, as well as the number of FTEs required and the total monthly volumes for those reconciliations.

Advantages:

- Volume data for majority of reconciliation types are available. (except for the yellow highlighted cells)
- Clients are charged based on the service they receive from GCBS, not on the region they are assigned to.

Disadvantages:

- Individual cost information for individual reconciliation types may be difficult to acquire.

Option 3 – Grouping by Reconciliation Tools:

One of GCBS's main goals for the near future is to create as much straight through processing as possible which would decrease its labor and overhead costs substantially. Reconciliation tools are the most important component of STP because auto matching is conducted via those systems. Having considered those factors, the WPI team decided that a possible breakdown of reconciliations by reconciliation tools would help GCBS easily allocate STP costs to clients. Figure 19 in Appendix B shows all reconciliation tools listed in the Landscape document as well as the number of reconciliations conducted by those tools, the total number of FTEs required to manually match information that could not be auto matched and the total volume of transactions belonging to each tool. Listed below are the advantages and disadvantages of a possible breakdown of reconciliations by reconciliation tools.

Advantages:

- Volume data for majority of reconciliation tools are available.
- Fewer sources of data are needed as there are only 17 reconciliation tools (compared to 37 regions and 21 reconciliation types)

Disadvantages:

- Individual cost information for reconciliation tools may be difficult to acquire.

After considering the advantages and disadvantages of each option, the WPI team decided to group GCBS reconciliations by reconciliation tools. As mentioned above, the Landscape document lists 17 reconciliation tools. Since SSR and TLM are the two strategic reconciliation tools, the team created three categories for reconciliation tools: SSR, TLM and nonstrategic. All reconciliation tools other than SSR and TLM are included in the nonstrategic category.

4.3.6. Theoretical Cost Allocation Model

As explained in earlier sections, the WPI team had four objectives, the third of which was developing a theoretical cost allocation model to show how GBCS could allocate its costs to clients. The theoretical model explained in this section will provide a framework for the actual cost allocation model which will be implemented in 2010. Deciding actual values for specific activities within a service provision would be the next step for the individual who will be building the actual model.

GCBS's cost base consists of two types of costs: Direct costs and indirect costs. The first step of creating the model is to map GCBS's direct and indirect costs to cost pools. As explained in section 4.3.4, the WPI team created three cost pools: Management, headcount driven and platform driven. Depending on the nature of the cost, it would be placed into one of the three cost pools. For example, costs that are driven by headcount such as salaries, benefits and offshore consultants will be included in the "headcount driven" cost pool, whereas all staff related costs such as occupancy and travel costs not directly associated with reconciliation process will be included in the management cost pool. The platform driven cost pool will consist of IT costs such as IB IT and PCB IT which are incurred due to the usage of IT systems for conducting reconciliations. GCBS's current P&L statement consists of 115 costs, of which 51 are direct and 64 are indirect costs. Each P&L line needs to be mapped to one of the three cost pools mentioned. Once all costs are mapped to cost pools, we could allocate cost pools or proportions of those cost pools against individual service provision types.

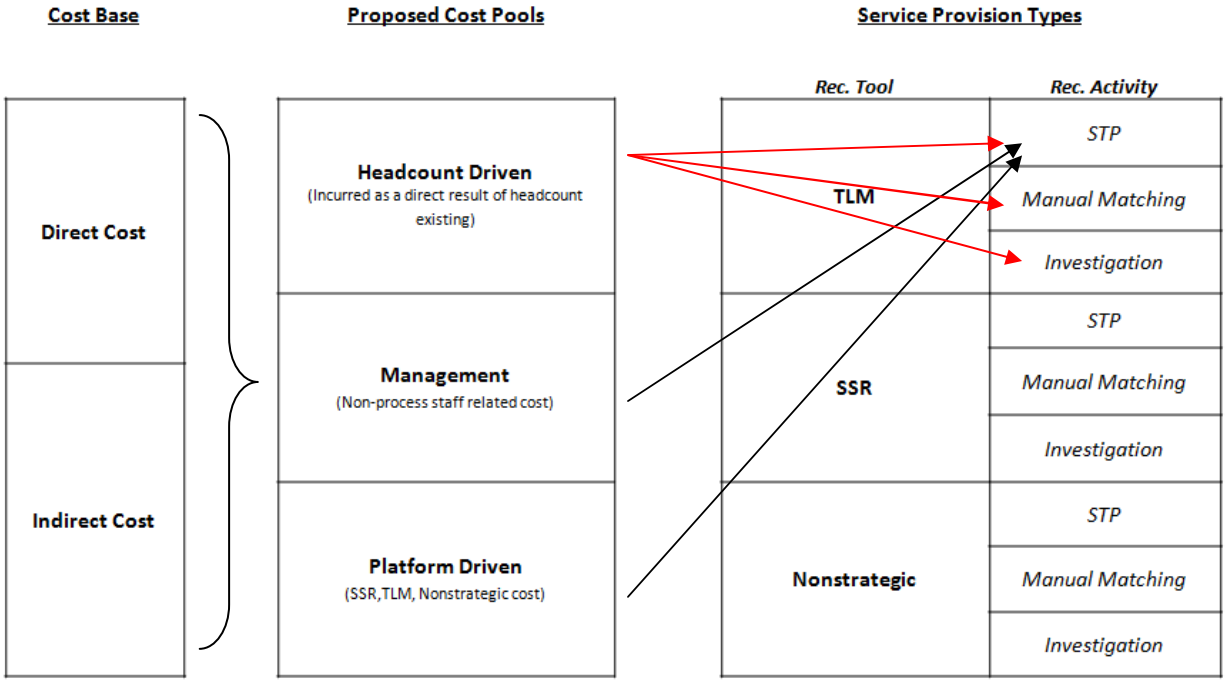

Figure 14: Theoretical Cost Allocation Model

As explained in section 4.3.5, the WPI team decided to group GCBS's reconciliations by reconciliation tools: TLM, SSR and nonstrategic. Because there are 3 major activities required to complete reconciliations, each category is split into three subcategories: STP, manual matching and investigation. This means that a client's bill will consist of costs associated with these three activities. If a client does not need any manual matching or investigation, then it would be charged on STP only. In other words, every GCBS client will be charged on STP and the total charge will increase depending on a client's need for manual matching and investigation.

The second step of creating the theoretical model requires us to allocate a portion of each cost pool to the subcategories (activities) mentioned above. Figure 14 illustrates a possible allocation for the TLM category. (The same allocation is also true for the SSR and nonstrategic categories but not shown in Figure 14) First, headcount driven cost pool is mapped to the STP, manual matching and investigation activities in the TLM category. In other words, all costs in

the headcount driven cost pool which are incurred as a direct result of TLM reconciliations are mapped to TLM activities. Similarly, headcount driven costs incurred as a result of conducting reconciliations via SSR and nonstrategic tools will be mapped to SSR and nonstrategic categories. Second, management and platform driven cost pools are mapped to reconciliation activities in a similar fashion (Figure 14 maps management and platform driven cost pools only to the TLM category). Since platform driven costs are incurred as a result of using IT systems, the platform driven cost pool is mapped only to the STP subcategory.

It is crucial for GCBS to determine what portion of each cost pool should be allocated against individual service provision types. For example, x% and y% of salaries could be allocated to TLM manual matching and investigation activities, respectively, and the remaining portion of salaries could be allocated to SSR and nonstrategic manual matching and investigation activities based on calculated percentages.

Finally, after all costs are mapped to activities (service provision types), the transaction price can be calculated by dividing the total costs of each activity type by the metrics identified. Below is an example indicating how GCBS could charge a client (e.g. Client ABC). Assuming that labor cost is only driven by number of breaks, STP cost is only driven by transaction volume throughput and investigation cost is only driven by number of investigations conducted, Client ABC's charge can be calculated as follows:

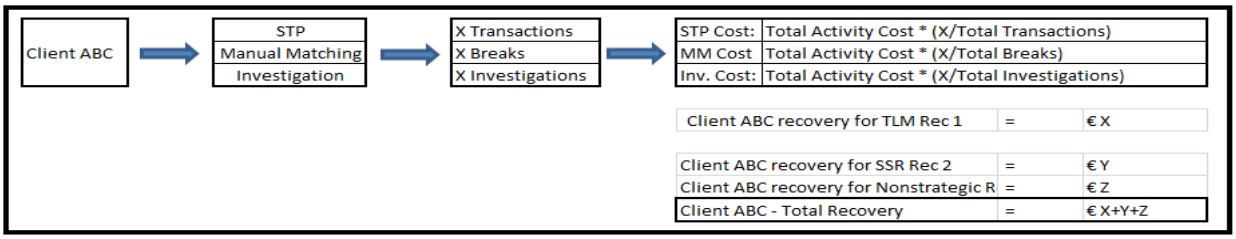

Figure 15: Client Recovery Model Example

As seen in Figure 15, three reconciliations were completed for Client ABC. STP, manual matching and investigation costs for each reconciliation are calculated by dividing the total activity cost of each activity by the metrics shown. For example, if GCBS fixed a total of 100 TLM breaks within a certain month and only 20 of these breaks belong to Client ABC, then Client ABC's manual matching charge will be one fifth of the total manual matching cost allocated to the TLM category The total charge for Client ABC is then calculated by adding up the respective costs of each of the three reconciliations.

4.4. Data Sources

As stated earlier in the methodology section, one of the primary objectives of this project was to identify the data sources needed to run the theoretical cost allocation model explained in section 4.3.6. During their 7-week presence at Deutsche Bank, the WPI team members were able to acquire some of those data sources. Nevertheless, some data sources could not be obtained either because they were not available to GCBS or they never existed.

Below is a list of the data sources that the team was able to acquire:

1. ***Monthly SSR and TLM transaction volume data:*** GCBS currently has monthly transaction volume throughput data for the two major reconciliation tools, namely SSR and TLM. Transaction data are required to run the theoretical cost allocation model because the STP cost which is one of the three major components of a client's total charge is driven by transaction volume throughput. SSR and TLM volume data can be obtained from the GCBS IT team.
2. ***Monthly GCBS costs:*** Regional costs are available to GCBS on a monthly basis. Cost data can be obtained from the COGNOS software. Cost information is the backbone of the theoretical cost allocation model since GCBS needs to recover 100% of costs by allocating them to clients.

3. ***Employee distribution data (Regional FTE distribution data):*** As explained in section 4.3.3, GCBS gets FTE information from two sources of data: "Landscape document" and "Regional FTE Distribution data". Regional FTE Distribution data clearly show how many employees are involved in reconciliation processes in each region. FTE information is necessary to run the theoretical cost allocation model because manual matching and investigation activities are performed by full-time employees and the costs incurred as a result of FTE involvement in manual matching and investigation processes need to be allocated to the clients based on the number of manual matching and investigations that GCBS carries out for them. FTE information could be obtained from regional managers.
4. ***List of reconciliations performed by GCBS (Landscape Document):*** By filtering the Landscape document, a list of all reconciliations performed by GCBS could be acquired. This information is necessary to run the theoretical cost allocation model because GCBS needs to know how many reconciliations are completed for a specific client as well as identify which reconciliation tool was used during the process.

Below are the data sources that could not be acquired:

1. ***Monthly break volume:*** Monthly break volumes are necessary to accurately allocate costs to clients because manual matching costs are driven by break volumes. According to their interview with Sage Gajarawala, the team members found out that monthly break volumes could be acquired from the OPAL software.
2. ***Reconciliation volume for individual reconciliation tools other than SSR and TLM:*** SSR and TLM are the strategic reconciliation tools used by GCBS. On the other hand, there is a good number of other reconciliation tools used by GCBS that go into the "nonstrategic" category in the theoretical cost allocation model. Since STP (system) and infrastructure costs

are driven by transaction volume throughput, GCBS needs to obtain volume information for the nonstrategic reconciliation tools to charge its clients for whom reconciliation services are performed by using nonstrategic reconciliation tools. Volume information associated with those reconciliation tools need to be collected from the clients and IT groups within the bank.

3. ***Monthly auto-match volume:*** FTE effort is needed whenever a transaction cannot be auto-matched. Currently, GCBS holds monthly auto-match volume for SSR and this information could be obtained from the software itself. According to their interview with Sage Gajarawala, the team members found out that the auto-match volume for TLM does not exist.
4. ***Cost of specific reconciliation systems:*** As explained in earlier sections, the WPI team grouped GCBS reconciliations by reconciliation tools: TLM, SSR and nonstrategic. Each category is then split into three subcategories: STP, manual matching and investigation. Even though SSR, TLM and nonstrategic categories consist of the same subcategories, the cost of performing a reconciliation using SSR, TLM and nonstrategic tools are different from one another. Therefore; the accuracy of the theoretical cost allocation model also depends on differentiating between the costs of completing reconciliations using different reconciliation tools.

5. Conclusion

In this section, the team will discuss the conclusions made after the analysis was completed. The conclusions concern the insecurity of information as well as the uncertainty behind cost drivers. As a reminder, the key findings were:

a. An Activity Based Costing model would be the appropriate method for charging clients.

b. Six countries (UK, USA, Germany, Italy, Singapore and Japan) have an annual cost that exceeds €800,000. The sum of annual costs that are incurred in these countries is about €21M which constitutes 67% of GCBS's annual cost which is €31M.
c. GCBS's P&L statement consists of 115 P&L lines, of which 51 are direct and 64 are indirect. 10 P&L lines constitute "99%" of GCBS's annual cost. These major costs are listed below:
    - *Direct costs:* Salaries and Overtime, Benefits, Occupancy expenses, Offshore Consultants, IT Sys Consult Excl Offshore & Agency/Con, Rental and Maintenance costs for IT.
    - *Indirect Costs:* IB IT, PCB IT, GTO IES and SOM IB.
d. Identifying headcount, volume, and other cost drivers become challenging due to the information analyzed.

Conclusions presented reference to the mentioned findings from the detailed analysis in Section 4.

5.1. Information Insecurity

Accurate information is required for a costing model to provide an accurate service charge. Information should come from a reliable source and ideally be updated automatically into the cost model between given time intervals. Although, reconciliation and break volumes are key drivers of the current cost allocation model, their volume data do not come from dependable sources. Within COGNOS, the break and reconciliation volumes are determined by percentages set by managers instead of true TLM and SSR volumes. In place of estimations, clients should be charged on the true amount of reconciliation and break volumes they produce. Continuing to charge estimates will result with inaccurate charges to clients.

Updating COGNOS with true reconciliation volume presents new information problems. The total number of reconciliations is not available for all reconciliation tools. Less commonly used reconciliation tools (especially EUDAs) do not provide the volume information easily. The information is attainable; nevertheless, it will require time and resources.

The team felt that the information inputted into model should not be static or require manual updates. Using static sources in the model will create more manual labor as well as inaccuracy. Volumes processed should be as up-to-date as possible to ensure correctness in charges.

5.2. Cost Behavior Unclear

The P&L statement used to examine the possible cost drivers created difficulties with establishing correlations between costs and drivers. As the team members compared the trends within each P&L line, they noticed large fluctuations from month to month. Many of fluctuations were due to corrections made by the accounting department. Corrections are made when costs are incorrectly attributed to a P&L line. To correct a mistake, an amount would be debited from one P&L line and credited to another. When the P&L lines were charted, the corrections can be mistaken for an actual representation of cost behavior. However, many fluctuations are due to the corrections and do not accurately represent the trend of GCBS costs.

Change the Bank (CTB) costs were included in the P&L used, thus creating another difficult identifying the correct cost behavior. From the beginning, the team aimed to create a cost allocation model for providing reconciliation services. Ideally, the clients should be charged based on the process of providing the service. Since the both RTB and CTB costs are included in the P&L statement, the cost behavior will reflect trends associated with the process and

improvement projects. To identify costs related with the process, a P&L statement consisting of only RTB costs would be more appropriate.

6. Recommendations

Branching off the analysis and conclusions, the team formed short and long term recommendations for continuing the creation of a new cost allocation model. Recommendations are meant to be the next steps in the process and will be presented as so.

6.1. Short Term

1. **We recommend obtaining and understanding a clean P&L:** All CTB costs should be excluded from the P&L statement and accounting corrections should be revised. A clearer representation of cost behavior will result in a better understanding of cost drivers.
2. **We recommend identifying cost drivers:** Once a cleaner P&L statement is obtained, cross examine the costs with possible driver information. For example, compare GTO IES cost trends with reconciliation volume to find correlations. Identifying cost drivers will also assist in determining the number of cost pools.
3. **We recommend determining the number of cost pools:** More cost pools will increase the accuracy of service charges; however, it will also increase the complexity of the costing model. The number of cost pools should be closely related to the number of cost drivers.
4. **We recommend determining the activity costs for service provisions:** A relationship between costs and activities must be identified. Once the relationship is established, the proper portion of cost pools can be attributed to the appropriate service provision. For example, X% of salaries should be included as part of the manual matching fee based on the relationship between the two.

5. **We recommend determining the status of data sources:** Since the creation of the costing model is in its infancy, the existence of certain data sources is unclear. We recommend establishing the status of the data sources that are required as of now. For example, total reconciliation volume for EUDAs are unknown, therefore it should be determined if volume data exists for the systems. If so, how can the information be attained and monitored?

6.2. Long Term

1. **We recommend revisiting the operating model:** To provide a more accurate costing model, the operating model should be revisited in order to fully understand the process and resources associated with reconciliations and break resolutions. By doing so, reconciliation steps that require more manual labor and resources can be identified and priced accordingly.
2. **We recommend identifying performance measures for reconciliation activities:** GCBS should begin to examine how productive and efficient they are within the department. By measuring how many breaks are resolved in a month, they can see how effective the department is. By measuring how long it takes to resolve a break, they can begin to see how efficient the department is. The performance measures should be compared over time in order to track GCBS performance.
3. **We recommend considering opportunity cost:** It is important that the cost of a new model not exceed the benefits. Although a highly sophisticated model will produce more accurate costs, it will also be more costly to run. A balance should be found between the quality of the system and cost.
4. **We recommend considering penalties for outstanding break time:** Currently, many clients have breaks that have been outstanding for long periods of time. The team suggests

that charges should include a time factor depending on how long a break has gone without resolution. This will provide clients with an incentive to resolve breaks more immediately.

7. References

"Activity Based Costing | AccountingCoach.com." *Free Online Accounting Course | AccountingCoach.com*. Web. 18 Dec. 2009. <http://www.accountingcoach.com/online-accounting-course/35Xpg01.html>.

"Activity Based Costing." *12manage - Management Encyclopedia and Network*. Web. 11 Nov. 2009. <http://www.12manage.com/methods_abc.html>.

"Activity based costing (ABC) definition." *BusinessDictionary.com - Online Business Dictionary*. Web. 29 Oct. 2009. <http://www.businessdictionary.com/definition/activity-based-costing-ABC.html>.

"Activity-based costing -." *Wikipedia, the free encyclopedia*. Web. 20 Nov. 2009. <http://en.wikipedia.org/wiki/Activity-based_costing>.

"Activity-Based Costing (ABC)." *Management and Leadership*. Web. 11 Nov. 2009. <http://www.emblemsvag.com/abc.htm>.

"Activity-based costing: Definition from Answers.com." *Answers.com: Wiki Q&A combined with free online dictionary, thesaurus, and encyclopedias*. Web. 29 Oct. 2009. <http://www.answers.com/topic/activity-based-costing>.

Antic, Ljilja. *Criteria for Evaluating Tranfer Pricing Methods*. Economics and Organization, 2000. Print.

Basic Cost-Management Concepts. McGraw-Hill, 2006. Print.

"Capital Market." *Economy Watch - World, US, China, India, UK and Canada Economy*. Web. 18 Oct. 2009. <http://www.economywatch.com/market/capital-market/>.

"Capital Markets." *Welcome to Investopedia.com*. Web. 18 Jan. 2010. <http://www.investopedia.com/terms/c/capitalmarkets.asp>.

"Cost Allocation: Encyclopedia of Business and Finance." *ENotes - Literature Study Guides, Lesson Plans, and More.* Web. 18 Dec. 2009. <http://www.enotes.com/business-finance-encyclopedia/cost-allocation>.

"Deutsche Bank - Global Network." *Welcome to Deutsche Bank!* Web. 18 Oct. 2009. <http://www.db.com/en/content/company/global_network.htm>.

"Deutsche Bank -." *Wikipedia, the free encyclopedia*. Web. 18 Nov. 2009. <http://en.wikipedia.org/wiki/Deutsche_Bank>.

Edmond, Thomas P. *Fundamental Managerial Accounting Concepts*. Irwin McGraw-Hill, 2000. Print.

"Full Cost Recovery." *Fact Sheet 25* (2007). BVSC. Web. 1 Nov. 2009. <http://www.bvsc.org/files/downloads/bvsc-factsheets/25%20-%20Full%20cost%20recovery.pdf>.

Game Theory and Business Applications (International Series in Operations Research & Management Science). New York: Springer, 2001. Print.

"Global Cross Business Services." *Deutsche Bank*. Web. 1 Nov. 2009.

"Global Cross Business Services." *Deutsche Bank*. Web. 4 Nov. 2009.

"Global Cross Business Services." *Deutsche Bank*. Web. 4 Nov. 2009.

Jiambalyo, James. "Managerial Accounting." 31 Oct. 2003. Web. 11 Nov. 2009.

Oliver, Lianabel. *The Cost Management Toolbox A Manager's Guide to Controlling Costs and Boosting Profits*. New York: American Management Association, 1999. Print.

Pfeiffer, Thomas. *Cost Based Transfer Pricing*. 1999. Print.

"Primary Market." *MapXL Inc*. Web. 10 Nov. 2009.

"Problems with cost allocation." *OverheadCAM.com OverheadCAM Cost Allocation Software Component*. Web. 29 Oct. 2009. <http://www.overheadcam.com/Problem.html>.

Shim, Jae K. *Schaum's outline of theory and problems of managerial accounting*. New York: McGraw-Hill, 1998. Print.

Smullen, John. *Transfer Pricing for Financial Institutions*. Grand Rapids: Woodhead, 2001. Print.

T., Horngren, Charles. *Introduction to management accounting*. 13th ed. Upper Saddle River, NJ: Prentice Hall, 2005. Print.

Tatum, Malcolm. "What is the Capital Market." *Conjecture Corporation*. 2009. Web. 11 Nov. 2009.

Vaysman, Igor. *A Model of Cost-Based Transfer Pricing*. Review of Accounting Studies, 1996. Print.

Appendix A – P&L Statement Screenshot

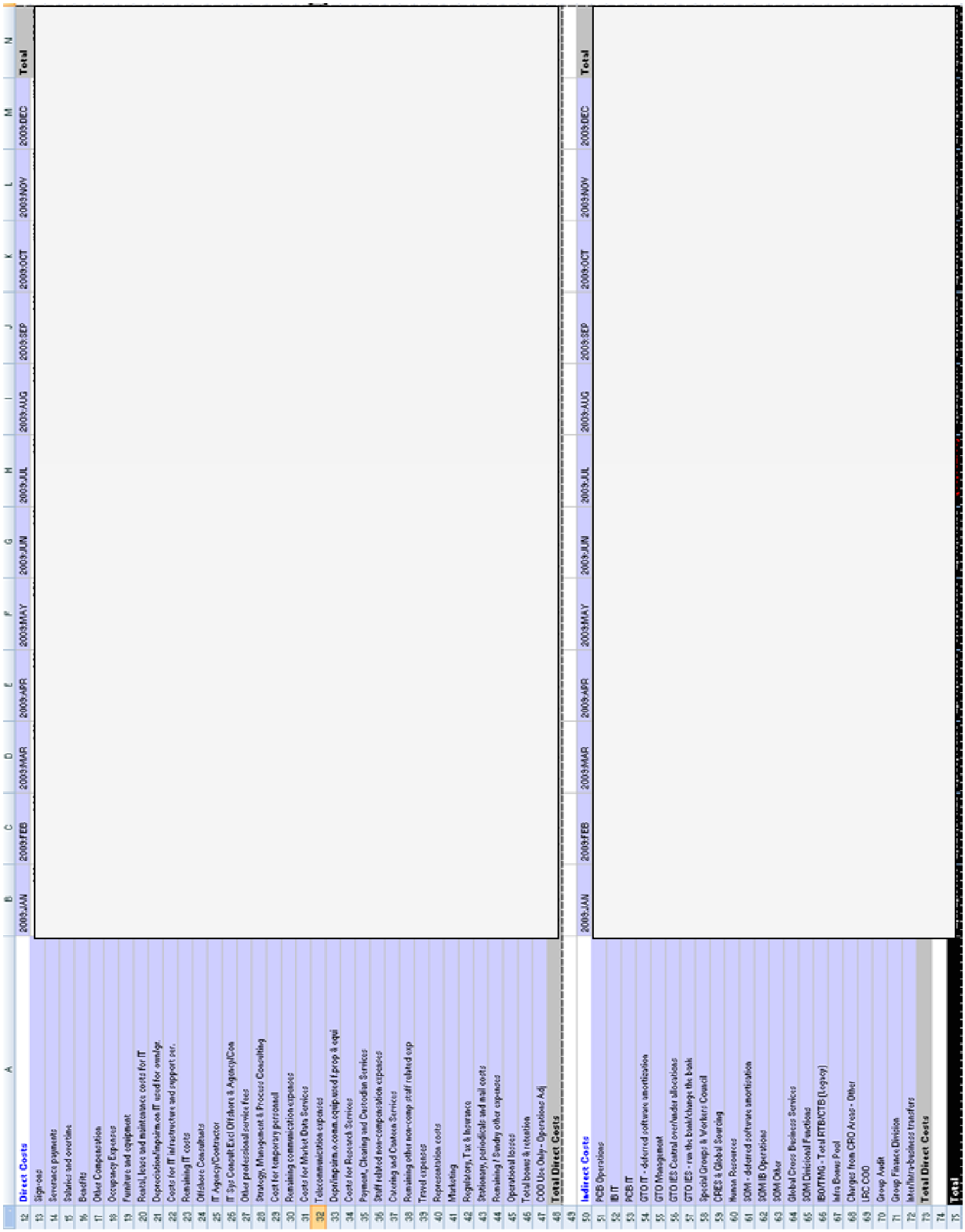

Figure 16: GCBS's P&L Statement for 2009

Appendix B – Grouping of Reconciliations Screenshots

Owner	Barry Zucker			
Reconciliation Tools	Values Count of Type of Rec	Sum of Total FTEs	Sum of Total Monthly Volume (not breaks)	Annual Cost
Americas	78	51.8004	5,478,034	
Americas - Argentina	2	1.2	26,050	
Americas - Brazil	9	4.28	235,480	$ 628,393.20
Americas - Mexico	1	1	-	$ 66,247.64
Americas - New York	2	26	72,630	$ 6,476,880.80
Americas - Peru	2	0.4	8,250	
Americas - Uruguay	3	0.12	2,547	
APAC	22	8.79	33,872,828	
APAC - Australia	1	1.6		$ 186,699.75
APAC - China	1	1		$ 20,849.43
APAC - Hong Kong	1	1		$ 34,754.05
APAC - India	1	1.3		$ 1,983.01
APAC - Indonesia	1	1		$ 1,357.72
APAC - Malaysia	4	1	128,058	$ 121,303.55
APAC - Manila	1	0.7		
APAC - Pakistan	2	0.6	27,719	
APAC - Singapore	1	2.1		$ 2,322,499.98
APAC - South Korea	1	0.6		
APAC - Sri Lanka	1	0.6		
APAC - Sydney	2	1.29	27,598	
APAC - Taiwan	1	0.7		$ (29.29)
APAC - Thailand	1	0.8		
APAC - Tokyo	2	0.8	95,514	$ 1,080,669.73
APAC - Vietnam	1	0.6		$ 1,412.09
Europe	128	113.3334333	99,567,240	$ 159,443.08
Europe - Barcelona	1	1	742,437	$ 245,507.83
Europe - Brussels	1	1	410,380	$ 359,579.95
Europe - FFT	2	23.92	6,752,095	$ 3,563,482.00
Europe - LDN/FFT	2	0	1,100,000	
Europe - London	1	27.2	15,402,054	$ 12,557,475.37
Europe - Luxembourg	1	3.4	125,000	$ 658,309.76
Europe - Milan	6	34	7,308,456	$ 1,777,604.43
Europe - Paris	1	1.05	188,424	
Europe - Portugal	1	0.85	66,800	$ 128,905.95
Europe - Russia	1	0.81	291,300	$ 852,890.71
Europe - Turkey	1	2	321,896	$ 167,445.23
Global	13	17.05	30,803,916	
Grand Total	**300**	**334.8938333**	**203,054,706**	**$ 31,413,665.97**

Figure 17: Grouping Reconciliations by Region

Owner	Barry Zucker		
Rec Tool	(All)		
	Values		
Reconciliation Type	Count of Type of Rec	Sum of Total FTEs	Sum of Total Monthly Volume (not breaks)
Internal	2	0.6	20,923,893.00
BO-BO	4	2.28	6,328,332.00
BO-Exch	43	9.046666667	32,650,764.00
BO-Ext	1	0.5	10.00
BO-GL	1	1.2	5,313.00
BO-SL	2	1.25	2,188,604.00
Depot	1	0.05	
FO-BO	67	68.9801	41,702,438.00
FO-Exch	6	2	1,954,996.00
FO-FO	7	2.03	43,320.00
FO-GL	2	0.5	9,680,000.00
FO-SL	2	1	23,503,524.00
Intercompany	6	1	1,954,996.00
Internal	15	6.65	2,088,943.00
Intersystem	12	11.49	23,948.00
Nostro	32	94.98	16,163,758
Nostro/Suspense/Depot	30	26.0002	
Nostro/Suspense/Internal/Depot	46	96.2002	16,692,759.00
Regulatory	5	2.2	5,123.00
SL-GL	1	1	25.00
Static	1	2	
Suspense	13	2.936666667	27,143,960.00
Suspense	1	1	
Grand Total	300	334.8938333	203,054,706.00

Figure 18: Grouping Reconciliations by Reconciliation Type

Owner	Barry Zucker		
	Values		
Reconciliation Tools	Count of Type of Rec	Sum of Total FTEs	Sum of Total Monthly Volume (not breaks)
ACS	1	1	
Application - RMS	1	0.02	269
Autobalance	1	1.2	5,313
DB LOGGER	2	1.75	4,784
Diasoft	1	0.29	10
DREX	8	9	14,293
EUDA	73	42.1601	160,265
Imhotep	4	4	445,267
Kosinus	1	0.17	500
Midas	1	0.18	798
Nostradamus	3	0.73	12
Other - Sundry Items	1	1.27	31
Prospectus	2	1	5,119
Ran-Rec	2	5	-
SRN	1	1	
SSR	166	234.5737333	118,558,895
TLM	32	31.55	83,859,150
Grand Total	300	334.8938333	203,054,706

Figure 19: Grouping Reconciliations by Reconciliation Tool

Appendix C – Cost vs. Country Line Graphs

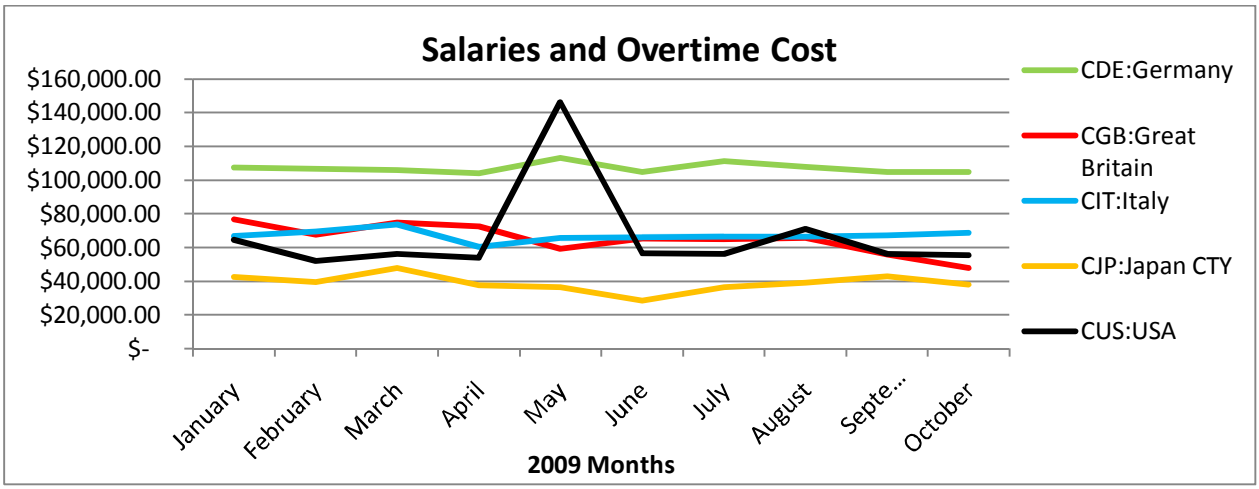

Figure 20: Salaries and Overtime Cost for top 5 countries

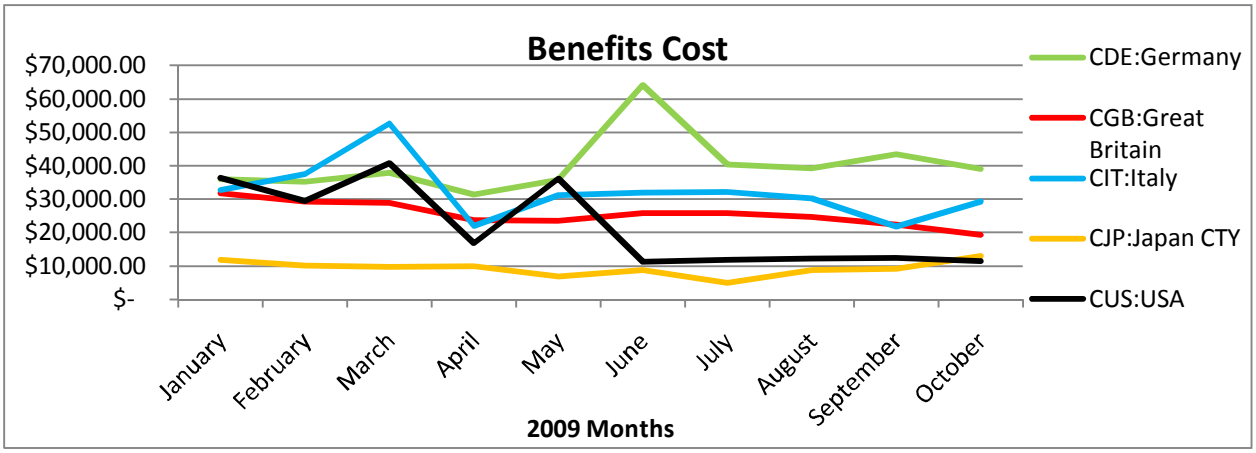

Figure 21: Benefits Cost for top 5 countries

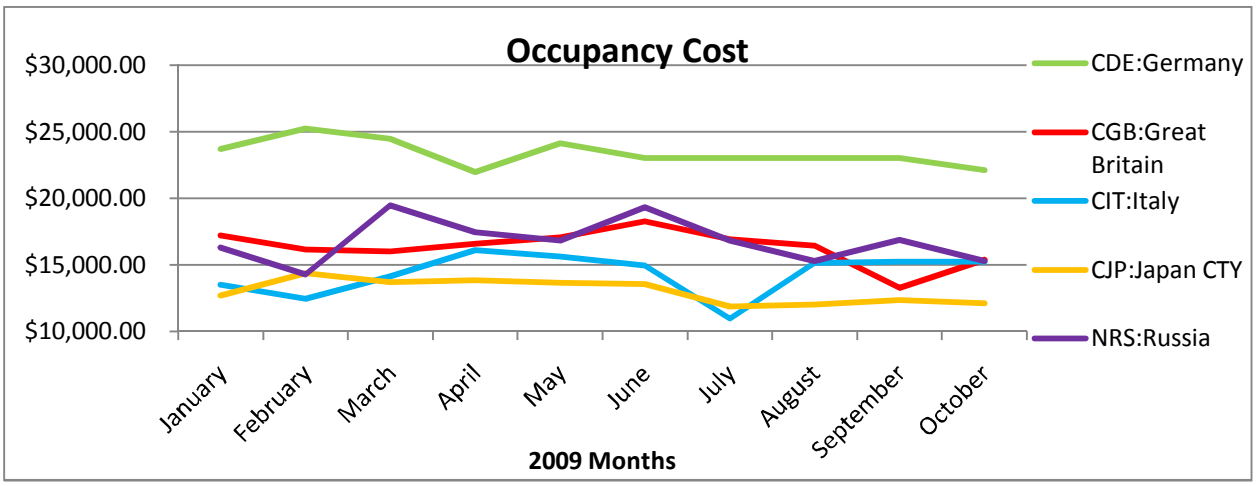

Figure 22: *Occupancy Cost for top 5 countries*

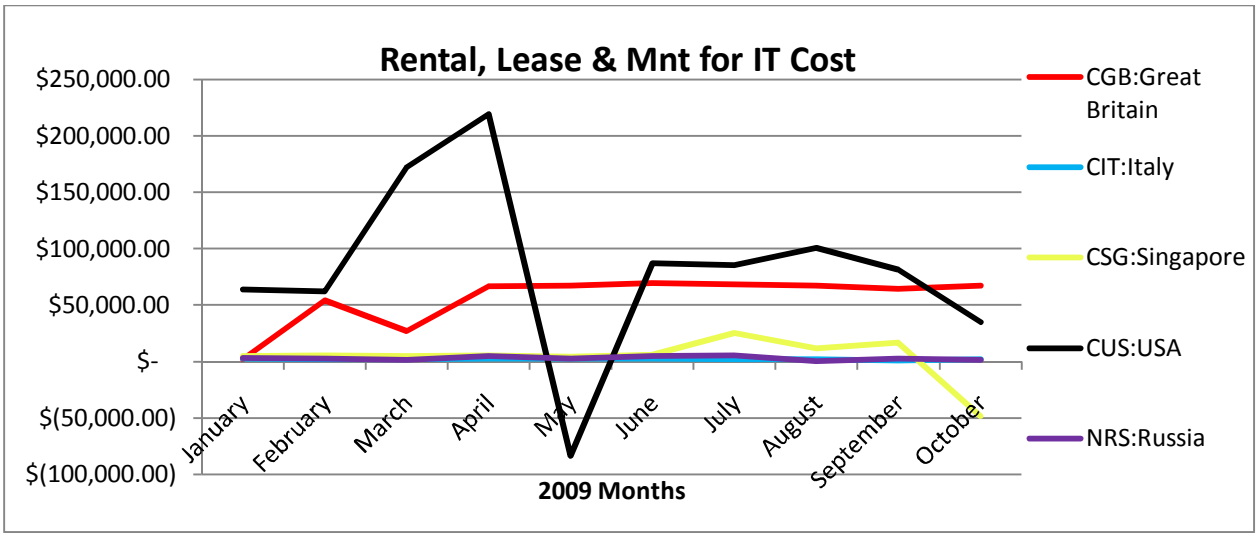

Figure 23: ***Rental, lease, and maintenance Cost for top 5 countries***

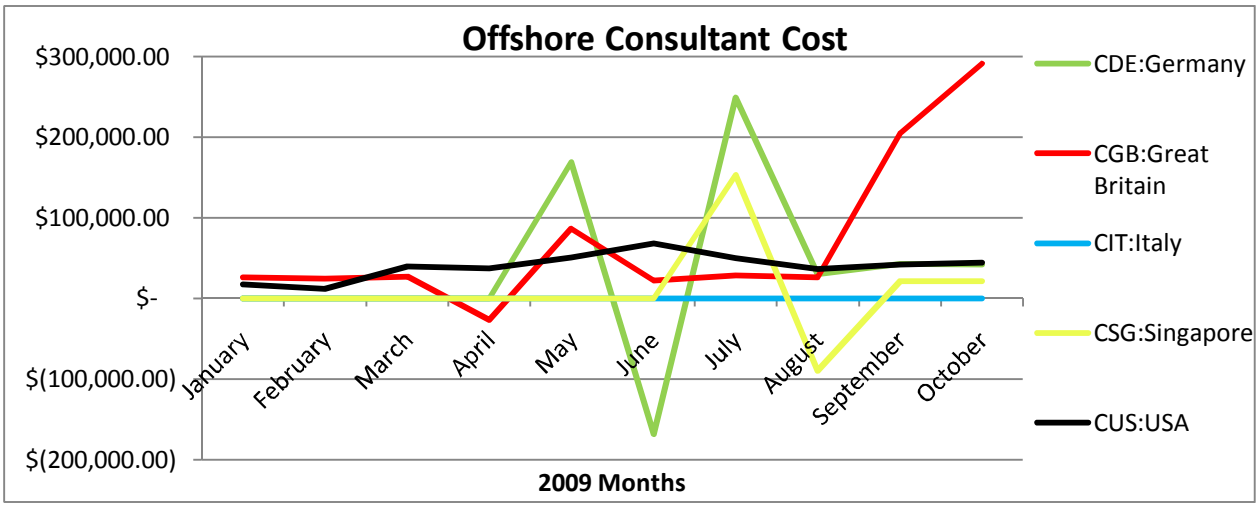

Figure 24: Offshore Consultant Cost for top 5 countries

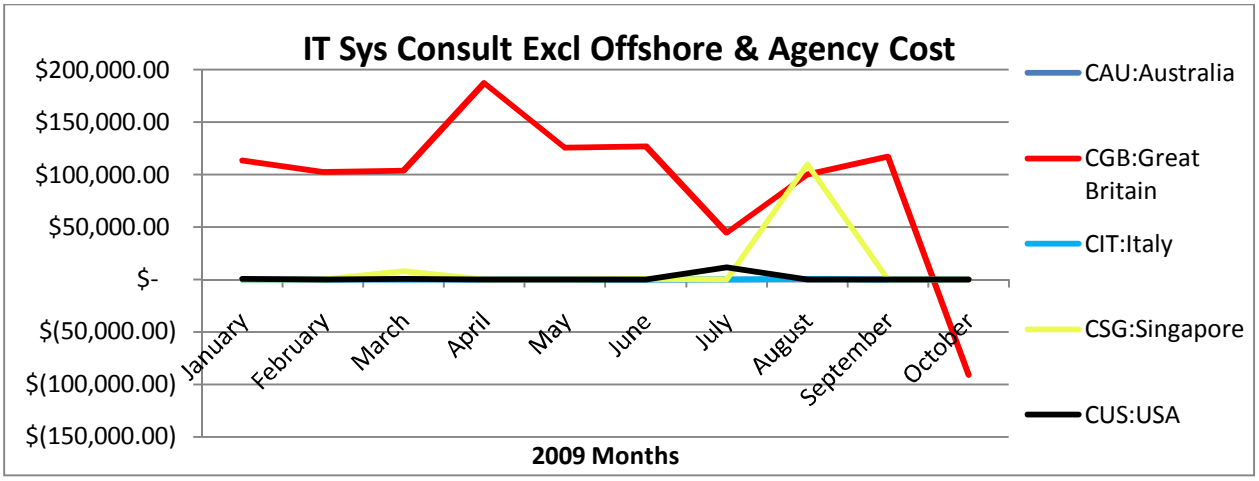

Figure 25: IT Sys Consult Excl Cost for top 5 countries

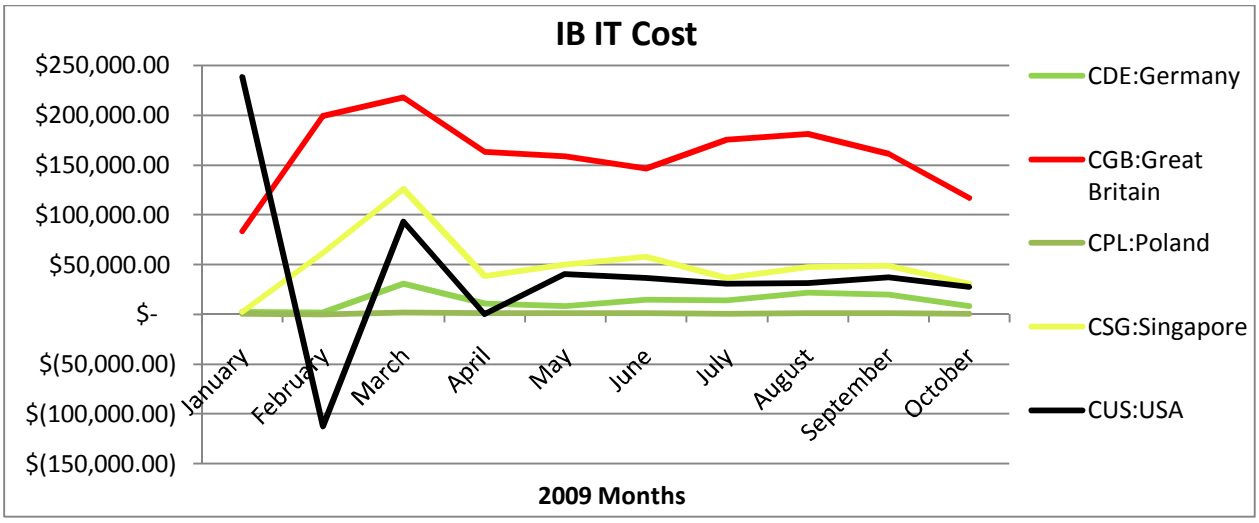

Figure 26: IB IT Cost for top 5 countries

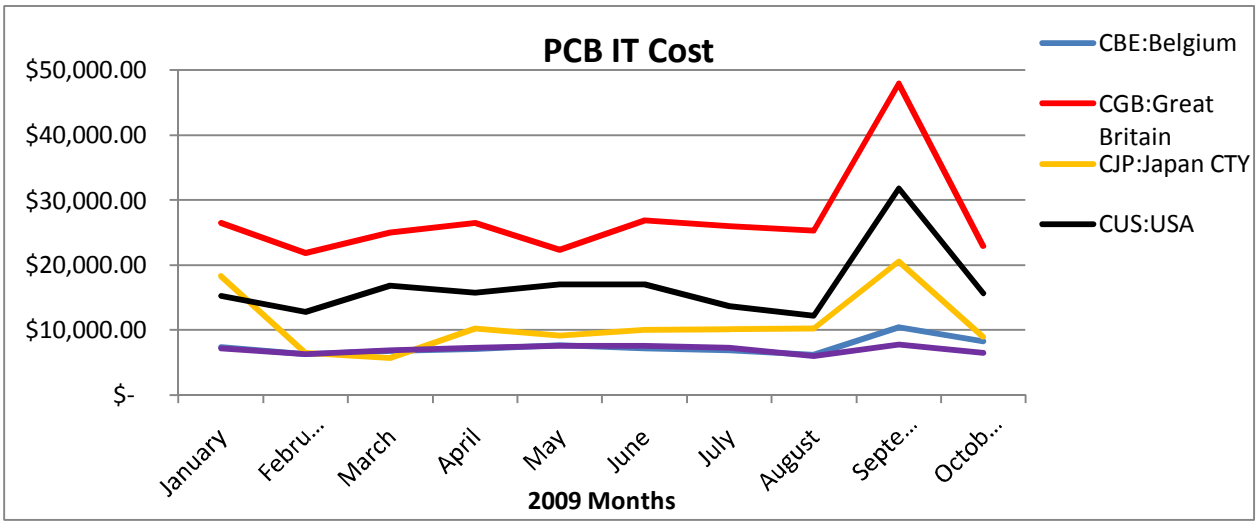

Figure 27: PCB IT Cost for top 5 countries

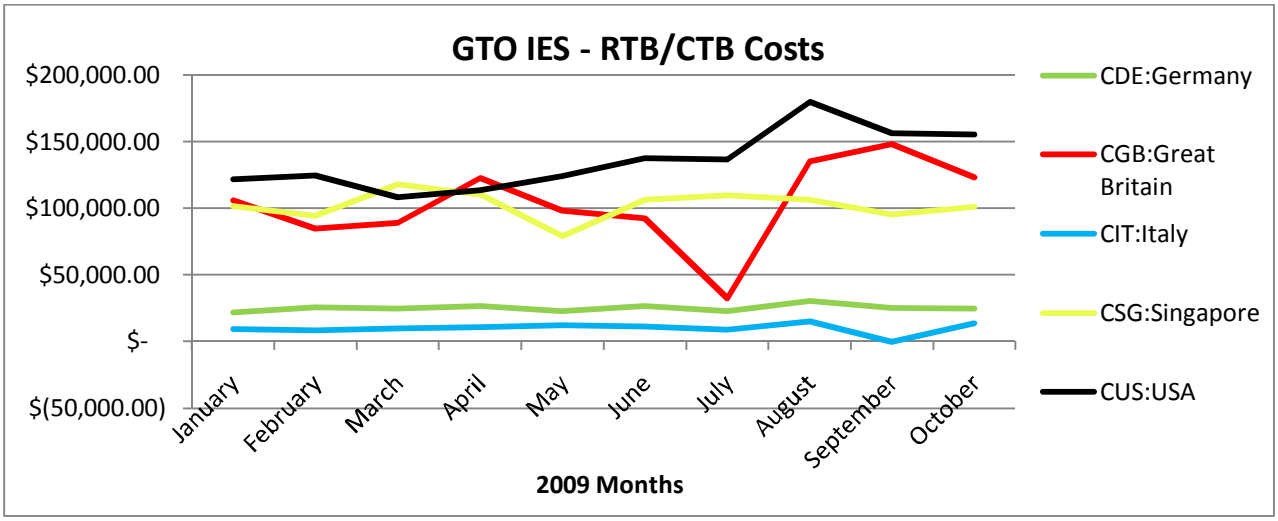

Figure 28: GTO IES Cost for top 5 countries

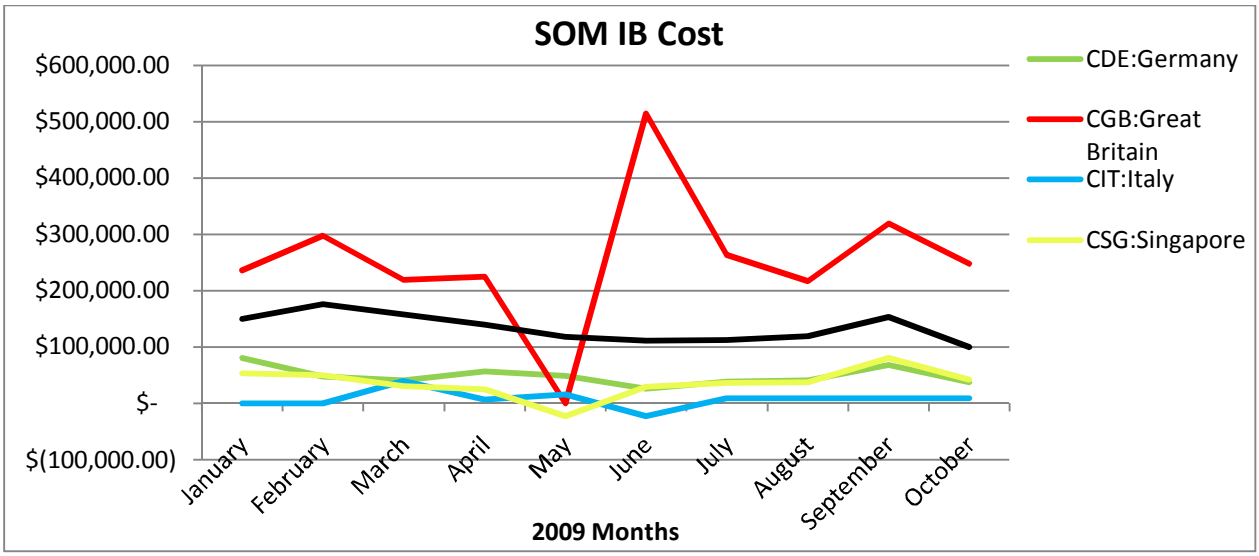

Figure 29: SOM IB Cost for top 5 countries

Appendix D – FTE vs. Key Cost

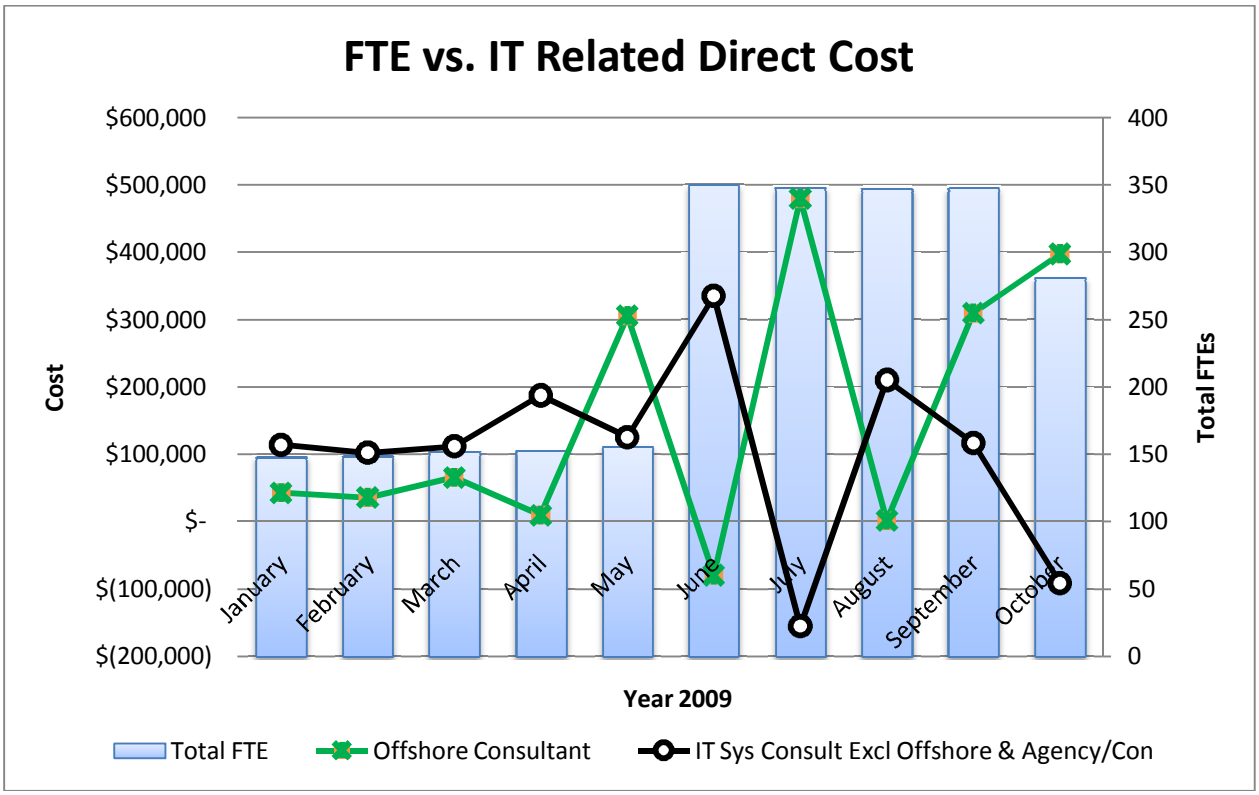

Figure 30: Total FTEs charted with IT related direct costs

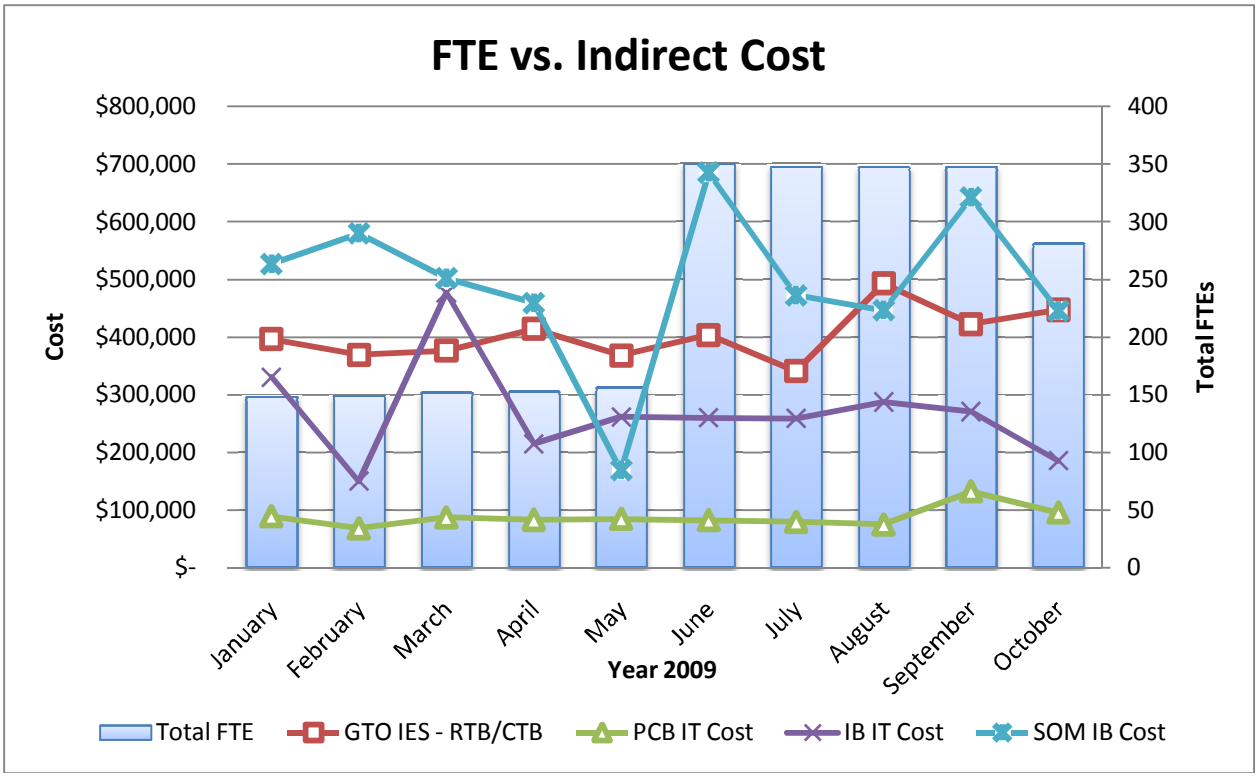

Figure 31: Total FTEs charted with IT indirect costs

Appendix E – Microsoft Project WBS and Gantt Chart

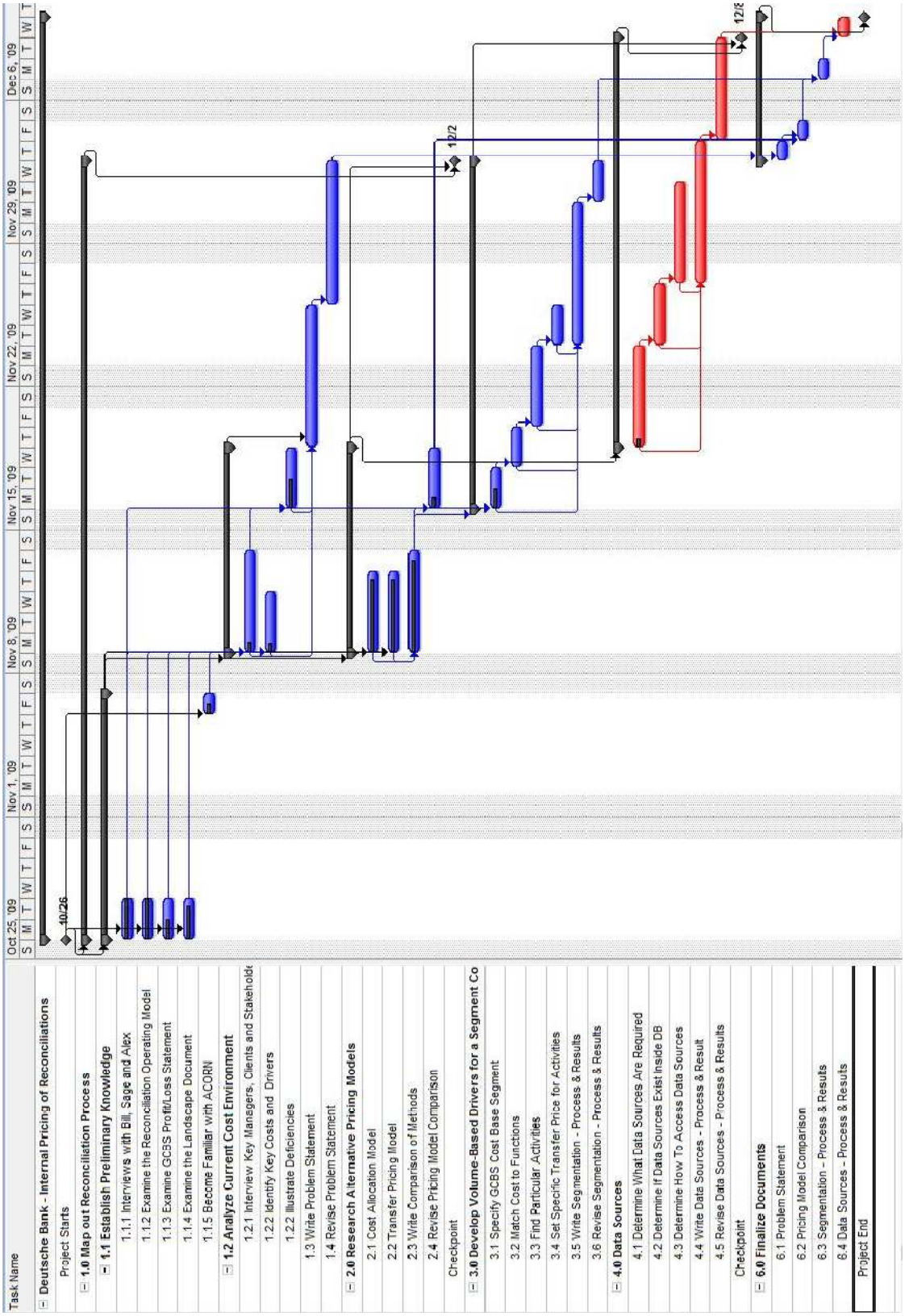

Figure 32: Gantt Chart on MS Project

Deadline	Task Name	Duration	Start	Finish	Baseline Finish	% Complete	Actual Start	Actual Finish	Predecessors	Successors
NA	**Deutsche Bank - Internal Pricing of Reconciliations**	**33 days**	**Mon 10/26/09**	**Wed 12/9/09**	**Wed 12/16/09**	**28%**	**Mon 10/26/09**	**NA**		
NA	Project Starts	0 days	Mon 10/26/09	Mon 10/26/09	Mon 10/26/09	0%	NA	NA		5,6,7,8,9,4,3
NA	**1.0 Map out Reconciliation Process**	**28 days**	**Mon 10/26/09**	**Wed 12/2/09**	**Fri 11/20/09**	**32%**	**Mon 10/26/09**	**NA**	**2**	**21**
NA	**1.1 Establish Preliminary Knowledge**	**10 days**	**Mon 10/26/09**	**Fri 11/6/09**	**Tue 10/27/09**	**81%**	**Mon 10/26/09**	**NA**	**2**	**10,16,17,18**
NA	1.1.1 Interviews with Bill, Sage and Alex	2 days	Mon 10/26/09	Tue 10/27/09	Tue 10/27/09	100%	Mon 10/26/09	Tue 10/27/09	2	11,23
NA	1.1.2 Examine the Reconciliation Operating Model	2 days	Mon 10/26/09	Tue 10/27/09	Tue 10/27/09	100%	Mon 10/26/09	Tue 10/27/09	2	11,12
NA	1.1.3 Examine GCBS Profit/Loss Statement	2 days	Mon 10/26/09	Tue 10/27/09	Tue 10/27/09	50%	Mon 10/26/09	NA	2	12,11
NA	1.1.4 Examine the Landscape Document	2 days	Mon 10/26/09	Tue 10/27/09	Tue 10/27/09	90%	Mon 10/26/09	NA	2	11,12
NA	1.1.5 Become Familiar with ACORN	1 day	Fri 11/6/09	Fri 11/6/09	Mon 10/26/09	50%	Fri 11/6/09	NA	2	12
NA	**1.2 Analyze Current Cost Environment**	**8 days**	**Mon 11/9/09**	**Wed 11/18/09**	**Fri 11/6/09**	**21%**	**Mon 11/9/09**	**NA**	**4**	**14**
NA	1.2.1 Interview Key Managers, Clients and Stakeholders	5 days	Mon 11/9/09	Fri 11/13/09	Tue 11/3/09	10%	Mon 11/9/09	NA	5,6,8,7	14SS,13
NA	1.2.2 Identify Key Costs and Drivers	3 days	Mon 11/9/09	Wed 11/11/09	Fri 10/30/09	10%	Mon 11/9/09	NA	7,8,6,9	14SS
NA	1.2.2 Illustrate Deficiencies	3 days	Mon 11/16/09	Wed 11/18/09	Fri 11/6/09	50%	Mon 11/16/09	NA	11	14SS
NA	1.3 Write Problem Statement	5 days	Thu 11/19/09	Wed 11/25/09	Fri 11/13/09	0%	NA	NA	11SS,12SS,13SS,10	15
NA	1.4 Revise Problem Statement	5 days	Thu 11/26/09	Wed 12/2/09	Fri 11/20/09	0%	NA	NA	14	37,36
NA	**2.0 Research Alternative Pricing Models**	**8 days**	**Mon 11/9/09**	**Wed 11/18/09**	**Tue 11/10/09**	**78%**	**Mon 11/9/09**	**NA**	**4**	**21,29**
NA	2.1 Cost Allocation Model	4 days	Mon 11/9/09	Thu 11/12/09	Mon 11/2/09	90%	Mon 11/9/09	NA	4	19SS
NA	2.2 Transfer Pricing Model	4 days	Mon 11/9/09	Thu 11/12/09	Mon 11/2/09	90%	Mon 11/9/09	NA	4	19SS
NA	2.3 Write Comparison of Methods	5 days	Mon 11/9/09	Fri 11/13/09	Tue 11/3/09	90%	Mon 11/9/09	NA	17SS,18SS	20,22
NA	2.4 Revise Pricing Model Comparison	3 days	Mon 11/16/09	Wed 11/18/09	Tue 11/10/09	25%	Mon 11/16/09	NA	19	38
NA	Checkpoint	0 days	Wed 12/2/09	Wed 12/2/09	Fri 11/20/09	0%	NA	NA	3,16	
NA	**3.0 Develop Volume-Based Drivers for a Segment Cost Base**	**13 days**	**Mon 11/16/09**	**Wed 12/2/09**	**Fri 11/27/09**	**7%**	**Mon 11/16/09**	**NA**	**19**	**35**
NA	3.1 Specify GCBS Cost Base Segment	2 days	Mon 11/16/09	Tue 11/17/09	Thu 11/5/09	50%	Mon 11/16/09	NA	5	24,27SS
NA	3.2 Match Cost to Functions	2 days	Wed 11/18/09	Thu 11/19/09	Tue 11/10/09	0%	NA	NA	23	25,27SS
NA	3.3 Find Particular Activities	2 days	Fri 11/20/09	Mon 11/23/09	Fri 11/13/09	0%	NA	NA	24	26,27SS
NA	3.4 Set Specific Transfer Price for Activities	2 days	Tue 11/24/09	Wed 11/25/09	Wed 11/18/09	0%	NA	NA	25	27SS
NA	3.5 Write Segmentation - Process & Results	5 days	Tue 11/24/09	Mon 11/30/09	Fri 11/20/09	0%	NA	NA	24SS,25SS,26SS,23	28
NA	3.6 Revise Segmentation - Process & Results	2 days	Tue 12/1/09	Wed 12/2/09	Fri 11/27/09	0%	NA	NA	27	39
NA	**4.0 Data Sources**	**14 days**	**Thu 11/19/09**	**Tue 12/8/09**	**Wed 12/2/09**	**2%**	**Thu 11/19/09**	**NA**	**16**	**35**
NA	4.1 Determine What Data Sources Are Required	3 days	Thu 11/19/09	Mon 11/23/09	Fri 11/13/09	10%	Thu 11/19/09	NA		31,33SS
NA	4.2 Determine If Data Sources Exist Inside DB	3 days	Tue 11/24/09	Thu 11/26/09	Wed 11/18/09	0%	NA	NA	30	32,33SS
NA	4.3 Determine How To Access Data Sources	3 days	Fri 11/27/09	Tue 12/1/09	Mon 11/23/09	0%	NA	NA	31	33SS
NA	4.4 Write Data Sources - Process & Result	5 days	Fri 11/27/09	Thu 12/3/09	Wed 11/25/09	0%	NA	NA	30SS,31SS,32SS	34
NA	4.5 Revise Data Sources - Process & Results	3 days	Fri 12/4/09	Tue 12/8/09	Wed 12/2/09	0%	NA	NA	33	40
NA	Checkpoint	0 days	Tue 12/8/09	Tue 12/8/09	Wed 12/2/09	0%	NA	NA	22,29	
NA	**6.0 Finalize Documents**	**5 days**	**Thu 12/3/09**	**Wed 12/9/09**	**Wed 12/16/09**	**0%**	**NA**	**NA**	**15**	**41**
NA	6.1 Problem Statement	1 day	Thu 12/3/09	Thu 12/3/09	Tue 11/24/09	0%	NA	NA	15	38
NA	6.2 Pricing Model Comparison	1 day	Fri 12/4/09	Fri 12/4/09	Thu 11/26/09	0%	NA	NA	20,37	39
NA	6.3 Segmentation - Process & Results	1 day	Mon 12/7/09	Mon 12/7/09	Tue 12/1/09	0%	NA	NA	28,38	40
NA	6.4 Data Sources - Process & Results	1 day	Wed 12/9/09	Wed 12/9/09	Fri 12/4/09	0%	NA	NA	34,39	
Thu 12/17/09	Project End	0 days	Wed 12/9/09	Wed 12/9/09	Wed 12/16/09	0%	NA	NA	36	

Figure 33: WBS on MS Project