From Health Checks to the Seven Sisters: The Data Quality Journey at BT

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1 Company Profile

1.1 Overview

BT is one of the world's leading providers of communications solutions, with customers in Europe, the Americas, and Asia Pacific. Its principal activities include networked IT services, local, national and international telecommunications services, and higher-value broadband products and services.

	BT Group plc
Foundation	1846 foundation of Electric Telegraph Company, 1984 privatisation as British Telecommunications plc
Headquarters	London, UK
Sector	Telecommunications
Lines of Business / Divisions	Four lines of business: BT Retail, BT Wholesale, Openreach, BT Global Services
Corporate Structure	Four lines of business, two operational units (BT Design and BT Operate), local availability in 70 countries
Homepage	www.bt.com
Revenue	20.2 billion GBP (2007), (UK 17.2 billion GBP)
Profit	2.5 billion GBP (2007, profit before tax)
Employees	106,200 (2007), (UK 92,800)
Customers	More than 18 million business and residential customers (UK); approx. 11 million broadband customers

Table 1-1: Brief profile of BT Group plc

BT Group plc is the listed holding company for an integrated group of four lines of business (cf. Figure 1-1). *BT Retail* serves business and residential customers and is the prime channel to market for other BT businesses. *BT Wholesale* runs BT's networks and provides network services and solutions for other communications companies. *BT Global Services* is BT's global managed services and solutions provider and serves multi-site organisations worldwide. *Openreach* owns, maintains, and develops the access network which links homes and businesses to the networks of Britain's communications providers. The four lines of business are supported by two operational units. *BT Design* is BT's IT design and delivery business. *BT Operate* deploys and runs communications services for customers over BT's core network and systems.

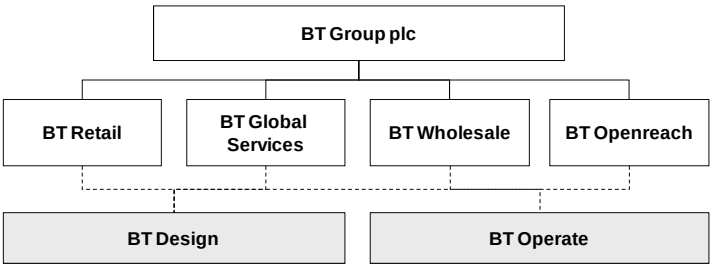

Figure 1-1: Corporate structure of BT

1.2 History

BT is the world's oldest telecommunications company. Its origins date back to the first telecommunications companies in the UK, such as the first commercial telegraph service, the Electric Telegraph Company, introduced in 1846. These companies were eventually transferred to state control under the Post Office. In 1984, they became a privatised company, British Telecommunications plc – the forerunner of BT Group plc. Privatisation enabled BT to become more responsive to competition in the UK and to expand its operations globally. But BT also lost its monopoly in running telecommunications systems. Since 1991 customers have been allowed to acquire telecommunications services from competing providers using a variety of technologies. In 1991, the company unveiled its new trading name – BT – and a new corporate identity. A number of joint ventures, mergers and acquisitions, and restructuring programmes followed to enhance BT's position as a leading provider of communications solutions across the globe. Today, the company is structured so that British Telecommunications plc (BT) is a wholly owned subsidiary which encompasses the four separately managed businesses and virtually all other assets of BT [BT Group plc 2008].

1.3 Market Environment

BT operates in an environment which has been getting increasingly competitive and dynamic. "The telecommunications industry … is in the midst of several major transitions that together are creating more change than the industry has experienced in its century-long history" [PricewaterhouseCoopers 2004, 7]. Major market forces of these transitions include deregulation, technology innovation, demand for mobility, digital content, and the Internet. The convergence of fixed-line, wireless, cable, satellite, and Internet technologies is accelerating competition, raising customer expectations, and creating new opportunities. Globalisation has led to international competition between companies operating in the telecommunications services sector [Uthman 2001]. As a consequence, telecommunications

companies have been facing significant new issues on the regulatory, public law and policy, corporate, intellectual property, and litigation fronts. New competitors are able to offer services at a lower price, thereby drawing in customers from previously dominant national telecommunication companies [Uthman 2001]. In order to remain competitive in a saturated market, telecommunications companies seek new ways to increase productivity, to reduce processing costs, and to improve the quality of their products and services. It has become increasingly important to react to changes quickly and effectively while maintaining the highest level of performance and reliability.

2 The Starting Point

2.1 General Business Drivers

Strategic Perspective

In the late 1990s, BT introduced the strategy to “deliver faster”, i.e. to increase the speed of service deliveries to customers, as a response to the effects of market deregulation and increasing competition. Also, BT decided to increasingly use the opportunities of the Internet and to become a leading e-business company. Integral to BT’s corporate vision was its aim to “reshape the company’s assets in a way that represents a new-wave communications company” [Crane/Turner 2001].

As the primary asset of “new-wave business” (or e-business) is information, BT recognised that there was a challenge to transform into an information business. The business processes and IT systems were not ready to effectively support the changes in strategy and the requirements of fast service delivery. The business created new products and services faster than the supporting processes and IT systems could be adapted. Hence, BT was not able to leverage one of the key factors of successful transformation – speed [Kagermann/Österle 2006].

Process Perspective

BT’s business processes used to be very complex, and in many cases processes were supported by more than one - often stovepipe - IT system. Business processes were mainly designed to fit the functional orientation of BT’s organisation. Hence, end-to-end processes were split across many different organisational units. Employees in a certain organisational unit often had only limited knowledge about upstream or downstream process steps and the impact of their actions on these process steps.

Apart from that, cost cutting efforts forced business units to reduce process cycle times and at the same time cut process and labour costs.

Data Perspective

The basic enterprise data structure of BT is depicted in Figure 2-1. Data is built up from *access network* cables and ducts to network equipment in buildings supporting the *core network* throughout the UK. *Products* are built from the network. *Services* are instances of specific products configured from network elements. *Customers* own services together with billing and repair information.

Regarding the enterprise data structure, the central problem at BT was that no corporate standards existed for the creation, use and maintenance of the data. Rather, those activities were spread across the entire organisation. For example, each line of business had its own customer data, diverse set of products, and different contractual agreements.

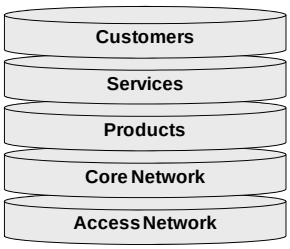

Figure 2-1: Basic Enterprise Data [adapted from Hill 2003]

Another problem was to meet the need for high-quality customer address data as an essential precondition for business processes such as billing, delivery, repair, and marketing. As residential customers often failed to inform BT of address changes when they moved house, keeping customer address data consistent and up to date was greatly impeded.

Likewise, cross- and up-selling was impeded, as there was no consistent knowledge about product portfolios of individual customers across different lines of business [Dyché/Levy 2006, 226].

System Perspective

BT's Operational Support Systems support all business processes. However, the systems landscape was very complex and heterogeneous, and it involved many legacy systems. For illustration purposes, Figure 2-2 shows one business process with its complex system relationships.

Over time, proliferation of systems led to complicated interfaces and data flows. Moreover, acceptance of IT services was limited because the business often did not yield the expected

business benefits from systems. In this context, BT's IT strategy aimed at improving existing systems and better leveraging their potentials rather than at building up a new, "revolutionary" architecture design.

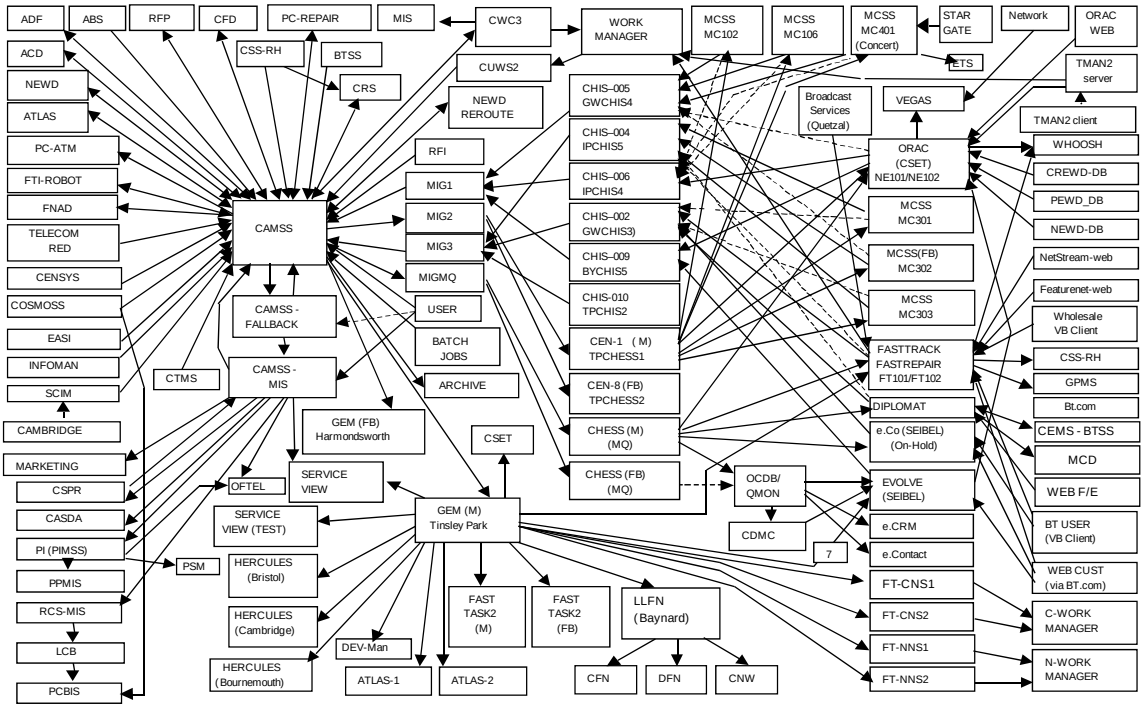

Figure 2-2: Selection of Operational Support Systems [Hill 2003]

2.2 Data Quality Challenges

The challenges regarding data quality which BT was facing in the past could be mainly ascribed to the business environment and business drivers the company was confronted with [Hill 2003]:

- Following the strategy to "deliver faster" and at the same time cut costs, employees were forced to accelerate their work routines and to work more cost-efficiently.
- As BT was undergoing continuous organisational changes, business processes were permanently designed "behind reality". This gap between business process design and the demands of reality was typically closed by increased manual activities and workarounds - both of which do not contribute to better data quality.
- Business processes were designed for an "ideal world", in which, for example, customers do not cancel orders. Based on that assumption, business processes did not include any rollback mechanisms.

- New sales and communications channels (the Internet, for example) required much improved data quality. Customers were unwilling to tolerate incorrect, incomplete, or inconsistent data when conducting e-business.

Other main drivers causing BT to deal with the issue of data quality resulted from its functional organisation, which did not support true end-to-end business processes:

- Business units did not know where the data they were using came from, and which other units in subsequent process steps were using the same data for what purpose. As a consequence, employees did not focus on entering seemingly unnecessary data correctly, which resulted in poor data quality in subsequent process steps. For example, repair personnel were sent to wrong locations because of incorrect customer address data, what was costly for BT and a poor experience for the customer.
- After organisational restructuring, new organisational units did not assume responsibility for "legacy" data of former organisational units.
- Although employees often recognised problems in business processes, they did not perceive them as data quality problems. Too often, such problems were considered to be purely IT system related and not immanent to the business.

Moreover, poor data quality per se caused a "snowball effect" [cf. Hill 2003].:

- For example, incorrect records were used in the planning of network investment decisions. Assets were installed but then recorded incorrectly or not recorded at all, or assets were moved but data records were not updated. Then, during service provision, the physical configuration differed from data records. During maintenance the configuration was changed but not recorded, or assets were modernised but the corresponding information was not updated. In BT Wholesale, investments in and spending on network assets were around 2 billion GBP a year. If only one or two per cent of asset data had been incorrect, additional investments would have amounted to 20 to 40 million GBP.
- New information systems often failed to deliver the expected benefits. One of the major reasons for that was data quality. "The systems were fine, performance was fine, but data was often wrong" [Karel 2007, 5]. Often, legacy data was not compatible with new IT systems, requiring a lot of rework.

The situation at BT was characterised by low maturity with regard to data quality management. BT did not have specific data quality management processes defined. They had

no methodology to support the identification and resolution of data quality issues within processes, organisation, or IT systems. And neither did BT have any specific data quality support tools and systems in place.

3 The Years of the Information Management Programme

3.1 Overview

BT's data quality efforts started in 1997 with an initial project and over time evolved into the Information Management (IM) Programme. The project was sponsored by the Group CIO, which was a business function at that time. It had a budget of 20,000 GBP and aimed at conducting a survey among 25 people from BT Wholesale to identify opportunities to better leverage investments in information systems. The survey covered various topics and their impact on business. It turned out that data quality was rated as number one priority.

As a response to that, a team of two people was formed. The first area which was selected dealt with data quality of customer names and addresses used by BT Retail. The project team analysed and evaluated appropriate software tools to improve data quality in that domain. BT decided in favour of *Trillium Quality*. The project was a success with the one-year license fees recovered within three months through postage savings after the address cleansing.

With this success as the starting point, more projects followed. The largest project undertaken aimed at replacing two marketing systems by one new system called SWIFT. It was based on the introduction of standards for customer names and addresses. In the following years, the system eventually gave rise to the so-called NAD (Names and Address Database), which now forms a single source for customer master data at BT. The increasing number of data quality projects led to the establishment of the Information Management Steering Group in 1998, whose main objective was to oversee projects and make sure they were to time and budget.

In 1999 BT Wholesale joined the initiative driven by lacking transparency about assets. Out the Steering Group grew then the Information Management Forum. Among the major tasks were portfolio management for data quality projects, business planning and budgeting processes for data quality activities, co-ordinated identification of opportunities for data quality projects, and alignment with BT's overall business goals. Also in 1999, the Information Management Forum issued the first version of the BT Group Information Policy, which aimed at maximizing exploitation of information assets across the organisation.

In 2000, the IM Forum initiated a one-day information event called “Shaping the futureBT Conference”. The event was chaired by BT’s CEO and he gave a keynote speech emphasising the importance of information in BT’s strategic goals. The conference was a big success and attendance exceeded expectations by far. Both BT Retail and BT Wholesale presented selected data quality projects and set proof-points that increased data quality results in improved business performance. Also, external speakers were invited (e.g. from IBM and NASDAQ) supporting the message from an external standpoint. As a result of the conference, the request for data quality projects to the Information Management Forum increased significantly.

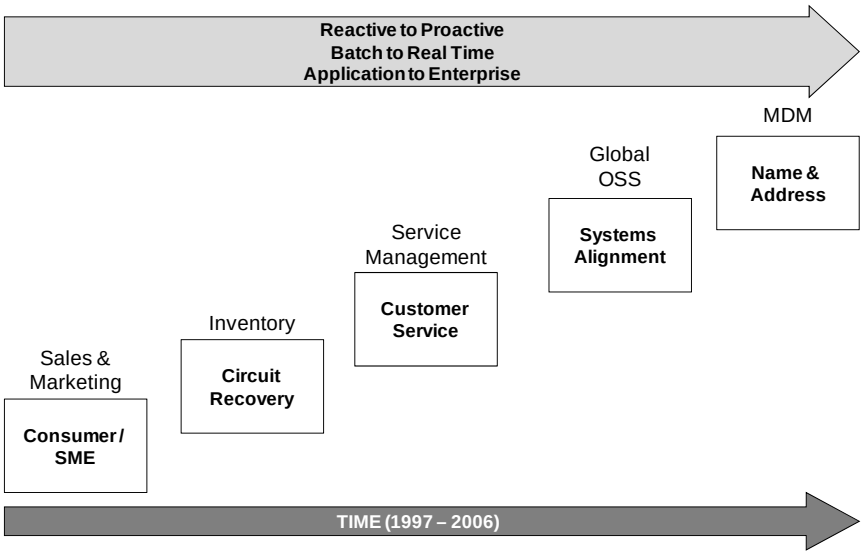

Figure 3-1: The Information Management Programme Over Time [Turner/Evans 2008]

Also during that time, the team developed a methodology for data quality projects. One of the major steps of the approach was the clear focus on the business case. Project proposals that could not prove a reasonable cost-benefit ratio were not accepted. While the Data Quality Methodology was an answer to the need of a structured approach to efficiently manage the growing number of projects, it was also a means to foster adaption of the Information Policy. The team learned that a simple directive for the use of information and data was not enough to achieve sufficient buy-in from the business. Instead, the team had to speak a “language the business understood”, hence, being able to quantify the monetary benefits of improved data quality in a business process or function. In 2002, the team for the first time was able to offer services around the Data Quality Methodology to clients outside BT.

By 2003, the number of data quality projects managed under the IM Programme had grown to more than 50, delivering an overall business value of more than 600 million GBP.

Figure 3-1 summarises important milestones of the Programme and lists some example projects. At the beginning of the Programme, BT was at a low level of maturity regarding information management and data quality. However, BT underwent an evolution in the time that followed. The strategy was shifted in a threefold way: from being purely reactive to proactive identification of data quality opportunities, from batch-wise data quality improvements to real-time cases, and from an application-oriented to an enterprise-wide perspective on the topic.

3.2 Project Examples

3.2.1 SWIFT

SWIFT was one of the first data quality projects at BT Retail. It was driven by the strategy to reduce IT operations costs and to consolidate data centres. Moreover, it supported the business goal to increase marketing effectiveness in order to defend traditional business and customers, and to generate new revenue sources. However, existing IT systems and data quality did not support this effort. The systems were too complex, contained duplicate data, did not support campaign monitoring and tracking, and had limited data analytics. Targeting information was inaccurate. The consequences, among others, were unacceptably high turnaround times for mailers (more than three months).

BT then introduced a new marketing system, called SWIFT, which replaced two legacy systems. Other measures were the introduction of a defined e-mail channel, specific tools and applications for customer reporting, campaign management tools, and analytical applications. However, the biggest data quality challenge was poor customer data quality in the Customer Service System (CSS), which was a source system for SWIFT. *Trillium Quality* was implemented to validate name and address data during transfer from CSS to SWIFT. Also, CSS is now using data from the Names and Address Database (NAD), especially customer contact information. The business benefits were manifold:

- 2.5 million GBP annual savings in operational costs;
- 1.8 million GBP annual savings in postal costs;
- 2.5 million GBP annual savings in mailing costs;
- Reduced time to market for new products;

- Reduced marketing cycle times;
- Reduced number of customer complaints.

3.2.2 The "Lost Asset" Project

Locations of inventory were not recorded and the asset inventory in the UK was not transparent and could therefore not be made available to sales. As a consequence, lost revenues were estimated at approximately 25 to 30 million GBP per year. Also, the usage of assets could not be invoiced correctly, leading to lost revenues.

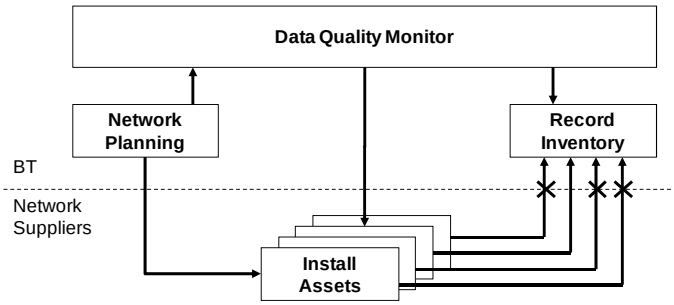

Figure 3-2: Lost Asset Problem and Solution [Turner/Evans 2008]

The fact that assets were missing resulted from a process problem: network planning used incorrect data, suppliers who installed assets made decisions based on this incorrect data, and people recording the assets were remote from the process, i.e. they knew too little about the assets actually installed. It was found that 15 percent of assets installed were not recorded in the inventory system. The major problem for the team was how to measure missing records.

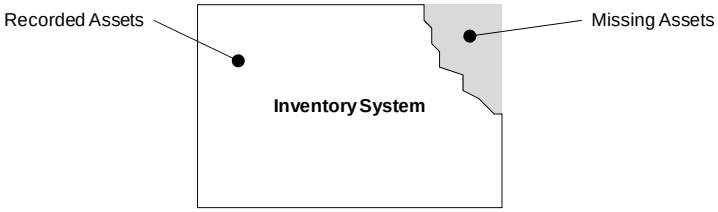

Figure 3-3: The Missing Assets Problem [Turner/Evans 2008]

The "Lost Asset" project was sponsored by Global Services and comprised the following steps:

- Profiling data in the source systems;
- Identification of inconsistencies and missing records;
- Root-cause analysis;
- Harmonisation and integration of asset data using *Trillium Quality*;
- Continuous monitoring to sustain the data quality level.

The benefits totalled to more than 2.5 million GBP, of which 1.6 million GBP were realised through revenue recovery.

3.3 Programme Organisation and Information Governance

In 1999, BT underwent an organisational change. In parallel to the business, IT reorganised and the Information & Knowledge Management (IKM) practice was created. In this context, the IM Forum was established as a consequence of the "realignment" between the business and IT. Members were the Group CIO, the CIOs of the different lines of business, and a representative from the IKM practice. The projects co-ordinated by the Information Management Forum were funded by a central budget provided by the Group CIO. However, the benefiting lines of business were to contribute from the savings they made as a result of the projects, so that the IM Forum would be self-funding.

Main areas of responsibility of the IM Forum were budget allocation and portfolio management. The Information and Knowledge Management practice coordinated the required technical skills. It shared best practices and experiences from the projects and provided data quality related knowledge management services.

The IM Forum established and maintained working relationships across the lines of business for transferring knowledge, best practices, ideas, and actions in support of the policy. It signed off and reviewed on an annual basis the information policy and associated policies in order to ensure they were relevant and complied with.

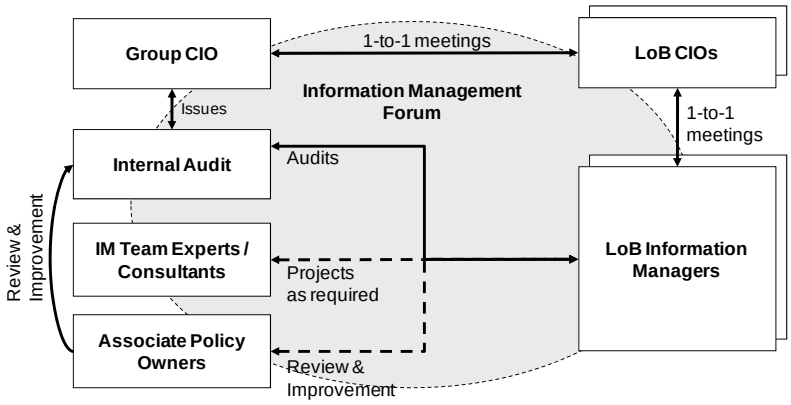

Figure 3-4: Information Management Governance at BT [adapted from Crane 2002, 5]

In the course of the IM Programme, specific roles in both business and IT were established. As the data held by each line of business need to reflect the different market and organisational needs, one senior manager of every line of business was appointed *Information Manager*. Information Managers were responsible for the type of data held by

their line of business. They had to ensure that IM functions were carried out according to the information policy, and they were responsible for data quality communications, cultural change and improvement activities, and data cleansing [Crane 2002]. Business owned the definitions of data quality, business rules, and the metrics that define success across data quality projects. An *Internal Audit* group carried out audits to ensure compliance of lines of business with the information policy. Figure 3-4 provides an overview of BT's information governance roles and responsibilities.

One of the IM Forum's main areas of responsibility was to implement the Information Policy. As a corporate-wide instrument, the Policy set out directives for the different lines of business, such as:

- Attending and contributing to the IM Forum;
- Conducting baseline and subsequent assessments;
- Developing measures and targets;
- Developing communications plans;
- Aligning line of business policies and processes.

However, BT realised that the Information Policy in itself was just a first step and not sufficient to create sustained awareness of the importance of data quality in the business. It was not that business managers were per se reluctant to the implementation of the Information Policy, but certain business drivers (such as "do more with less", organisational changes etc.) were conflicting with data quality objectives.

The IM Forum reacted by changing its approach and introducing the Data Quality Methodology, which allowed to focus on the business impact of data quality. Speaking the "language business understood", i.e. quantifying the monetary benefit of each data quality project, facilitated the deployment of sustainable, reusable solutions, hence, sustainable data quality improvements.

3.4 A Common Data Quality Methodology

BT's Data Quality Methodology represents the "recipe" for success for BT's data quality projects. It consists of five phases (cf. Figure 3-5):

- Problem and opportunity identification;
- Health check (diagnosis);
- Commercial proposition (proposal);

- Delivery (re-engineering);
- "Holding the gains" (consolidation).

It is complemented by tools, templates, and component-based software. In short, the Methodology is conceived as a 1-2-3-method: *1* day problem identification workshop, *2* (to 6) weeks data quality health checks, *3* months projects.

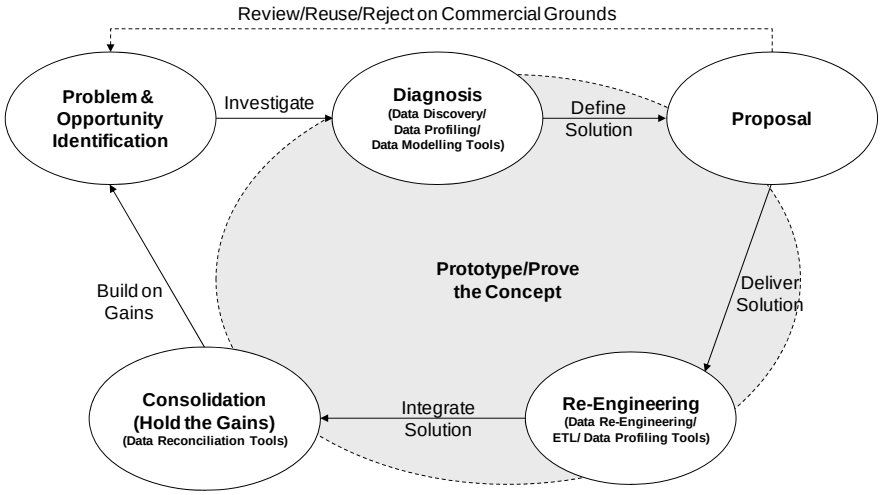

Figure 3-5: The Data Quality Methodology [adapted from Turner/Evans 2008]

The first phase, *Problem & Opportunity Identification*, involves interviews, workshops, ideas schemes, and focus groups with participants from business and IT. Objectives are to identify pain holders and champions, and to relate complaints and suggestions regarding data quality to key business objectives. Within the second phase, *Diagnosis*, the project team carries out a quick data analysis comprising data discovery and data profiling techniques in order to identify the current data quality level as a baseline (also called "data quality health check"). The health check is followed by a workshop with stakeholders to identify problem sources and potential business benefits. Proposals with no indication of business benefit are rejected. For approved proposals, stakeholders and the project team create a commercial proposition document within the *Proposal* phase. The document, which serves as a business case, has to be agreed by the business sponsor and then forms the project agreement. It outlines the business problem and its solution; potential benefits (qualitative/quantitative); the assignment of tasks regarding data and business analysis, proof of concept, implementation, holding the gains, and in-life review; project measures; and risks and assumptions. The commercial proposition ensures that business owns the project. In the fourth phase, *Re-Engineering*, the project team designs and implements the solution. Business leads and IT supports the solution, which includes changing culture, systems, processes, and technology. By the fifth

phase, *Consolidation*, the project team aims at ensuring a sustainable solution. In addition to the Data Quality Methodology, the Architectural Forum - which was formed as a sub-group of the IM Forum - developed data quality principles for system development, as part of the design procedures called Joined-Up Design (JUD). New system development projects had to pass the JUD test, which ensured that the prerequisites for data quality were taken into consideration in the design of new systems. For example, only existing data sources were to be used. The Architectural Forum was empowered to stop system development projects until they passed the test.

3.5 Data Quality Software Tools

In the course of the work of the IM Forum, three data quality software tools contributed to the overall success:

- *Trillium Quality* is a tool kit for identifying and correcting data quality problems.
- *Trillium Discovery* is an analytical tool used primarily for data analysis and data profiling. When data is loaded into the tool, it analyses the data with regard to attributes, entities, formats, links, exceptions, and joins, etc.
- *Ab Initio* is a development environment which is used to check consistency and integration of key data fields across different systems. Furthermore, it is the basis for the system to monitor and report changes in data fields based on business rules. It helps fix problems, transform and reconcile data, and correct fields based on business rules.

The overall success of the IM Programme did certainly not depend solely on software tool support. However, it supported the strategy of the team to get access to the data in order to show current weaknesses and also to discuss on the basis of clear evidence.

3.6 Business Benefits

BT achieved a cumulative 700 million GBP in business benefits during the seven-year IM Programme. Sources of benefits mainly were process improvements, i.e. reduced costs of failure, less scrap and rework, enhanced productivity, and better morale. Through reduced lifecycle costs and faster deployment of enhancements return on investment in information technology was increased, which was one of the main goals of the IM Programme.

Within BT Wholesale the business signed off over 600 million GBP in benefits, which amounts to 85 percent of all of BT’s data quality benefits. Benefits resulted from decreased

inventory costs, CAPEX[1] avoidance, revenue recovery and creation, and improved asset utilisation. Furthermore, lost assets could be found, asset status was corrected, correct bills for products and features were issued, e-business was enabled, and customer satisfaction and process efficiency was improved [Hill 2003]. Every year, the team was given targets for savings in the asset investment budget, and the team succeeded in meeting these targets. Figure 3-6 shows the savings from 2001 to 2004. When it came to defining business benefits, there were no generic measures – these were specific for every project. However, the team used the Benefit Dependency Network (BDN) for analysing the business benefits of data quality projects [Peppard et al. 2007].

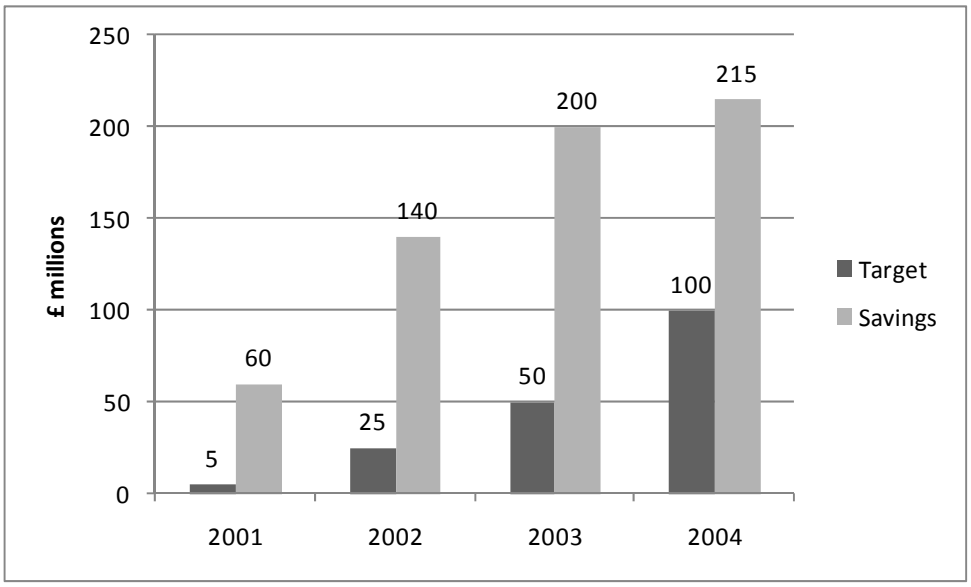

Figure 3-6: BT Wholesale Benefits from 2001 to 2004 (Target and Actual)

The financing of these business benefits came from two sources. While the central budget of the Group CIO funded cross-functional data quality activities, such as the provisioning of the Data Quality Methodology and the exchange of best practices, the lines of business funded the projects in their domain and also paid for data quality services, provided a positive cost-benefit ratio had been identified for each project.

[1] In terms of accounting, an expense is considered to be a capital expenditure when the asset is a newly purchased capital asset or an investment that improves the useful life of an existing capital asset.

4 The Situation Today

4.1 Overview

The IM Programme was a very successful initiative, saving a lot of money for BT. However, with its growing maturity and stability, it continuously moved from an “investment” into a “revenue mode”. It became self-contained and “business as usual”, which is why today it does not exist as a strategic goal in its own right.

At BT Wholesale, there is a relatively small team that has continued to run internal data quality projects using the Data Quality Methodology. A part of the core IM Team is now working at BT Client Services, providing data quality services to BT’s customers using the Data Quality Methodology. The Architectural Forum turned into a group dealing with Enterprise Master Data Management.

4.2 Enterprise Master Data Management and the Seven Sisters

Enterprise Master Data Management is a programme located at BT Design and is led by the Chief Master Data Architect. The team comprises about 20 data architects and is responsible for BT’s corporate-wide information architecture. The information architecture has its early roots in the NAD and its conceptual data model, which was virtually a by-product of data analysis in data quality projects.

The strategic goal of this programme is to implement the so-called Seven Sisters, which are “one truth” repositories for seven key enterprise information objects:

- User
- Customer
- Contract
- Inventory
- Product
- Revenue
- Pricing

The Seven Sisters are both a business and a technical concept. From a business point of view, they reflect business requirements to consistently respond to customer needs with speed and agility. As a technical concept, they are seven master files. The philosophy behind the Seven Sisters can be described by the following principles [Hepburn 2008]:

- All platforms must be aligned via Master Data Management and conform to the enterprise data model.
- Each platform has appointed a Data Designer to contribute to the Master Data Management data team.
- The Rule of ONE to achieve real-time Golden Source for each entity will be enforced"

4.3 BT Client Services

Within the Customer Management practice, part of BT Design, the Information Management domain offers data quality services to BT's enterprise customers. With about 150 employees, the practice has an annual turnover of approximately 3 million GBP. For data quality projects, the team uses the Data Quality Methodology and tools developed in the course of the IM Programme. Projects encompass data warehousing, extract transform load (ETL) processes, and data management of both structured and unstructured master data (usually customer and inventory data).

Projects usually start with the data quality health check, which assesses the status quo of data quality. The health check is often the basis for data migrations, such as in ERP, business intelligence, or data warehouse projects. The second, detailed analysis together with the client drills into the details and analyses the root causes of problems.

5 Lessons Learned and Key Success Factors

5.1 At a Glance

With its corporate data quality programme, BT underwent a journey from early health checks for specific data quality domains to an enterprise master data management approach. The key success factors of BTs data quality journey can be categorised into four major clusters:

- Business alignment
- Leadership
- Complexity management
- Communication

5.2 Business Alignment

One of the major success factors for BT was the link between the IM Programme and BT's strategic objectives, bringing about that all people involved in data quality problems spoke a

“language the business understood” instead of using technical terminology. This was the reason a business case was required for every data quality project which was launched. This approach had also an important side-effect, as it put the business into a situation in which it actively took over ownership of the project - and also the data quality problem.

Apart from that, the Information Management team acted very service-minded. It actively searched for opportunities to deliver data quality services. Another way to proactively convey the message of the importance of high-quality data is to make use of so-called “carrier initiatives”, i.e. existing business projects and programmes the Information Management team could leverage for its purposes.

5.3 Leadership

Another key success factor was the commitment of executive management to the goals of the IM programme, laying the foundation for the creation of the IM Forum and the Information Policy. But the team also encountered that a master and commander philosophy did not work, as buy-in was not achieved at any level of business management. Instead, the strategy followed the stringent approach to make the business feel to be part of the solution and to take over ownership.

The change in the governance strategy was further induced upon realising that roles, such as stewards, needed to be empowered. When they had no budget, the roles also had no influence to change the status quo.

Apart from that, BT underwent different stages of maturity, starting small and growing big. This evolution had the advantage that the Information Management team was able at all times to demonstrate its contribution to business in terms of benefits such as cost savings, increased product and process quality, or higher revenues.

5.4 Complexity Management

Data quality issues are always a complex problem. One of BT’s main lessons learned was to consider data quality initiatives as processes rather than short-term projects. It was not only important to fix a problem, but to ensure that data quality could be sustained at a desired level. Monitoring was implemented permanently to avoid the so-called Hawthorne effect, i.e. a short-term quality improvement as long as monitoring is in place followed by a downturn immediately upon its discontinuation. BT realised that data quality did not “just happen”.

Apart from that, BT learned that poor data quality can occur because the world is not perfect, as, for example, business process design does not take into account exceptions, organisations undergo continuous change programmes, or individual goals of employees or business units are conflicting with overall company objectives.

Amongst the concepts BT came up with in order to manage complexity were:

- Accessing the actual data in order to discuss on an objective and neutral standpoint;
- Building causal chains in the sense of a Benefit Dependency Network, so that it becomes transparent to the business which impact poor data quality has on business goals.

5.5 Communication

Establishing a culture for data quality management within an organisation the size of BT requires a change programme. Its success depends highly on the communication of the purpose, the goals, the scope, and the results of the initiative. The scope of potential communication measures is virtually unlimited; BT has chosen the following instruments, amongst others:

- Letting executive management convey the message in the “Shape the FutureBT” conference;
- Producing success stories and case studies;
- Introducing an own data quality brand;
- Looking outside the organisation.

Appendix A. Interviews

Boris Otto (Project Manager, IWI-HSG) and Kristin Weber (Research Assistant, IWI-HSG) were the interviewers in all interviews.

No.	Date, Time and Location	Interview Partners (Interviewees)
1	14th April 2008 13:30 – 17:00, London	Jon Hill (IT, BT Wholesale, involved in data quality projects since 2004) Ray Burr (Information Management Manager, Business Revenue Management, BT Wholesale) David Evans (BT Design) Nigel Turner (Head of Unit, Customer Management ICT Transformation, BT Design)
2	14th April 2008 19:30 – 21:30, London	John Hodges (IT, BT Retail, started the data quality projects during the IM programme in 1997) David Evans and Nigel Turner
3	15th April 2008 12:30 – 13:45, Cardiff	Ian Osprey and Chris Griffiths (Data Management Consultants, BT Design, external data quality projects) David Evans
4	15th April 2008 14:45 – 15:30, Cardiff	On telephone: Helen Hepburn (BT Design, Enterprise Data Architect, responsible for MDM within BT) David Evans
5	15th April 2008 16:00 – 17:15, Cardiff	Edward Hunt (responsible for project delivery, leads a group of 30 FTEs), Bridgette Griffiths (responsible for front-office business/new business) (Data Management Consultants, BT Design) David Evans
6	16th April 2008 10:45 – 11:30, Cardiff	Wrap-up meeting with David Evans and Nigel Turner

Table 5-1: List of Expert Interviews

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