Introduction to the case study

This case study explores how Merrill Lynch a worldwide leader in the economic management, with over 60,000 workers (WetFeet, 2009) covering over 40 countries and territories, and approximately 1.6 trillion dollars of client's assets at the time of this case study, presently, Merrill Lynch client's assets is said to be $2.2 trillion (Merrill Lynch ,2011).
For Merrill Lynch to remain competitive in our ever-rising technological world: it had to modernise its Information Technology infrastructure, according to The Economist (2001) most of its competitors had already modernised their IT infrastructure and were using Web service applications. Web service application is described by Manes (2003) as an application that provides Web application Programming Interface (API) which exposes the functionality of an application within Merrill Lynch IT infrastructure to other applications.
Merrill lynch's present information technology infrastructure uses IBM mainframe, which is largest in the world, it runs over 23,000 programs daily to process customers' accounts and stock trading, covering over 80millions transactions daily (Merrill Lynch,2011)
The case study further explores how Merrill Lynch invested in its information technology infrastructure to remain competitive. The first task was to analyse its current system and design or purchase vendor software that would allow customers access to their portfolios and the right tools to work with them, without compromising the operations of its IBM mainframe in any respect, hence compatibility and security were considered during this analysis (Duvall, 2007)
The infrastructure team considered buying a software, would be easier than developing one, in this aspect, Merrill Lynch was trying to cut cost and remain competitive, most of the software considered did not meet the requirements of the project team, the use of SOA platforms meant Merrill Lynch would spend a further year to adapt to SOA platforms.

Buying software from vendors was discarded for the following reasons:

- Compatibility issues
- Unfamiliar platforms
- New programming tools
- In experienced programmers to use new tools
- The cost of retraining users to cost over $80 million
- The cost of buying new workstations

The big question was how Merrill Lynch could acquire an application while leveraging the processing power and wealth of its IBM mainframe. Merrill Lynch decided to approach the situation unconventionally by constructing a Web development platform and extend the capabilities of its legacy mainframe system, but this plan was put aside due to cost. The team avoided the cost of building a new infrastructure by copying data stored in its mainframe installation into the following database platforms

Database platforms:

- Oracle
- Sybase

- Microsoft SQL.

An idea, which did not last long, as it was slowing down business processes, as copied data became obsolete, clients had to wait 24hrs to see an update of their transactions and account balance. During this period, files were being corrupted due to disk error and space issues and it was time consuming, a waste of resources as accurate data is always residing on the mainframe. Many clients could have left Merrill Lynch or decided to invest with competitors who had real-time processing infrastructure using Web service application (Manes, 2003)

Merrill lynch had to go back to the drawing board and produce a business process strategy, Merrill Lynch embarked on a project, that would expose programs stored in its mainframe computers to its customers and advisors. After various consultations with key customers and advisors and the result of the consultations were, the project had to develop an application that would give clients direct access to their portfolios in real time mode, as most of its clients were trading with Merrill Lynch's competitors who were using Web service applications (Rangan & Bell, 2000)

How did they come about this breakthrough to remain competitive?

Merrill Lynch built an information technology infrastructure (web services) using an application that describes data for other applications that are equipped with XML tags to interpret XML (Hagel III & Brown 2001). In addition, the use of SOAP which makes it possible for different software application on different platforms to communicate with each other (Snell *et al*,2001), hence the in-house tool known as X4ML could communicate with Merrill Lynch's IBM mainframe, without using additional layer of middleware which could minimise simplicity and speed (Manes,2003). The project team installed/implemented a past technology application directly onto the mainframe, this strategy reduced cost and other issues during translation, which promised better performance. The software programme, which is rarely used in today's technological world, developed in the 1950s, also known as Assembly Language. The entire project lasted for three years and nearly $1 billion was earmarked to develop and lunch X4ML (Manes,2003).The use of Assembly Language software and avoiding the use of a layer of middleware … aspect of the project was very important, when it comes to security, reliability, availability and performance by extending the capability of its legacy mainframe systems.

S.W.O.T Analysis of Merrill Lynch.

From the introduction one can agree that Merrill lynch had issues whilst trying to modernizing its IT infrastructure, these issues would be analysed by the team using an analysis tool known as SWOT analysis. Clow and Stevens (2009) describes SWOT analysis tool as a tool that helps identify the Strengths, Weaknesses, Opportunities, and Threats of an organisation.

Strengths (S) and Weaknesses (W) are considered internal factors over which Merrill Lynch has some measure of control. Also, by definition, Opportunities (O) and Threats (T) are external factors over which Merrill Lynch have no control (Clow and Stevens,2009). In other words, it is a straightforward model that assesses what an organisation can and cannot do as well as its potential opportunities and threats. (Chapman,2006).

SWOT analysis determines what may assist the firm in accomplishing its objectives, and what obstacles must be overcome or minimised to achieve desired results (Chapman, 2006).

The table below illustrates the SWOT analysis of Merrill Lynch as identified by the team.

Strengths, Weaknesses, Opportunities and Threats		
Item	Description	Comments
Strength		
1.	World Leader	Merrill Lynch is a worldwide monetary management advisory service. They have offices in 36 countries employing 50,600 employees. As of 2011, the company has over 60,000 employees. Merrill Lynch presently has offices in over 40 countries and territories.
2.	All fiscal management and advisory service Providers.	Company provides brokerage, investment banking, financing, wealth management, advisory, asset management, insurance ending, and other products and services.
3.	Strong financial position	The company has total assets of $1.6 trillion.
4.	Strong business growth	Merrill Lynch posted a record $5.1 billion in net earnings and 15% increase over the previous year on net revenues of $26 billion.

5.	Good information and technology infrastructure	• Merrill Lynch World's largest IBM mainframe played a significant role in the company's gain. • 23,000 programs installed in mainframe • Mainframe processed over 80 million transactions daily
6.	The use of Assembly Language (past technology)	The installation of this application directly into its mainframe reduced the number of things that could go wrong during translation. It improved performance as well as having middleware.
7.	Excellent web service Applications	Web services have saved the company $41 million in application costs through wealth management applications and their X4ML development tool.
Weakness		
8.	Poor IT Policy (Now Resolved)	Just to avoid the cost of bespoke software for the company, Merrill Lynch opted to copy data stored in its mainframe to other platforms.

9.	Making wrong decisions in Modernising IT infrastructure	• Declined to buy vendor software, as it did not meet requirement specification. • Declined to use the vendor's expertise and access to consultants familiar with integrating mainframe and web service applications. • Copied data delayed business processes by over 24hrs. • Data became obsolete once copied
10.	Lack of knowledge	• Programmers did not know the deep-rooted code of the IBM mainframe • Programmers did not have experience in new/recent development tools such as JAVA and NET.
Opportunities		
11.	The creation of Web Service applications	Merrill Lynch project team created its own propriety web service tool and called it X4ML, and its use saved the company $41 million in application development.
12.	The Idea to sell its proprietary tool X4ML	The Idea to sell this web service application was debated for over 6 months. The sale was made to a SOA vendor for an undisclosed amount, the sale was appreciated by the management.
13.	Enhancing scope through acquisition.	Due to companies' strong financial position, it can enhance in future through acquisition.

14	Improved Information technology infrastructure	• It became clear that there were huge opportunities to use technology to enhance Merrill's operations. • Its primary business was creating, distributing, and using information, and it was drowning in the stuff. • The Internet offered a way to bring order and speed where there had been chaos.
Threats		
14.	Sale of its proprietary web service tools	• Merrill Lynch used past technology and future technology to create an application that could interact directly with its mainframe, after making various wrong decision to get this far. • The decision to sell on X4ML was a surprise and the team believes that Merrill Lynch could lose its competitive advantage. • The exit of its four key members that developed the X4ML.
	Delayed Business Process	• Copying of data. • Customer being frustrated. • Customers might look elsewhere for better services. • Competitors can take advantage and lure

16	change in regulations	Changing government regulations and budgetary crisis like: ● Recession ● Investment banking pressure on the rise ● Stiff competition

Summary of SWOT analysis

From the above illustration, one would agree that Merrill Lynch was in an extraordinarily strong position in the finance management business, they also had a particularly good Information Technology Infrastructure, which needs to be modernised to remain competitive. The project team were indecisive concerning the types of business process to apply in modernising its IT infrastructure.

The SWOT analysis also shows the negative impact of business processes used to weaken their position, by delaying business transactions, wasting resources and time. SWOT analysis also illustrates the opportunities created by the project team and the threat they were exposed to after selling on a newly developed Web service application to a software vendor. The exit of the project four key members was a threat, while the copying of data from its mainframe to other platforms was seen as a weakness and threat as it delayed transaction processes.

Identification of a single critical SWOT

As identified above, Merrill Lynch is worldwide leader in fiscal management and advisory services, who had to modernise their information infrastructure to remain competitive. Merrill Lynch had to make a choice regarding its legacy computers and applications. The main purpose for modernising its infrastructure was to allow its customer access to their portfolios and tools to work with them in real-time mode (Dawson, 2002)

Most of the software sought after, were not compatible with Merrill Lynch's mainframe computer, and they were not ready to develop a software from scratch, neither were they ready to retrain their programmers with over $80million.

Merrill lynch tried to avoid cost and opted to copy data into the following platforms:

- Oracle
- Sybase
- Microsoft SQL.

The team debated about all identified SWOT issues and agreed that the copying of data into other platforms was a weakness, major problem, and the most prominent issue for Merrill Lynch. The copying of data (weakness) from its mainframe to other platforms is more important than other issues are: Merrill Lynch spent a lot of money copying data, customers could not see their portfolio in real-time mode, and they had to wait over 24hrs to see an update of their account, and sometime more, if the disk had errors. A client could not tell if their transactions were authorised until 24 hrs.

Critical Evaluation:

As explained above, the most critical issue was Merrill Lynch copying data from its mainframes into other platform; data during this period was either corrupted or obsolete. This was a weakness of Merrill lynch, a weakness that could have created opportunities for its competitors.
Always remember that all Merrill Lynch wanted was a modernisation of their IT infrastructure. The organisation had diverse options in modernising its IT infrastructure to remain worldwide leaders in monetary management:

Options

- To develop an application from the scratch
- To purchase an SOA platform
- To change its entire IT infrastructure.

Merrill Lynch discarded the listed options, due to cost, and decided, they would copy data from its mainframe into other platforms.
One could argue that this implementation of technology, copying of data into different platforms contributed negatively to Merrill Lynch Business operations and might/could have created opportunities for its competitors;

The negative impact, data copying had on Merrill Lynch are as follows.

- Clients could not see an update of transactions in real-time mode; they had to wait over 24hrs.
- Most of the copied data became corrupted due to disk errors
- Read errors or running –out-of-space errors
- By the time the data copied are installed into other platforms, it had become obsolete (out-of-date as soon as it is copied)
- The up-to-date information is/was always in its mainframe in real time.
- Customers /advisors needed to see information about transactions in real time mode

During the period of data copying, instead of developing or purchasing a Web service application, customers during this period could have ended up being frustrated and look elsewhere where they could see their transaction and account balances in real-time mode (Dawson,2003). Customers had to wait over 24hrs to have access to transactions carried out the previous day to find out if these transactions were authorised or declined.
Merrill lynch competitors during this period, were carrying out transaction in real-time mode, they could or did take advantage of the weakness Merrill Lynch possessed. This Process was a waste of resources and time

What Alternatives did Merrill Lynch have?

One will ask why Merrill Lynch decided to copy data from its mainframe to other platforms for customers to view their transaction; data that had errors and data was obsolete the moment it was copied from the mainframe, as real-time data is constantly stored in or sent to the mainframe. The main issue was how Merrill Lynch, and its customers could use applications to communicate directly with its mainframe computers without compromising it. (Kizza, 2005)
Merrill Lynch had other options than copying data to other platforms, which led to its business transaction delayed and customers had to wait over twenty-four hours to confirm if their transactions were authorised or declined. This process must have been very frustrating for Merrill Lynch's advisors and customers, this weakness became a threat.

One would at this stage agree that Merrill Lynch was wasting a lot of resources and time and its position been threatened and weakened, hence creating business opportunities for its competitors, as most financial institutions during this period had implemented Web services application into their Information technology infrastructure, which enabled customers with real-time mode access to portfolios and variety of tools to take advantage of, in a more user-friendly web interface. Clients could see their account balance almost immediately after transactions and not waiting 24hrs (Dawson, 2003)

According to the case study and research carried out by the team, Merrill Lynch had the following options, before assessing these options, it would be appropriate to assess the

details of Merrill Lynch's Information Technology Infrastructure.

- The largest IBM mainframe computer in the world

  23,000 programs installed in it

  Performed 80 million transactions daily *(accessing customers' accounts and stock trades)*
- Mainframes was built using COBOL programming tools

The options available were the following business process management tools:

- Business process re/design or engineering
- Business process automation
- Business process improvement

The alternative to address the critical SWOT issue that Merrill Lynch possessed was to use Redesign Knowledge Management, which can be a combination of BPI and BPR as opposed to BPA.

The alternative business process suggested for Merrill lynch is Business process redesign, which involves critical redesign of its service delivery process, by dramatically improving the analysis and merge the capabilities embedded in its IBM mainframe, to provide better full-service value to its customers (Holsapple, 2004).

Recommendation

The project team are in favour of technology already implemented by Merrill Lynch. The implementation of XML tags to describe data for other applications that are equipped with XML (Hagel III & Brown 2001) and SOAP software that makes communication possible for applications running under different operating systems (Duvall, 2007). These two standards and the implementation of past technology, a translation code written in assembler (Assembly Language) directly into the IBM mainframe, made it possible for online applications to communicate effectively with the mainframe with speed and simplicity; hence, customers could transact businesses in real-time mode.

The Redesign Knowledge Management, (BPR) which Merrill used to modernise its IT infrastructure, saved the company $2million a year and a further $41 million in application development cost due to investment in Web service applications. (Duvall, 2007).

Conclusion

The team has learnt a lot about Merrill Lynch's leadership in the economic management business and how it was bought by the Bank of America during the credit crunch. One has also learnt about how it made wrong decisions when trying to modernise its technology infrastructure to remain competitive. We have also learnt, how much it can cost an excessively big organisation like Merrill Lynch to change the way it serves its customers and operates it business.

Copying data to other platforms was a very wrong strategy and the sale of its proprietary tools (X4ML) can be seen as a threat and a business opportunity.