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**TWO FACES OF INTEGRATED SOLUTIONS IN BT IN THE UK: THE CASE OF BT
21ST CENTURY NETWORK (BT 21CN) AND BT GLOBAL SERVICES**

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Abstract:

This paper elaborates on the value stream approach used by Davies (2004) in order to analyze the provision of integrated solutions from the perspective of a service provider (BT in the UK) to large business customers. It shows how BT, as a large service firm, is moving from a product or service-centric to a customer-centric organisation, and how BT is taking advantage of integrated solutions in two different settings: BT 21st Century Network (BT 21CN) project and BT Global Services (BTGS). It shows how integrated solutions of suppliers of high technology capital goods are further integrated into BT's network, where BT assumed the role of prime integrator. On the other hand, the case of BTGS providing integrated solutions to large business and government customers is analyzed. BTGS has been emerging as a major force in BT's recovery, after a major crisis in the beginning of 2000s, offering managed services and solutions to multi-site organisations with operations in Europe. As opposed to the prime integrator role usually played by the supplier side, BT decided to be the prime integrator of BT 21CN, which has major implications on how BT is taking advantage of learning as prime integrator. This paper also shows that the value stream is extended when the end customers are large business ones. The more complex the customer, the higher the likelihood of offering integrated solutions. So, integrated solutions does not occur only in the interface manufacturing-services, but also in the interface service provision-large complex customer.

Two Faces of Integrated Solutions in BT in the UK: the case of BT 21st Century Network (BT 21CN) and BT Global Services

1. Introduction

It is well known that firms which concentrate on selling isolated products and services may reach a point where revenues and/or margins decrease and they need new sources of revenues. Then, the common sense calls for new and more products and services which may offset the declining revenues. Metrics for these product-centric organisations usually involve the amount of revenues coming from products or services launched in the last 3 to five years, for example. However, large firms mainly struggle to keep steady growth. This is because to have, for example, 1% growth in a US\$ 50 billion firm means to generate additional US\$ 500 million in revenues and that is an enormous amount of money. More new own products and services may not be enough. That is why some large firms are trying to capitalize on its existing portfolio of products and services and wrap up with products and services from other suppliers (even from competitors) in order to address a customer's need. Large firms secure then a contract with the customer in order to deliver a solution to meet that need. Although this may sound conceptually simple, this requires a shift in the way of conducting business. This is the nature of integrated solutions (IS), which consists of 'combining products and systems with services in order to specify, design, deliver, finance, maintain, support and operate a system throughout its life cycle' (Brady et al., 2005). It is important to emphasize that, in this definition, such products, systems and services can be the firm's own ones or from third party firms, the partners in the integrated solution business. Much effort is placed on initial stages, during the bidding process in order to win the contract. It is usually a higher risk business (than when selling isolated products and services) as it requires high levels of coordination of suppliers: systems integration and project management skills. Customers in this context are usually large business customers.

Large firms such as IBM have moved to integrated solutions in the 1990's, after a major crisis period. One option was to split and sell the firm, the other was to remain as One IBM. The second option was taken by its recently hired CEO Louis Gerstner (see, for example, Gerstner (2002)). Other advocates of integrated solutions, according to Davies and Hobday (2005), include Alstom Transport (railways), Ericsson (mobile communications systems), Thales Training and Simulation (flight simulator), WS Atkins (infrastructure and the built environment), and Cable & Wireless Global Markets (corporate IT and telecommunications networks). This last case (Cable & Wireless) is of special interest for this paper (for comparison reasons) as BT and BT Global Services are analyzed in more details in the context of integrated solutions.

This paper is part of a broader research to investigate how traditional telecommunications operators have been surviving and facing the challenges of major technological change, fierce competition and financial difficulties after the bubble burst occurred at the beginning of the 2000's. Within this context, it investigates how these traditional telecommunications operators are changing their capabilities and boundaries of the industry in order to survive in the context of technological change and convergence of markets and services. In particular, this paper is concerned with the phenomenon of integrated solutions, where traditional telecom operators are increasingly concerned with building a customer-centric organisation, offering not only products, but a whole set of products and services (their own and/or from third parties) to satisfy specific customer needs. This is happening not because to be customer-centric is good in itself. It is becoming a need to compete in the market, establishing long-term relationship with 'customers that matter', and offsetting decreasing revenues from traditional fixed-line voice services. Following this trend, BT in the UK, through its division BT Global Services, offers an excellent example of how customer-centricity is being built.

BT was chosen as it illustrates two sides or 'faces' of the provision of integrated solutions from the user of complex capital goods perspective:

- The deployment of the BT 21st Century Network (BT 21CN), where suppliers (with a base in manufacturing) like Ericsson, Alcatel,

Lucent, Siemens, Huawei, Ciena, Cisco and Fujitsu offer integrated solutions, which in turn need to be integrated within BT infrastructure. This environment involves the interesting situation of collaborating with competitors.

- The integrated solutions offered by BT Global Services to multi-site organisations with operations in Europe. Customers are large firms, and BT Global Services tailor its solutions to each one.

This paper focuses on the provision of integrated solutions by users of complex capital goods. Recent literature (for example, Davies and Hobday (2005), and Brady, Davies and Gann (2005)) show the provision of integrated solutions from a manufacturing base and from a service base perspective. Firms like C&W and BT are service providers and users of complex capital goods. When providing integrated solutions to customers, they not only integrate diverse external products and services, but also combine with their own services provided by their network (which is composed by complex capital goods). The overall aim of this paper is to present another evidence of the growing tendency of large firms, not only the suppliers of complex products and systems, but also the service providers (i.e. BT), to offer integrated solutions to their (large) customers. Also it extends the value stream approach used by Davies (2004), including large business customers besides consumers. Section 2 describes the overall methodology used in this research. Section 3 recollects some of the research already done in the area of integrated solutions and customer-centric organisations. Section 4 shows the background of BT and BT Global Services in the provision of integrated solutions, which is further detailed in section 5. Section 6 concludes with some implications and generalisation issues for other incumbent telecommunications operators.

2. Research Methodology

This paper is part of a wider research where the following research method was applied. The data collection involved interviews and observations at major trade conferences during the years 2005 and 2006. The attendance to trade conferences was important to interview executives, attend their presentations and get insights which would not be possible (or would take much more time) if analyzing documents was the sole input. The interaction between the information obtained through interviews and presentations (as primary sources) and through documentation (as secondary sources) helped to speed up the process and deepen the understanding of the phenomenon.

Being a recent phenomenon, I adopted an exploratory approach in three stages. The research was conducted through interviews and analysis of documents such as reports, newspaper articles and official Internet websites. The reports included annual reports of suppliers and incumbent service providers, and documents of regulators. The interviews were conducted with senior managers, managers and other practitioners of incumbent telecommunications service providers and suppliers, regulators, consultants and market research analysts. An overview of the documentary and interview data used is shown in appendix 1.

The interviews were conducted during the trade conferences and lasted typically less than half an hour. I organised a questionnaire with several questions related to my research and during the trade conferences I adopted the strategy to make few questions very focused on the expertise of the interviewee and wherever possible, made the same question to various interviewees for confirmation and comparison of different views. I tried to cover all the questions in one trade conference. Then, whenever possible, I compared with the documentary data, trying to confirm or not the information obtained in the following trade conference. Dubious or ambiguous information I have either discarded or considered for a discussion topic. When necessary and possible, I contacted again some previous interviewees (by telephone and e-mail) for clarification or to obtain more information.

3. From Product-Centric to Customer-Centric Integrated Solutions Business

Integrated solutions have been mostly addressed from the perspective of firms that produce their own tangible goods and bundle them with services like financing and consultancy. Little research on these solutions has been done from the perspective of service firms which traditionally do not manufacture their own tangible goods, but integrate them from third party suppliers.

Wise and Baumgartner (1999) show how manufacturing firms are moving downstream in order to offer services around their manufactured products and thus extract more revenues and profits from the transaction with the customer. Incumbent telecommunications operators, like BT, France Telecom and Deutsche Telecom have outsourced their system/equipment research and development, and nowadays dedicate themselves only to the provision of services (see, for example, Fransman (2002)).

When referring to integrated solutions, the focus is on large business customers, where the solution requires not only a single product, but a whole range of intertwined products and services including consultancy, financial services, and the ability (and willingness) to choose the best solution among competing ones being by the customer's side even if it requires to use products/services from the competition.

A project is usually defined as a temporary undertaking to deliver a unique product, service or result (PMBok, 2004). Although a product, service or result may or may not be a solution to a specific problem or need, this definition does not definitely emphasize the increasing role of integrated solutions as 'combining products and systems with services in order to specify, design, deliver, finance, maintain, support and operate a system throughout its life cycle' (Brady et al., 2005, p. 360). So, it is proposed to define a project as a temporary undertaking to deliver a unique product, service, result or integrated solution (to meet a customer need).

With the impossibility of relying only on its own products and services to foster future growth, large firms are working closer to customers and trying to build long term relationships and anticipate their needs. It is not exactly to anticipate

the need, but to anticipate the solution to the emerging needs. This way, solution and need co-evolve and firms position themselves around those emerging needs, developing in-house capabilities, collaborating with other firms, merging and acquiring firms.

The business of integrated solutions starts with identifying a need of a customer well in advance, positioning the firm (some level of restructuring around customers may be necessary) and offering a solution to satisfy that need. The firm moves from a product or service-centric strategy to a customer-centric strategy (see, for example, Galbraith (2005) for a discussion on customer-centric organizations).

The integrated solutions offered by telecommunications operators like BT include systems which provide managed services and outsourcing. These solutions comprise, for example, security, mobility, voice, LAN/WAN extension, applications management and hosting, sustainability. Building on a particular need or a set of needs like these ones, a contract is signed and the integrated solutions provider is committed to provide the best solution bringing together its own products and services and others from third parties to best meet those needs. In order to deliver integrated solutions it is necessary the capability of systems integration. The next section deals with these two concepts.

Systems Integration and Integrated Solutions

Paoli (2003, p. 157) mentions the various knowledge bases the integrator needs to have in order to:

- put together the parts;
- manage the interfaces;
- organize the architecture;
- invent the 'missing' links (e.g. to integrate).

In order to 'invent the missing links', the systems integrator needs to develop organisational and technological capabilities in order to succeed in a changing environment. This systems integration approach refers to putting together the parts of a complex product or system, which is composed by many sub-systems. It is important to develop the system design or architecture, explaining how the parts will make the whole. Here the mind-set is still in the

product or system level, not on how it will be fit into the specific environment of the customer when in operation.

Wise and Baumgartner (1999) stated that “smart manufacturers are moving downstream for a very simple reason: that’s where the money is”. Manufactured products are becoming commodities as long as competition becomes fiercer, reducing profitability and the installed base becomes big and the extended product life cycle makes the necessity of substitution or replacement not so demanding. This leads to a strategy of diversification, where the company decides to move to services based on its existing products or on products and systems from others, offering integrated solutions, which, according to Davies (2003) comprise the following four sets of capabilities: systems integration, operational services, business consultancy and financial services (p. 334). The integrated solutions may be offered around the supply of complex products and systems (CoPS), defined as “high cost, engineered-intensive products, systems, networks, constructs” (Hobday, 1998). Thus, systems integrators have the opportunity not only to provide CoPS, but also to operate and maintain the product/system (operational services), provide professional services to upgrade or improve the system performance (also in other areas of the firm, resulting from the deployed integrated solution) and offer financial packages, facilitating the cash flow of the customer, as usually the amount of money and the amortization period are high (Davies, 2003).

Davies (2003, 2004) uses the concept of value stream to illustrate the higher value added activities as long as the transactions are closer to customers. This is shown in figure 1.

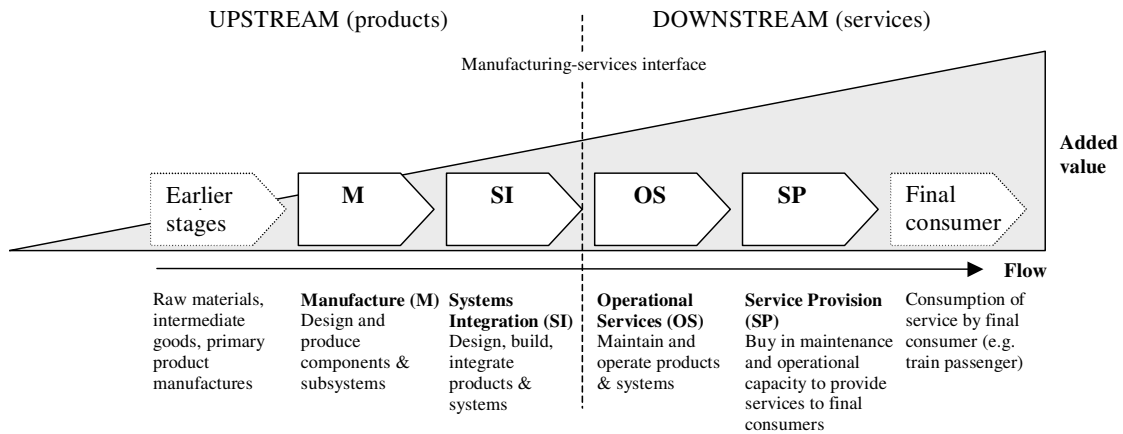


Figure 1 – The value stream of CoPS
Source: Davies (2003)

Although many manufacturing companies are moving downstream into services, there are service companies moving upstream and acting as systems integrators as well (Davies, 2003). As end customers are or become more sophisticated, the scope for integrated solutions is higher. Hence, it would be relevant to approach the business of integrated solutions taking into account different levels of sophistication of customers.

When designing and offering a complex system, the role of the prime integrator becomes important, as depicted in figure 2.

The role of prime contractor or integrator emerges as a consequence of customers trying to push risks and complexity to suppliers. Customers usually want to know how to use or operate the complex system, but not how to build it. Systems integration and the role of the prime contractor can be traced back to the military projects run the Department of Defense (DoD) in the United States (see, for example Sapolsky (2003)). The government, as the buyer and user, did not want to know how to build the complex weapons, but know how to use and operate them. At the same time, emerged the role of project manager, as the single formal point of contact, hiding from the Government the complexities of the supply system (subsystem, component and parts/materials suppliers). Usually, customers of complex systems assume a more passive position and rely on prime contractors or integrators. But are all

customers like that? Are there situations where it is important for the customer to take the responsibility of prime integration?

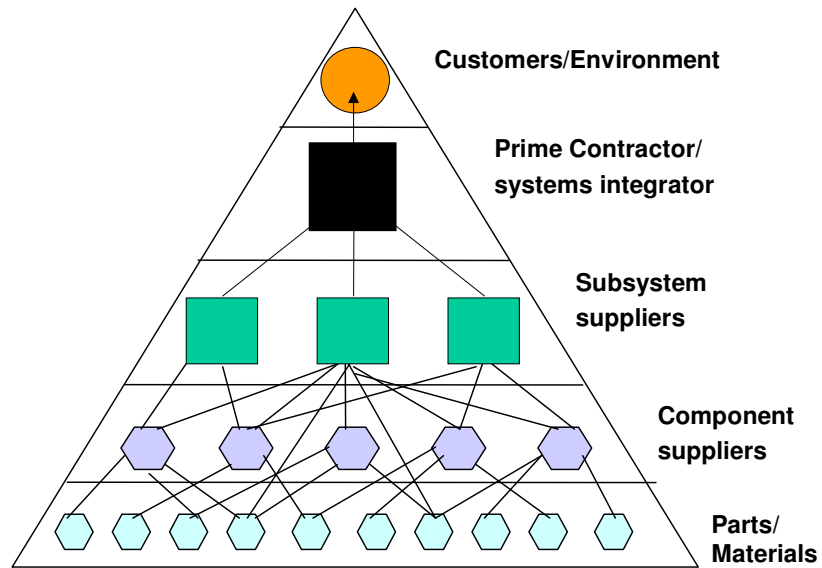


Figure 2 – The integration of systems
Source: Davies and Hobday (2005)

According to Galbraith (2005), customers want relationships with key suppliers (with as few as possible), in order to have close relationships, which allow suppliers to identify unmet needs and requirements and allow them to expand their offerings including more products and services. It is not a surprise then that the debate over technology push and market pull remains open-ended, as supply and demand are treated as separate entities and not co-evolving.

As products and projects have their life cycle, integrated solutions seem to have their own features of a life cycle. Davies and Hobday (2005) proposes the integrated solutions life cycle as in figure 3.

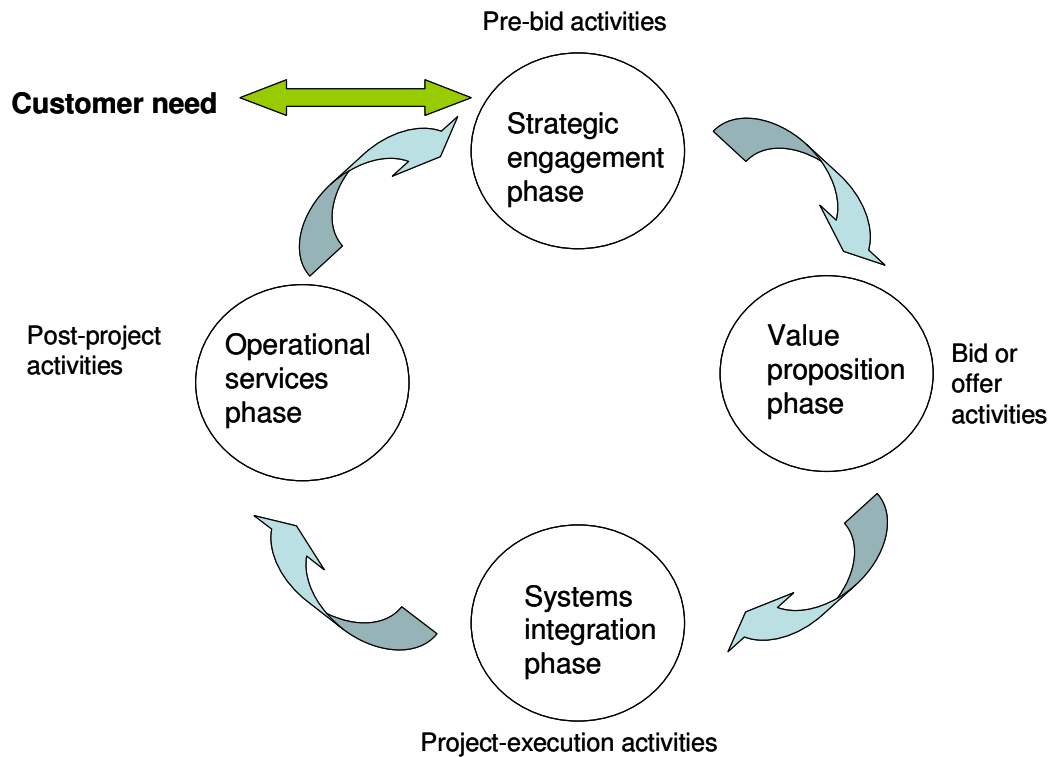


Figure 3 – The integrated solutions life cycle
Source: Davies and Hobday (2005, p. 245)

The life cycle concept is important when analyzing the profitability of integrated solutions in ICT (Information and Communications Technologies) projects.

4. Background of BT and Telecommunications Industry Transformation

During the Chairman Sir Iain Vallance leadership, until April 2001, BT's vision was 'to be the most successful worldwide communications group'¹. And this was to be achieved by 'seizing the many opportunities open to us in the global market'². This has led BT to make many acquisitions in the 1990's which resulted in the high amount of debt in 2001. Sir Christopher Bland assumed as BT Chairman on 01 May 2001 with the mission of making a 'structural and financial transformation of BT'³. As of 31 March 2001, the net debt reached the unsustainable amount of £27.9 billion after the acquisitions made in that

¹ BT Annual Report 2000, p.1

² Idem

³ BT Annual Report 2001, p.4

fiscal year⁴. BT was divided by geographical criteria, BT UK and BT Worldwide until April 2000, when a new structure was established, taking into account market sector rather than geography. Four main divisions were created: Ignite, for the broadband IP (Internet Protocol) business; BT Openworld, for the mass market internet business; BT Wireless, for the mobile business; and Yell, for international directories and e-commerce business⁵. In October 2000, two new divisions were created: BT Retail and BT Wholesale. In November 2000, it was announced the intentions to sell BT Wireless and Yell in order to reduce debt⁶. In BT Annual Report of 2001, the vision of 'to be the most successful worldwide communications group' has disappeared. In February 2002, Ben Verwaayen was hired as the new BT CEO (Chief Executive Officer), replacing Sir Peter Bonfield.

Ben Verwaayen established then a strategy composed of three parts: the first is 'passionate concern for [...] customers, and a scrupulous focus on their requirements, now and in the future'; the second is 'the pursuit of profitable growth'; and the third is 'the delivery of Broadband Britain', recognising broadband as 'a critical growth opportunity'⁷. As of May 2002, Ben Verwaayen wrote that 'after a difficult time for the company, we now need to understand our strengths better and play to those strengths'⁸. In other words, he was re-evaluating BT's core capabilities and business. The former vision of being the most successful worldwide communications group led BT to expand its range of activities to unsustainable levels. And his work was to re-establish BT's focus on the customer and not on itself.

About the position of BT in the market, Ben Verwaayen wrote⁹:

Post-privatisation, BT was the benchmark company in the telecommunications industry, not just in the UK but in Europe and globally. The bad news is that we've currently lost pole position. But the good news is that there's a vacancy. No single company in this industry can confidently lay claim to that position at the moment. That's the opportunity and challenge for

⁴ Idem

⁵ BT Annual Report 2000, p.9

⁶ BT Annual Report 2001, p. 6

⁷ BT Annual Report 2002, p. 7

⁸ Idem

⁹ BT Annual Report 2002, p. 7

us. We can become the benchmark once again. So, that's what we're aiming to do.

It seems that the target is still to be the 'benchmark', but there is a significant cultural shift in terms of achieving that focusing on 'customer requirements now and in the future' rather than focusing on the greatness of itself.

The mobile business was demerged on 19 November 2001, Yell business was disposed and BT Group plc was formed, consisting of four lines of business: BT Retail, BT Wholesale, BT Ignite and BT Openworld. Other business like Japan Telecom, J-Phone and Airtel were also disposed to focus on the core business and reduce debt¹⁰. A possible floatation of BT Ignite was being studied in 2001¹¹, but this has not occurred. By May 2002, after assuming as BT CEO, Ben Verwaayen wrote that 'the restructuring is done; stability has been achieved'¹². In the 2002 financial year (ended 31 March 2002), 89% of the BT revenues were obtained within UK. Internationalisation was restricted to Europe in the strategy set in 2002. Concert, the joint venture with AT&T was also disposed. The seven strategic priorities for the lines of business set in 2002 were¹³:

- to deliver the highest levels of customer satisfaction performance and reduce the number of dissatisfied customers each year;
- to achieve organic profitable revenue growth, while constraining capital expenditure;
- to put broadband at the heart of BT, expand the market for broadband services and create a media-enabled network;
- to provide solutions and other value-added services for multi-site corporate customers in Europe;
- to place all UK networks under a single management structure and to limit investment in legacy voice and data platforms, while migrating operations to new platforms;
- to use the strength of the BT brand to move into broadband services for consumers; and also into related markets, such as communications solutions and business mobility services for major business customers; and information and communications technology for SMEs; and
- all delivered by diverse, skilled and motivated people.

¹⁰ BT Annual Report 2002, p. 9

¹¹ BT Annual Report 2001, p. 8

¹² BT Annual Report 2002, p. 7

¹³ BT Annual Report 2002, p. 8-9

From these seven strategic priorities, some deserve further elaboration. The fourth priority led BT to rename BT Ignite to BT Global Services and become a leading provider of integrated solutions to major customers in Europe. This move to integrated solutions is going to be explored in more details in this paper. The fifth strategic priority led BT to two major initiatives: BT 21CN, a mega-project of £10 billion to be done in 5-6 years; and the open innovation model to revitalize the innovation processes within BT. As a result, the Next Generation Network (NGN) is the all-IP (Internet Protocol) network which incumbents need to deploy in order to compete in the world of horizontal broadband applications, where exposure of capabilities, different forms of collaboration with third parties and new business models are important.

The central question is how the incumbent telecom operators are surviving convergence/fierce competition and radical technological change mainly after the bubble burst at the beginning of the 2000's. I examine here the BT case study as it has embraced technological change in an unusual way. Also BT seems to be taking more radical initiatives in order to stay ahead of their competitors. Thus, BT, as a first and faster mover, was chosen to be the main case study from which possible generalisations could be drawn.

BT in particular was suffering from huge debt problems in the beginning of the 2000's. In 2001 when Christopher Bland joined BT as Chairman of the Board, BT had had £28 billion in debts. 'We went through a traumatic situation. [...] We could do nothing. We could only pay our debts at that point'¹⁴. 'BT took some big decisions at that time to rapidly address its debt mountain and that created malleability within BT - an understanding that change was needed and that the old BT wasn't right anymore'¹⁵. It is important to note that the debt problem occurred in the beginning of 2000's was a huge crisis in the history of BT and may have accelerated its change process. As Matt Bross notes, that moment of crisis brought some 'malleability' to BT's culture and opened the mind of BT employees to a 'new BT'. The Chairman Christopher Bland prepared the ground to bring new people to BT and in 2002, a new CEO was hired, Ben Verwaayen, and also a new CTO, Matt Bross, this last responsible

¹⁴ Interview with BT CEO Ben Verwaayen in Global Telecoms Business, Sept/Oct 2005 n82, p.13

¹⁵ Interview with BT CTO Matt Bross in

<http://networks.silicon.com/telecoms/0,39024659,39152548,00.htm> accessed on 13 Dec 2005

for the open innovation and technology strategy at BT. Four years later, in 2005, 'the debt problem has been addressed, we've changed from just being a telco to also being a major supplier of ICT services, and we've also revitalised our approach to innovation'¹⁶. The main areas to work in telecom in this transformation are 'ICT for business, broadband the consumer, and convergence of services where you bring things together. That's how you build innovation'¹⁷. ICT services seems to be a core competence of BT. The issues that have been addressed more intensely in the last years are the broadband adoption in the UK and the revitalisation of the approach to innovation. This revitalised approach to innovation has been called open innovation.

While analyzing the data, it became clear that the four main issues or challenges for the transition to Next Generation Network and BT survival under the technological change are:

- Reduction of debt (at £27.9 billion in 2001), finding its strengths (core business/capabilities) and consolidating its operations. One of the strategic priorities was to consolidate BT and present it as one BT to the customer. A strength that BT has been exploring during this technological change to IP is to offer networked solutions to multi-site customers, the networked IT services.
- The construction of a new infrastructure based on IP (Internet Protocol) technology. For this BT established a large and complex project: BT 21CN. Here the aim is to build a network that will serve as a platform that will allow the development of new services by BT and with the collaboration of external parties. Main capabilities in focus here are project management and systems integration for large and complex projects in the context of a large user of technology and complex products and systems.
- To revitalise the innovation process within BT. It means to innovate the way BT innovates. A new structure is put in place, where innovation is owned at the chairman level. Also, this shows how BT is reorganised its structure for innovation and establishing mechanisms to take better

¹⁶ Idem

¹⁷ Interview with BT CEO Ben Verwaayen in Global Telecoms Business, Sept/Oct 2005 n82, p.12

advantage of external innovations and integrate into BT's internal processes. It also shows how BT is using venture capital and Intellectual Property rights to foster innovation. The theory behind this analysis is the Open Innovation Model.

- Service innovation for 'horizontal broadband applications', where the management of creativity, user innovation and convergence of services play a major role. Internet and broadband have been changing the perception of customers about services and their active participation and collaboration on shaping them. Developing services from the customer perspective, taking into account the total customer experience, forces BT to establish new processes for service development, involving the customer and using multidisciplinary teams. The main capability here is software development and the main challenge is on creating in collaboration with third party firms. The issue of business model becomes of central importance, as the value of the platform will be determined by the appropriate business model for each service or package that will be delivered through the new IP infrastructure.

One recurrent theme in BT transformation and fast implementation of the NGN through their 21CN project is innovation, i.e., changing the way BT innovates: innovating innovation. So, innovation processes at BT are examined and the concept of 'open innovation' is used as a background to analyze the data acquired. Also the capabilities of systems integration, project management and software development, highlighted by the CoPS (Complex Products and Systems) research are examined in the context of the user of CoPS.

One answer to the question of how BT is surviving the radical technological change and competitive market provided by the adoption of IP and market convergence is through changing the way BT innovates both in infrastructure and service layers. But how is BT trying to innovate innovation and what are the implications on BT organisation and the whole industry?

5. Integrated Solutions at BT

At BT, integrated solutions can be seen through two perspectives:

- Occurring at the interface between large suppliers and BT in order to build the BT 21CN network.
- The solutions offered to BT Global Services to multi-site organisations with operations in Europe.

These two perspectives are elaborated below:

5.1. Integrated Solutions at BT 21st Century Network (BT 21CN)

As it occurs in projects to deliver complex products and systems, the starting point is the tender process which led to the selection of the preferred suppliers. BT divided the tender process in four stages¹⁸:

Stage 1: Pre-ITT (Invitation to Tender) from January 2003 to June 2004.

Stage 2: Formal ITT (July 2004)

Stage 3: Short listing and negotiation (July 2004 to March 2005)

Stage 4: Supplier selection (April 2005 to March 2006)

From the dates above, the first striking characteristic is that the whole tender process lasted three years and two months to define the suppliers for the project. In stage 1, BT conducted a market research and developed the architecture for the network. A symposium was held where around 300 suppliers showed interest in the project. In stage 2, 71 suppliers were invited to tender, and they were required to offer full technical and commercial proposals within 4 weeks response time. In stage 3, suppliers entered into a phase of fierce negotiations with BT, based on technical and commercial grounds. It was an extensive and expensive process, where many pilot projects were run to prove the technical capabilities of the suppliers focusing on the interconnection with legacy systems and the benefits of the 21CN network. In stage 4, once the suppliers were selected, it took more than one year to negotiate the details of the contracts and sign them. In total, eight suppliers were selected: Alcatel, Siemens, Cisco, Fujitsu, Huawei,

¹⁸ Source: BT presentation

Lucent, Ciena and Ericsson. Four contracts were signed in December 2005, and the other four within January and March 2006.

Comparing to some other case studies and the literature in systems integration and project management for complex systems, there are some differentiating features in this tender process that are important to highlight. First is the duration and stages of the bid process up to the selection of suppliers. Davies and Hobday (2005) presented the life cycle stages of a flight simulator project (civil and military) (p.158). In this case, duration for the price bid in response to RFP (Request for Proposal) is around 4 weeks (in civil) and 16 weeks for military. The negotiations with the buyer last around 1 week for the civil and 52 weeks for military projects. BT required 4 weeks of response time, very similar to the civil projects. However, the negotiation process lasted 8 months to be selected, and another 1 year and 1 month to negotiate and sign contracts signed. This shows that firms bidding for large projects need to have sufficient resources in order to compete for the contract for a long time (in BT 21CN case around 1 year and 8 months) without any income (from this project) during this time, and with the uncertainty (within the 8 months) of winning or not the contract. That is why only large firms end up being selected in the long run. Although firms have only 4 weeks to respond to the RFP, it is important to note that the engagement with the project may have occurred much earlier. In the case of BT 21CN, potential suppliers may have had up to one year to identify the opportunity and position themselves in the bid. Some smaller firms, like Juniper Networks, do not appear in the suppliers list, but it is working with Siemens and Ericsson in the project. Of course, many other suppliers are working with the 8 firms selected.

An overview of the supplier of the projects is shown in figure 4:

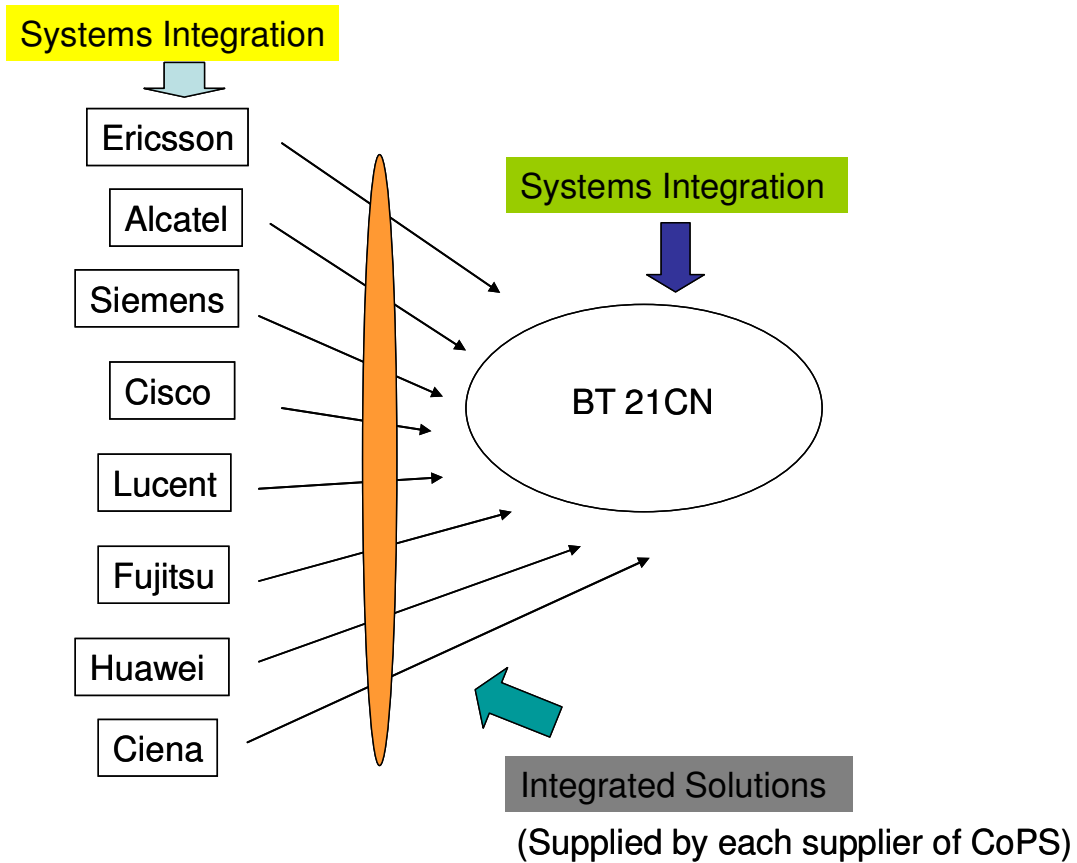


Figure 4 – Integrated Solutions between two levels of Systems Integration

Integrating the integrated solutions

In order to have an idea of what are the products and services provided in the integrated solutions by the suppliers, Fujitsu, one of the suppliers of BT 21CN, describes as key its activities¹⁹:

- Joint Solution Design activity with BT and other Vendors;
- Multi-vendor Testing as a Vendor responsibility;
- Voice and Broadband HDTV (High Definition TV) Trials;
- Transfer Engineering trials;
- Infrastructure preparation (Iron works etc);
- OSS (Operation Support System) Integration with Element Manager;

¹⁹ From a presentation by an executive of Fujitsu

- Deployment of MSAN (Multi-Service Access Node) equipment. MSAN is one the parts of the network architecture developed by BT;
- Installation of EvoTAM Equipment. EvoTAM (Evolutionary Test Access Matrix) is a piece of equipment introduced by BT in its BT 21CN in order to test copper loops and to automate the migration of circuits from the old to the new network;
- Integration of sites;
- All Ports Testing;
- CPE (Customer Premise Equipment) Proving;
- Support.

MSAN equipment is the complex product supplied by Fujitsu. All the other activities are services leveraged by the supply of the complex product. This illustrates the integrated solution supplied by Fujitsu.

Another feature of this major programme is that each one of these 8 suppliers is offering integrated solutions to BT in order to build the BT21CN. The literature on Complex Products and Systems (CoPS) may offer some highlights of what happens in those suppliers (Ericsson, Alcatel, etc.), but it stops there. In this case of BT 21CN, there is a second stage of integration, which is to put together all the complex systems of those suppliers into a network. And here there are some special characteristics to consider:

- The collaboration of competitors
- The lack of prime integrator

Looking at the firms selected to deploy the network, they are direct competitors in other projects and markets. 'Communicating road maps, future plans relating to 21CN prove difficult with vendors competing in other markets' as one executive exposed²⁰. And that is the challenge as BT is required suppliers to offer proposals looking at the whole life cost of the network for a ten-year time period. So, what makes them collaborate? They collaborate for the benefit of their common customer, BT. And it is important that the project be a success, as the success of the project means the success of the suppliers as well. As this project has a high visibility worldwide, the suppliers

²⁰ From a presentation of an executive of Ericsson

can use it as an evidence of their experience and expertise and facilitate the signing of other contracts in other telecom operators. As one executive said '21CN success means all vendors succeed'²¹.

Usually there is a prime integrator for the delivery of complex systems, like nuclear submarines or infrastructure projects. It is the case when the buyer (or user) does not have any interest in knowing about how to build the network. Usually the buyer wants only the final product or system delivered and trained on how to use it (not to build it). But BT seems to have much interest on learning how to build it, so BT is acting as the prime integrator (BT negotiates directly with the eight suppliers). An evidence of this interest on learning (and commercializing it) is the launch of the Global Ventures initiative in December 2006 and offering to other telecom operators the benefits from lessons already learned from 21CN. The aim of this initiative is to sell the 21CN know-how delivered by lead consultants, lead engineers, techno-economists and programme managers. The know-how includes expertise in network migration issues; network design, development and test; network implementation and build; vendor management; and techno-economic modelling. BT claims that they have knowledge and experience of what it takes to reduce operational and financial risks; of end-to-end innovation on people, processes and systems; of vendor capabilities and new ways of working with them; of the opportunities of industry regulation and the important benefits of standards; and of the totality of convergence (implementing and selling the concept of convergence).

5.2. The Rise of Networked IT Services as Integrated Solutions @ BT Global Services

The phenomenon of integrated solutions is predominantly analyzed from the supplier perspective, e.g. a manufacturer of one specific product that offers services around it, such as financial services, operational services, business consultancy and system integration (see, for example, Wise and Baumgartner (1999) and Davies (2003)). BT started a major transformation around the year 2000, when high debts were threatening the survival of the firm. At that time,

²¹ From a presentation by an executive of Ericsson

in April 2000, it was created one division called Ignite to be responsible for broadband IP network business, including Syntegra, their systems integration business. Ignite was a response to the growing market for data communications led by the IP technology. By the end of 2001, BT Ignite was being considered to be floated²². In November 2001, Andy Green was appointed as CEO of BT Ignite²³. In 2002, BT Ignite was described as the 'business services and solutions division, serving customers worldwide'²⁴. And its activities were realigned to focus on multi-site corporate customers²⁵. In April 2003, BT Ignite was renamed to BT Global Services²⁶, BT's 'managed services and solutions provider, serving multi-site customers worldwide'. And the target was '10.000 global multi-site organizations with European operations'²⁷.

This situation faced by BT in the beginning of 2000's finds some parallels to the situation faced by IBM in the mid 1990's (see, for example, Gerstner (2002)). IBM was also suffering financially and some analysts were suggesting that it would be better for IBM to be broken up and sold in order to survive. As long as IBM has not broken up, BT has not either.

In 2005, BT Global Services is described as addressing 'the networked IT services needs of multi-site organisations including major companies with significant global requirements and large organisations in target local markets'²⁸. 'Networked IT services' was the expression adopted as ICT (Information and Communications Technologies) services was not understood by some customers in North America²⁹. 'Networked' though emphasizes the infrastructure nature of the IT services provided by BT Global Services, since the network is supposed to be BT's core capability.

The starting point can be the value stream in CoPS shown by Davies (2003, p. 343), where he highlights for stages: manufacturing, systems integration, operational services and service provision. Integrated solutions occur in the

²² BT Annual Report 2001 p. 8

²³ BT Annual Report 2002 p. 5

²⁴ BT Annual Report 2002 p. 15

²⁵ Idem

²⁶ BT Annual Report 2003 p. 15

²⁷ BT Annual Report 2003 p. 15

²⁸ BT Annual Report 2005 p. 8

²⁹ Presentation by Andy Green, CEO BT Global Services

'manufacturing-services' interface for suppliers of CoPS. This is illustrated in figure 1. In the case of BT, as a large user of CoPS, integrated solutions occur in the service provision. Networked IT services are provided to multi-site firms. Customers are not only the final consumers. Customers are large sophisticated business customers.

As Davies (2004) points out, in order to analyze how firms are moving into high-value integrated solutions, it is necessary to identify (i) the firms' strength or 'base' and (ii) how firms diversify to other activities which render or will render profitable growth. BT passed through difficult times in the beginning of the 2000's and in 2002, Ben Verwaayen, BT CEO, suggested that BT needed to understand their strengths better and play those strengths. Providing integrated solutions to large multi-site corporations seems to be the strength that BT is playing to transform itself. Networked IT services represent both the convergence of telecommunications and IT, and the emergence of integrated solutions as the main business model for the transition to Next Generation Networks.

The core capability of BT was and continues to be the design, operation and maintenance of networks and offer services based on those networks. These networks used to be telecommunications networks, and at a certain point, it was renamed to communications networks³⁰. Although there are signs that value will migrate to services on top of the network (broadband horizontal applications), there are currently major opportunities to offer integrated solutions to large multi-site corporations in Europe. BT, through its major transformation project, BT 21CN continues to invest and improve its core capability in designing, operating and maintaining networks. However the nature of the services being offered is changing from fragmented products and services, like fixed-network calls, exchange lines, receipts from other operators, wireless products and private services to integrated solutions including 'desktop and network equipment and software; transport and connectivity; managed LAN (local area network), WAN (wide area network) and IPVPN (internet protocol virtual private network) services; managed

³⁰ In the BT Annual Report 1999 p. 5, there are remarks about changing from telecommunications to communications.

mobility; applications hosting; storage and security services; and business transformation and change management services'³¹. IT systems have increased substantially in large firms. Their complexity and internetworking make such firms to spend huge amounts of money and effort building and managing them. BT (and other operators) sensed an opportunity to provide their large business customers with the simplicity of one contract/provider, allowing them to concentrate on their core business (when IT is not their core business).

Incumbents like BT chose not to produce and manufacture their systems and equipment since the 1990's, preferring to buy them from the market. Thus, BT concentrates its efforts in the architecture and design of the network and selects the best vendors to realize them. The performance of integrated solutions can be measured by the performance of BT Global Services. Its turnover has evolved and in 2006 it has surpassed both BT Retail and BT Wholesale (other divisions of BT).

Moving from a base in services

BT has been experiencing decreasing turnover from fixed-to-fixed voice calls in the last years. This can be seen in part from the revenues from BT Retail. The strategy is then to move from traditional fixed-line voice services only to networked IT services. This comprises integrated solutions for large firms which intend to outsource their network operations. The traditional value stream for the supply of capital goods is as follows (Davies, 2004, p. 737):

Manufacture → systems integration → operational services → service provision

The interface between systems integration and operational services represents the locus of what Wise and Baumgartner (1999) calls going downstream from manufacturing to services. Incumbent operators like BT are service firms that do not have manufacturing activities for a long time. In BT's perspective, systems integration occurs when building the infrastructure, such as the BT 21CN. In this case, BT needs systems integration capabilities to match the systems integration capabilities of the suppliers and integrate

³¹ BT Annual Report 2005 p. 33

multiple vendors in a single mega-project. The value stream is extended by BT considering the service provision as an integrated solution, where BT offers systems integration, managed services and consultancy services to large multi-site corporations.

The end service provision is transformed into another stage of systems integration and operational services as follows:

Manufacture → systems integration → operational services → systems integration → operational services → service provision

So the downstream of the value stream approach needs a differentiation between final consumers and large business customers, as shown in figure 5.

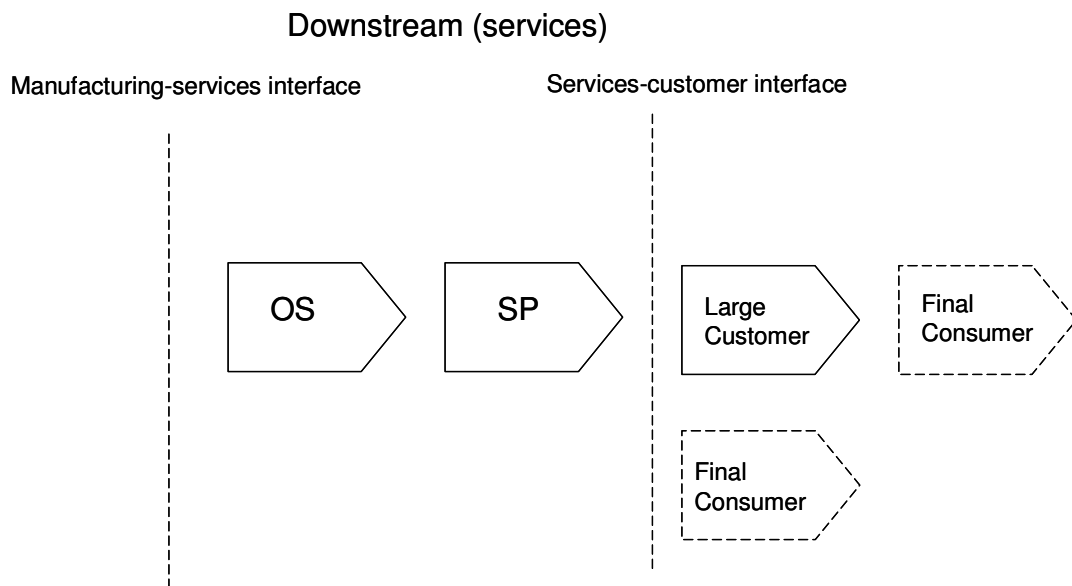


Figure 5 – Integrated solutions in the interface services-large customer

Integrated solutions happen in the manufacturing-services and services-large customer interface. As the customer becomes more sophisticated (in terms of size and level of resources and capabilities), the higher the scope for integrated solutions. At the final consumer, as long as it becomes more sophisticated, based on, for example, Personal Networks (see, for example, Noam, 1994), the possibility of offering integrated solutions becomes higher.

Among the capabilities of BT to deliver networked IT services are business transformation, change management, large scale project management, process transformation, solutions design and innovation.

Among the capabilities for integrated solutions, the following seems to be important for BT:

- Systems Integration

BT has won many contracts to 'provide and manage networks' for multi-site organizations. Providing networks means to integrate different equipment and systems from various external suppliers (e.g. Cisco, Nortel, ...).

- Managed (Operational) Services

Besides building and/or upgrading the network, BT becomes responsible for monitoring the performance of the network and taking care of the maintenance and preventive actions to keep the network running according to the SLA levels.

- Consultancy Services (Professional Services)

'Consultancy services are also provided to help organisations understand network performance, operate their networks and applications efficiently and transform their business to gain advantage in the digital networked economy'³².

Figure 6 below shows the two faces of integrated solutions at BT. On the left, integrated solutions is at the domain of a major project, BT21CN, established as a temporary organization within the permanent one (BT). On the right, integrated solutions are represented by various major projects for each major customer. These projects are temporary organisations which sustain the permanent one (in this case BT Global Services).

³² BT Annual Report 2006 p. 33

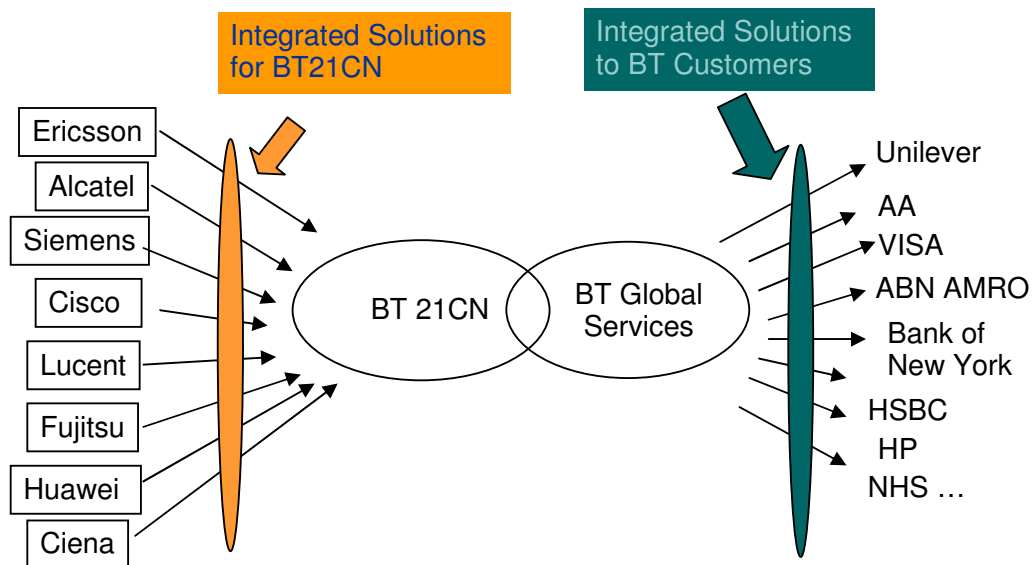


Figure 6 – The two faces of Integrated Solutions at BT

The Performance of BT Global Services

The year of 2005 was a remarkable year for BT Global Services as it reported operating profit, proving the business of integrated solutions. ‘The 2005 financial year saw Global Services deliver its first ever full year operating profit before goodwill amortisation and exceptional items, at £7 million’³³.

The activities of BT Global Services include: Global IP Infrastructure Services, Applications and Application Management Services, Outsourcing and Managed Services, Business Transformation Services. These activities are substantially done with partners: Cisco, Intel, Alcatel, Nortel, Vodafone, and Marconi for Global IP Infrastructure Services; Computacenter and Microsoft for Applications & Application Management Services; Siemens, CSC and HP for Outsourcing and Managed Services; and Accenture for Business Transformation Services. BT Global Services has restructured its division from a fragmented one to another more simplified from the customer perspective.

³³ BT Annual Report 2005 p.33

VISA is one of BT customers. VISA has operations worldwide and BT cannot be physically present in every place where VISA wants to be. 'We have to be an integrator'³⁴, as one BT executive pointed out.

The types of contracts that BT is now dealing with are of higher values, long term (for some 3 to 10 years usually) and one important part for the profitability of this business is the re-sign of major contracts. BT claims that around 90% are re-signed. 'Long-term contract is essential for the profitability of the business model'.

Each contract represents a different customer with different needs. In this sense, skills in large scale project management are important. In some instances, the learning in one project can be transferred to another, but the real gain (and profit) occurs when the contract is re-signed. Large business-to-business contracts where factors like trust, reliability and security are valued.

The business of integrated solutions as practiced by BT Global Services follows the life cycle proposed by Davies and Hobday (2005), shown in figure 3, with the addition that this cycle may assume the form a spiral, as these types of projects rely on re-signing them in order to be more profitable in the long term. Besides that the strategic engagement seems to be important over all the phases of the life cycle, as BTGS is trying to build trust and long term relationships with their customers. One special measure of success in these integrated solutions projects is if the customer extends the contract and relationship for additional years. This is the ultimate evidence of customer satisfaction. Re-signing is an important feature of this type of integrated solutions projects in order to be profitable³⁵.

The business of integrated solutions proves that convergence happens at the customer. Based on customer needs and requirements, firms strive to offer the best solutions. Technological convergence, like the IP (Internet Protocol) technology, integrating voice, video and data services, allows firms to offer complete and integrated solutions to customers more seamlessly and at a lower cost in the long term. Customers have a fluid and integral experience of the product and service, not a fragmented one.

³⁴ BT CEO Global Services Andy Green's presentation in 2005

³⁵ Presentation by Andy Green, CEO of BT Global Services

6. Conclusions

The crisis suffered in early 2000's made BT more humble and focused. From a vision of 'to be the most successful worldwide communications group'³⁶, BT moved to a strategy focusing on European customers with global presence.

Large firms like BT struggle with imperative of growth. Just a few percent of growth may represent millions or billion of pounds of additional revenues. Even large firms may not have enough resources to obtain those additional revenues from their own new products and services. They need to rely on new BT, during its years in crisis, experienced the same dilemma of IBM in the mid 1990's: should the firm be split and sold or should it remain one firm? Both BT and IBM decided to remain one firm. The underlying idea is that innovation is an end-to-end process. In the business of integrated solutions, splitting the firm makes innovation lose power. When large firms intend to deliver innovation to large customers, size matters. And that is the essence of integrated solutions: understand customer needs and offer the best solution possible using own and/or third party partial solutions. However, in order to not get lost in offering solutions, as firms may end up offering anything to anybody, two important lessons are important in the business of integrated solutions:

- First is to have customer focus, selecting which type of customer the firm intends to target. BT decided to focus on multi-site organisations with operations in Europe;
- Second is to identify its strengths or its core capabilities, which must be within the integrated solutions being offered, otherwise the whole solution may fall apart. BT identified this strength as 'networked IT services', providing services within their integrated solutions that leverage their network (infrastructure) capabilities.

As the business of integrated solutions and BT case has shown, innovation is not only about own new products and services, but also about integrating third party products and services (even from competitors) in a way that satisfies a customer need. The more sophisticated the customer, the more the need for

³⁶ BT Annual Report 2000, p.1

integrated solutions. That is why it is more common now in transactions between large firms. But, increasingly individual consumers are becoming more sophisticated. Noam (1994) predicted the existence of Personal Networks (PN), and although it is still in the first stages now, it is becoming a reality, and making the business of integrated solutions a pervasive practice.

The BT 21CN case shows that integrated solutions may happen between two stages of systems integration: within the suppliers of complex products and systems, and within the large customers, like BT, who need to integrate all the integrated solutions provided by those suppliers. A distinctive characteristic of BT 21CN case is that the role of prime integration is played by BT (the customer) and not by one of the suppliers. This has wide implication on the buyer's (BT's) learning, which is not a common feature in other mega-projects (or major programmes).

The BT Global Services case illustrates how a major telecommunications operator is taking advantage of integrated solutions and helping BT to emerge from crisis and achieve targets of future growth. The business of integrated solutions at this level is not easy. Projects start to deliver profits only after a few years from the start of the project (usually three years), and its profitability is also highly dependant on re-signing the contracts, i.e., on long term relationships. So, the business of integrated solutions goes beyond selling integrated products and services: it is about building relationships and trust.

In the value stream approach presented by Davies (2003, 2004), it is important to differentiate customers not only as final consumers, but also large sophisticated business-oriented ones. Thus the value stream is extended and integrated solutions emerge in other interfaces: not only at the manufacturing-services interface (which is the case of BT 21CN and its suppliers), but also in the operational services/service provision-large customer interface as in the case of BT Global Services.

Ultimately convergence happens at the customer. Technological convergence, like the IP (Internet Protocol) technology, capable of delivering integrated voice, data and video services, helps the convergence that happens at the customer.

The business of integrated solutions leverages innovation. It involves recognising new business opportunities in existing customers (unmet needs and requirements in the present and in the future), and searching for knowledge and solutions internally and externally to the firm. Hence innovation becomes more distributed along networks of firms working towards a common goal (such as the case of BT 21CN). Also, there is the recognition that even large firms cannot rely on their own internal innovation resources and processes. R&D still plays an important role, but R&D cannot be confined to the own laboratories. The boundaries become more permeable. The goal of BT 21CN is to build a platform where BT can co-create and co-develop new products and services with third-party firms. The laboratory is extended to the market, and innovation is taken to the Board of Directors level. This is the essence of Open Innovation in BT, which will be hopefully explored in another paper.

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Appendix 1 – Research stages, data collection and empirical sources

Table 1: Overview of the research stages for the data collection and empirical sources being used.

	Stage 1: March 2005 – July 2005 (Exploration)	Stage 2: August 2005 – March 2006 (Exploitation)	Stage 3: April 2006 – March 2007 (Exploitation and Confirmation)
Objectives	<ul style="list-style-type: none"> • Understanding industry structure, processes and resources to deliver and build NGN; • Identifying main suppliers of NGN; • Identifying main fixed-line incumbent telecom operators building NGN; • Exploring the dynamics of capabilities development, disruption and inter-firm collaboration. 	<ul style="list-style-type: none"> • Exploring in detail the specifics of industry change in terms of innovation and capabilities development in order to deliver and build the NGN; • Exploring in detail the dynamics of innovation and capabilities development in the transition to NGN of BT 21CN. 	<ul style="list-style-type: none"> • Finalizing data collection about the innovation dynamics of the transition to NGN at industry level; • Finalizing the data collection about the capabilities development in BT and BT 21CN; • Resolving remaining discrepancies.
Interviews	<p>Interviews with suppliers, service providers, industry analysts, consultants and regulators:</p> <ul style="list-style-type: none"> • 45 interviews in CEBIT 2005; • 26 interviews in VON Europe 2005; • 12 interviews in IEE Course; • 8 interviews in LightReading Carrier Ethernet. 	<p>Interviews with suppliers, service providers, industry analysts, consultants and regulators:</p> <ul style="list-style-type: none"> • 5 interviews in LightReading Live – The Future of Telecom; • 21 interviews in Carriers World 2005; • 38 interviews in Broadband World Forum Europe 2005; • 20 interviews in ITU-T NGN Focus Group and Industry Event 	<p>Interviews with suppliers, service providers, industry analysts, consultants:</p> <ul style="list-style-type: none"> • 29 interviews in CEBIT 2006; • 9 interviews in 21st Century Communications World Forum; • 3 interviews in VoIP for Business.
Secondary Sources	<ul style="list-style-type: none"> • Annual reports; • SEC filings; • Press releases; • Newspapers an magazine articles; • Product catalogues; • Official websites; • Pulver Research website; • Market research reports; • Trade Conference presentations; • Webinars. 	<ul style="list-style-type: none"> • Annual reports; • SEC filings; • Press releases; • Newspapers an magazine articles; • Product catalogues; • Official websites; • Pulver Research website; • Market research reports; • BT Technology Journal; • Trade Conference presentations; • Webinars. 	<ul style="list-style-type: none"> • Annual reports; • SEC filings; • Press releases; • Newspapers an magazine articles; • Product catalogues; • Official websites; • Pulver Research website; • Market research reports; • BT Technology Journal; • Trade Conference presentations; • Webinars.
Events involved in	<ul style="list-style-type: none"> • CEBIT 2005 • VON Europe 2005 • LightReading Carrier Ethernet • IEE Course on Telecoms NGN 	<ul style="list-style-type: none"> • LightReading Live: The Future of Telecom • Carriers World 2005 • Broadband World Forum Europe 2005 • ITU-T Focus Group on NGN • ITU-T NGN Industry Event • CEBIT 2006 • 21st Century Communications World Forum • VoIP for Business 2006 	<ul style="list-style-type: none"> • Broadband World Forum Europe 2006 • IP 06 • The New Telco: Europe 2006 • IP Leaders 2007 • VoIP for Business 2007 • C5 World Forum 2007 • Carrier Ethernet Expo 2007