

“Shaping the Future ***BT***: Building Enterprise Wide Information Quality Competency”

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Abstract

As the telecommunications industry re-invents itself, the effective management and exploitation of information becomes a critical competitive differentiator. This paper outlines how British Telecommunications plc is embarking on a major information management programme, with an end goal of enhancing information quality for electronic business. The underlying philosophy of the programme is that information quality can only be driven up through world class information management capabilities. The paper gives the background to the current initiative, highlights its major thrusts and suggests some key principles and learning points that may be of value to others considering enterprise wide information quality programmes & projects.

1. Introduction

‘I have a simple but strong belief. The most meaningful way to differentiate your company from the opposition...is to do an outstanding job with information. How you gather, manage, and use information will determine whether you win or lose...You need a fast flow of good information to streamline processes, raise quality and improve business execution.’ - Bill Gates¹

Business is transforming itself. As the Information Age takes hold, information is becoming the global currency. This has massive implications for the way that companies manage their information assets. The days where information

failures could be hidden from customers and the outside world by message and manipulation are rapidly coming to an end.

Ever more sophisticated and discerning customers will demand to have direct access to the information companies hold on them; in many instances they will expect to maintain the information themselves. When they conduct business over the Internet they will demand that the information they need is available instantaneously. If it is not there, or erroneous, they will readily switch their allegiance, and increased purchasing power, to companies that they can trust with their information. In this world companies who develop and sustain world class quality information will flourish; those who fail to do so will wither away.

Communications companies are at the forefront of this brave new world. These companies are reinventing themselves. Once predominantly telephony providers, they are now competing vigorously to be the dominant communications suppliers and partners. British Telecommunications (BT), once the monopoly telephony provider in the United Kingdom, has set itself the target to become the major player in this global market. BT is transforming itself, and recognises that developing world class information management capabilities is the essential prerequisite of attaining and sustaining the quality of information required to achieve its global aspirations. This paper outlines some of the ways in which it is building these information management capabilities, key enablers to Shaping the FutureBT.

Nothing in this paper is rocket science, nor does it purport to be. Instead it tries to outline a series of achievable, pragmatic activities which any major organisation needs to undertake to initiate a sustainable enterprise wide information quality improvement drive.

2. The tBT to eBT Transformation

BT is currently the United Kingdom's most profitable company. In 1998 / 1999 it made a profit of £4.3bn (\$6.7bn) on a turnover of £18.2bn (\$28.2bn). BT's share price rose by 55% over the same period. This is indicative of both the success of the company in moving into new wave businesses and also the rapid growth of the communications market. Within the UK, the BT network now carries more data than voice traffic. Internet usage accounts for nearly one fifth of all UK local network traffic. Globally, BT continues to expand rapidly, and is by any standards a major player, operating in

over 50 countries, mainly through joint ventures. Its impending Global Venture with AT&T will give it a major presence in North America.

Despite this success, BT recognises that great challenges lie ahead. Its UK home base is now the world's most competitive communications market, with over 200 licensed operators and many more waiting in the wings. Abroad similar competitive challenges must be faced. Its current success is therefore not leading to complacency; on the contrary it recognises that its current strengths gives the company a great opportunity, but it is an opportunity that must be grasped, and grasped quickly.

To achieve this end it has embarked on a major re-engineering programme, led by its Strategy unit, designed to wipe away the last vestiges of the old monopoly telco. mind sets, processes and systems. Traditional BT (tBT) is becoming Electronic, information led BT (eBT). A number of interrelated transformation thrusts are underway, focused around Customer Relationship Management, Service Provision, Network Management, Portfolio & Solutions and Business & Supplier Management. Together these form the core vehicles through which the overall transformation of BT will be realised.

3. The Information Implications

Underpinning the functional, specific business change transformation initiatives are two generic thrusts, both led by BT's Strategy team:

- a) The creation of a common Internet Protocol (IP) based technical infrastructure, with the Internet providing the access portals within the company and to and from the outside world. In parallel with this, best of breed operational support systems (OSS) are being implemented to replace the 700 or so legacy systems and applications that served the company well in the past, but which do not support the new world, given their product, not customer centric, design and deployment.
- b) The development of BT's generic information management capabilities. BT has recognised that the introduction of new technology does not in itself create the capabilities needed to create and maintain high quality, accurate, timely information. Hence it is investing heavily in business re-engineering. Critical to

this is a step change in culture, where information, previously viewed by many as an incidental by-product of business processes, is now seen as the primary strategic product of these processes. High information quality demands, allied with electronic process requirements, form the core requirements to be delivered by the new technical infrastructure. The latter is a key enabler, not the end in itself.

In line with other major communications companies, BT generates immense volumes of information. It is estimated that it currently holds a staggering 60 Terabytes of data on disk (excluding PCs and LAN servers) and 1.9 Petabytes on tape. As complexity increases in the networked world and vast numbers of data-generating devices are introduced, information volumes and information distribution are set to explode.

Whilst the volumes of information persisted in the network are relatively low, the volumes of information stored in operational data stores (ODSs) and data warehousing (DW) environments is enormous. For example BT collects and stores in excess of one terabyte of raw call data records (CDRs) per month. BT's Customer Service System, which supports its UK Public Switched Telephone Network (PSTN) service, handles 80 million transactions a day, 8 million transactions per peak hour.

4. The Information Challenge

The key challenge is how to manage the enterprise wide complexities and volumes required to transform tBT to eBT, particularly to overcome the inevitable information quality problems inherent in stovepipe legacy application areas and the need to maintain numerous interfaces between them.

For BT, the central driving concept is that of strategic alignment. The Oxford English Dictionary defines 'alignment' as '*placing in relation or agreement or alliance with others*'.² This means that each transformation initiative must be aligned around fundamental business change. Re-engineering business processes, working practices, cultures and roles & responsibilities all are essential components of the total change matrix, with new technology a key enabler. The concept also implies that all the transformation initiatives must be aligned with each other to ensure that each initiative does not create better, but still sub-optimal, stovepipes. In summary, technological re-engineering has a critical part to play, but is the servant, not the master of business change.

Whereas the creation of a new common technological infrastructure will prevent misalignment of individual transformation area technical solutions, information management, and its end goal of optimising information quality for maximum business advantage, is the critical glue that binds the initiatives together. To gain a 360° view of customers, and how BT's business supports them, all the business areas (Markets, Sales, Customer Service, Network Planning & Management and so on) must share a common view of the core corporate information, i.e. on customers and their behaviour, on suppliers, on the inventory of products and solutions BT provides, and on the network configurations they are delivered through and supported by. The alignment of information is therefore a key enabler to effect the strategic business alignment sought.

5. Investing in IQ

The Gartner Group has stated that:

*'Most re-engineering initiatives will fail because of lack of attention to information quality...More than half of data warehouses built fail to meet expectations because of poor information quality.'*³

In BT we do not intend to fall into this trap. But why do so many initiatives fail? There are many reasons, but one clear message emerges. In a survey of major companies in North America and Europe, John McKean⁴ demonstrated empirically the following paradox, coined McKean's Paradox:

Elements	Historical Investment	Competency Determinants
People	2%	20%
Processes	2%	15%
Organisation	2%	10%
Culture	1%	20%
Leadership	1%	10%
Information	10%	15%
Technology	82%	10%

Put simply, when re-inventing themselves most companies invest heavily in technology, yet themselves acknowledge that technology only contributes one tenth towards their overall capability to serve customers effectively. Exactly the same lessons can be applied to any attempt to re-engineer information quality. It is balanced investment in the full range of capabilities which delivers the desired results.

Poor information quality is in itself an effective measure of current failures in processes, organisational alignment, leadership etc. For example, a broken end to end process inevitably generates poor information. If people are not incentivised to create high quality information, but rewarded instead by the achievements of throughput, speed of service, number of sales etc, why should they worry about information quality? If no individual in an organisation has responsibility to lead an information quality drive, no effective action will be taken.

Given these lessons, BT's drive to achieve high information quality in support its transformation goals is balanced and aligned across all the competency areas. The remainder of the paper outlines briefly what these main thrusts are.

6. 'Why IQ?' to 'High IQ'

A small team in BT Strategy is leading the overall enabling transformation programme designed to drive up information management competencies across BT. Its key objective, and measure of success, is to enhance the quality of information held within BT's data stores, data warehouses and application systems. Critically, the emphasis is on driving up information quality within the world of today (tBT) **in parallel with** putting in place the competencies for the new world we will eventually evolve into (eBT). There are several reasons for this dual emphasis:

- a) Poor information quality is an expensive burden. In order to invest in the future business we must re-direct expenditure from today to tomorrow. Poor information quality hurts the bottom line and incurs unnecessary costs of failure.
- b) As we move towards new IP based Operational Support Systems (OSS), migration from the 700+ legacy systems to the new OSS will be the major challenge. Various estimates have indicated that the total costs of migrating information from legacy systems into new OSSs can be ten times that of acquiring the new

OSS environment. Unless we start to prepare our key legacy information now, our future investments will be more costly and time consuming to bring to fruition.

- c) Building eBt from tBT demands a radical culture change. Creating a culture where all employees and their agents see high information quality as the norm takes time. We must start now to prepare our workforce for the future world.
- d) Helping the business solve their information quality problems of today produces quick wins & consequent business benefits, raises the profile and credibility of information quality initiatives, and helps to stoke the flames of cultural change.

The interrelationship between the 'as is' and 'to be' worlds helps to define improvement focus and priorities. Setting off an enterprise wide information quality drive across a company as large and complex as BT would be unmanageable without clear consensus on the key challenges. It is vital to identify the major information areas that will need to be migrated, focusing on those, and effecting improvements.

7. The BT IM Programme

The overall programme has eight key thrusts. These are outlined below. Note that all are seen as essential and integrated components of the overall Information Management change programme. Each supports and reinforces the others. Reflecting McKean's findings, together they constitute a holistic approach to information quality improvement in BT.

Thrust 1 - Information Governance

'Real and sustainable information quality improvement can only be achieved by implementing management accountability for information...If managers have no accountability for information quality, there is no incentive.' – Larry English⁵

'Problems cannot be solved at the same level of awareness that created them.' – Albert Einstein

In line with most major companies, BT has not traditionally seen information as an asset to be managed in its own right. Instead the main focus has been managing the delivery channels through which information has been delivered, namely the systems and applications that contain the information. There is a growing recognition that this paradigm is not

sustainable in eBT. As a strategic shared asset, information transcends its delivery mechanisms and must be managed for the benefit of all its consumers. Management will be carried out by individuals who will act as stewards of the company's information, and who set objectives and targets to enhance its quality. These stewards will become a new, distinct specialist skill set within eBT.

Stewardship is being introduced at four levels:

- (i) **Information Champion** – The Director of UK Strategy has the overall role of nourishing the totality of the enterprise information assets. As such she will own the information quality policies and practices, and the common frameworks, needed to implement them.
- (ii) **Senior Business Stewards** – Normally the Managing Directors (MDs) of the major strategic transformation thrusts. Each major information area (Customer, Portfolio, Service Inventory, Network Inventory and so on) is assigned to an appropriate MD. Critically their sphere of responsibility for the information areas assigned extends across **all** transformation areas.
- (iii) **Information Stewards** – Dedicated business roles, often allocated to individual managers in a full time capacity. Their responsibilities will include the managing of Information Evolution plans (see below), the baselining of current information quality, the mapping of information areas to major systems and key processes, the creation and maintenance of meta-information, setting format and content information standards, and championing specific IQ improvement initiatives.
- (iv) **Information Producers & Consumers** – Every BT employee, and agents acting on the company's behalf, also have a major responsibility for managing the quality of the information they create, amend and consume. It is therefore essential that their responsibilities are clearly laid out via information quality statements in their job descriptions, that quality improvement objectives are set, and that recognition and rewards are aligned with these.

As information stewardship demands a radical culture shift within the overall BT business, its implementation is being managed with care. As this paper is written, the overall top level structures are being socialised and defined with key

business influencers prior to a full proposal to be put to the BT Board later in 1999. In parallel the stewardship structures in totality are being piloted in one significant part of the BT business, within **networkBT**, BTUK's Network Management division. Here awareness of information quality issues is high, given the vast amount of information used to manage the company's £11bn (\$17bn) network assets. Here also BT's first Information Stewards have been appointed. Information quality objectives and job description statements are being added to all **networkBT** people's responsibilities. This pilot approach will enable implementation issues to be fully understood and will also serve as an example of what can be achieved, with demonstrable business benefits, in the submission to the BT Board.

Thrust 2 – Information Awareness & Education

In order to prepare the mindset of all BT people for the new information led eBT, a massive investment in awareness of the importance of information quality, the costs of failure, and best practice education has been underway since April 1999. This awareness raising is aimed at all BT people initially but will eventually be extended out to our customers, suppliers and agents. Three main awareness & education initiatives are underway:

- (i) A BT Information Vision has been produced for approval by the BT Board. This lays out ten key principles & practices for effective information quality management, which will drive our improvement activities and assist us in evaluating vendor offerings. These principles encompass stewardship, standards, rewards and recognition of good practice, information quality feedback, information sharing, alignment of key processes for IQ, information duplication & redundancy and so on. As before, they are being trialled in **networkBT** to validate their value and practicability.
- (ii) Awareness raising and education on the importance of information management and quality is being targeted at senior and middle managers within BT via a series of high profile internal conferences and events, badged as 'Shaping the FutureBT'. The initial two day conference was held at BT HQ in London in May 1999, where over 200 senior BT managers heard BT Board members, internal experts and best practice external speakers lay out the implications of the information age and what eBT means. Conference material was made available to all attendees and many have subsequently transmitted onto their teams. Feedback since the conference also demonstrated that informal networking over the two days has spawned several collaborative ventures to drive up information quality.

A further major event for late in 1999 is already being planned, focussing on eBT progress overall and information quality success stories in particular.

- (iii) An extensive array of awareness and education material is also being developed for dissemination to information producers and consumers, using in the main BT's extensive Intranet. An Information Management web site has been authored and publicised via other Intranet links. Again *networkBT* is being used as a pilot division to assess the effectiveness of the communications material and channels.

Thrust 3 – Information Evolution Plans

Information Evolution Plans (IEPs) are being put in place across BT, with an initial completion date of November 1999. IEPs are technology independent evolution paths for BT's information assets. There will be a separate plan for each of BT's major information areas including Customer, Product & Portfolio, Network Inventory, People and so on.

IEPs lay out how information created within and outside BT, and used within the company, needs to be enhanced to support overall transformation goals. Eventually later versions of the plans will also include knowledge evolution. Taken in totality, the plans will be amalgamated into an overall IEP for BT.

The plans contain three primary elements: first, an evaluation of the state of BT's 'as is' information, including the producers and consumers of the information, baseline quality measures, key problem areas, mappings to key processes & systems etc. Second, a 'to be' picture of the information area, containing quality thresholds, key measures, legal and regulatory requirements etc. Third, a series of actions that need to be undertaken to enhance the information to evolve it from the 'as is' to the 'to be' picture. The initial versions of the IEPs will be owned by the Strategy team, but eventually their further development and ultimate realisation will be a key role for Information Stewards supported by Senior Business Stewards.

IEPs will have several benefits when complete. They effectively lay out, in business terms, the information requirements that must be realised by any re-engineered processes, operational data stores, warehouses or applications. As such they will form a major input into the evaluation of vendor offerings in these areas. By capturing the multiple requirements of all current and potential producers and consumers of the information, IEPs will provide a full 360° view. IEPs will also

identify and pinpoint critical areas where information is not fit for purpose, both now and in the future, and therefore help to set priorities for improvement investment. They are also communication and education vehicles that will be used to make producers of the information more aware of the impact of their activities on all consumers. Finally, by separating out information from its delivery mechanisms they will make the inherent value of information more explicit, facilitating future investment business cases.

Thrust 4 – Corporate Information Inventory

Meta-data has for some time been recognised as important in enabling companies to identify and manage their key data assets. Traditional meta-data is now seen as too narrow in its scope, given its emphasis on technical systems definitions and descriptions. However information has been defined as ‘data in context’ and so the range of contextual information required by knowledge workers is much beyond what traditional meta-data offers. For instance when drawing conclusions from a marketing campaign report a market analyst will need knowledge of look up tables, segmentation assumptions and sample sizes, business rules used to derive the statistics, response rates, data reliability measures, and even campaign advertising material used in various media (literature, TV commercials etc.) Today current technology allows this contextual information to be delivered to the knowledge worker in a digital form with hyperlinks embedded within a web delivered report.

In order to provide the business and technological environment in which information can be delivered in context, BT is developing an Enterprise Information Inventory (EII). This will evolve into a ‘one truth’ view of BT’s totality of information assets, and as such is a vital enabler to the Information Governance thrust. The Information Inventory is being built via a series of time boxed deliverables. At the enterprise level it will ultimately contain a single BT Information Model, an inventory of all current systems, matrices of information / processes / systems, key corporate reference information, information definitions and business rules, information quality targets and measures, and information quality issues feedback channels. Further applications, including specific multimedia and other context information, will be defined and managed by specific areas of the business.

Many of these functions are covered in part by current repositories, so a major goal of the EII is to rationalise what already exists. Further benefits will be the reduction of the cost of turning data into information and onwards into knowledge, and a more consistent information base leading to accelerated & more accurate decision making.

As before, the initial content of the Inventory is being targeted at *networkBT* in order to provide their Information Stewards with a mechanism to enable them to control their information areas. To be sustained, a key principle is that Information Stewards and their agents will carry out content maintenance; any central attempts to maintain content will fail as the centre is too far removed from the day to day needs of individual information areas. Hence stewardship roll out is seen as an essential prerequisite of future expansion of the Inventory.

Thrust 5 – Information Quality Tools & Methods

A further key requirement of Information Stewards is a tool set that supports information quality audit, cleanse, and migration. Given that there are numerous, proven tools available in the market place a project has been running since late 1998 to identify and evaluate best of breed tools and to match these to specific priority information areas across BT. Priorities are determined by two primary factors: one, the current costs of failure; two, the need to move towards the ‘to be’ picture in support of business transformation initiatives.

In light of these priorities, initial application of the tools has been in the network inventory, management information (MIS) and customer service support information areas. By providing seed corn funding and a central point of contact with vendors BT Strategy are helping individual business and systems owners to acquire and deploy the tools. This allows the start up costs to be shared, provides internal reference sites for further evaluation of the tools and also ensures that their implementation across BT is co-ordinated centrally, with consequent economies of scale.

Over the coming year a small central team of Information Quality Tools & Methods experts, drawn from within BT’s main IT division, is being created in order to downstream learning to additional information areas, and to support the emerging Information Stewards. They will also maintain central copies of tools to help specific business areas with information quality problems, mainly by importing sample data, feeding back results of audits and recommending & aiding further action.

This team will also develop and maintain a comprehensive information quality methodology, to include selected tools, for application across the company.

Thrust 6 – Enhancing the Information Quality Baseline

In concert with the above thrust, the overall Strategy led Information Management programme is actively working with information experts across the entire BT business to help them solve their specific information quality challenges. Examples of specific assistance given to business areas include marketing address inaccuracies, standardising product definitions, income integrity initiatives and so on. The underlying philosophy of this is that an information quality strategy can in part achieve its ends by fostering and facilitating synergy through common approaches, methods and tools. To achieve its ultimate goals it is imperative that the Programme is seen as being responsive to urgent business needs.

The main channel for baseline improvement activities is an Information Management Forum, which has been in operation for a year, where representatives from across BT meet regularly to share learning, hear about successes elsewhere in BT and outside, and seek help and expertise from others. The Forum also acts as a highly effective education and awareness vehicle for disseminating key messages and successes back into the business.

Thrust 7 – Knowledge Management

‘A solid information management implementation is the best precursor to knowledge repositories and other technologies that support the transfer of knowledge. Find it first, manage it, then figure out what it means.’ – David Rasmus⁶

A variety of knowledge management (KM) initiatives are underway across BT as a whole, led by various parts of the business. At this stage in its evolution the strategic Information Management programme’s main KM goal is to integrate these and to ensure that they are co-ordinated and share knowledge about knowledge management. A KM Practitioners’ Forum has been established, and sharing of approaches and methods is already underway.

Thrust 8 – Collaboration & Best Practice Benchmarking

Many enterprises have been grappling with, and are still addressing, information quality problems. BT has actively sought partners and collaborators with whom it can benchmark its own activities, and share ideas and learning. This is seen as an essential component of the overall programme as it ensures that we apply best practice and also validates our activities in an external context. To date, collaboration & benchmarking activities have been undertaken with the

National Association of Securities Dealers (NASD), Cisco Systems and others in the USA, and Telenor, Deutsche Bank and others in Europe.

Close contact is also maintained with major vendors such as IBM, Oracle and others to ensure that BT influences their future product offerings, as well as with leading edge research teams within BT itself and outside. To shape the future we must look to the future.

8. Summary & Key Messages

To conclude, some key messages for others embarking on an information quality journey:

- Invest holistically in information quality. Acquiring new technologies are major enablers but will not in itself solve information quality problems. New technology has to be introduced in alignment with re-engineered business processes, an information quality centric culture, & appropriate objectives and rewards.
- Put your main emphasis on the key transformation and business change programmes in your organisation. They will provide the future view and the visibility essential to sustain an information quality programme.
- Do not ignore local, minor information quality initiatives. All information quality enhancement work, if properly aligned and managed, delivers business benefits. The people you work with will become your future allies.
- Do not try to fund enterprise wide information quality programmes centrally. You need seed corn funding to open doors, share risks and demonstrate corporate commitment. Ultimately the wider business must take responsibility for specific improvements.
- Map out the overall framework of the programme, but do not try to progress in parallel all elements across the enterprise. Work with one area of the business to refine your ideas, demonstrate the benefits and learn lessons. Use the pilot area to sell the framework across the company.
- Baseline current information quality, but extrapolate where possible. Do not paralyse through analysis.
- When you have built the case, with detailed financial evidence from the pilot area, gain highest level Board sanction for your activities.
- Lead enterprise information quality programmes from within the business, not within IT. The business is ultimately responsible for information; IT provides the delivery mechanisms.
- Keep the central team small and cost effective. Build the bigger team on the matrix.

- Time spent communicating what you are doing and why you are doing it is time very well spent. You will gain allies, learn from others and encourage synergies and networking.
- Wherever possible use tools to automate information quality audit, cleanse and improvement activities. Manual intensive programmes are rarely sustained because of competing resource pressures.
- Spend the time to look outside your company. Many others have tackled and are tackling similar problems.
- Persevere. It takes a long time to sow the seeds of an information quality culture. But start now, or it may be too late.

‘We are trying to unfurl a sail in time to catch the wind...But it’s quite a wind. If companies handle it well and aren’t blown off course they will...find themselves propelled to new lands, rich with unexpected opportunities.’⁷ - Thomas Stewart

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