LEVERAGING MOBILE DATA COMMUNICATION TO IMPLEMENT 'BPR' CONCEPTS IN THE PC SERVICE SECTOR
- THE CASE OF COMPUNET -

by

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ABSTRACT

The case study covers options to strategically leverage existing mobile data communication networks into the service business. After a short description of the data networks considered, a description of recent business process redesign (BPR) efforts at CompuNet, the largest German PC reseller and service company, follows. The paper then focuses on the need for mobile data communication to implement CompuNet's newly developed service concepts. Criteria to choose the best suitable network as well as implementation benefits and pitfalls are discussed. The case closes with an outlook on further development opportunities.

STUDY BACKGROUND AND OBJECTIVES

Mobile communication has gained increasing importance over the last decade. While the main discussion still evolves around the development of mobile voice communication, existing networks also allow for mobile data communication with an improving quality standard.

Mobile data communication is often crucial to put into practice the various business process redesign concepts that have been developed. However, technical as well as economic arguments still slow BPR implementation down when mobile data communication comes into play.

The following case study illustrates a recent, successful BPR concept in the German PC service segment. It demonstrates the embedded need for mobile data communication; and it stresses the benefits to be gained from integrating the newly available

telecommunication infrastructure with advanced new business processes. However, the case also discusses the obstacles to a full-scale implementation at an early stage.

It will be shown that there is still a great difference between the technical feasibility of mobile data communication and its nation-wide, cost-efficient usage in the context of corporate applications.

Due to the company's location and market, the discussion focuses on the appropriateness of networks available in Germany. The main arguments, however, can easily be transferred to most EU-nations.

MOBILE DATA COMMUNICATION NETWORKS

Three networks are briefly introduced: the two German GSM networks and the MODACOM network.

The **Global System of Mobile Communication (GSM)** was established in 1982 to initiate European communication standards [Commission of the EC, 1990]. Since its first introduction in Germany in 1992, its growth has been even faster than the already explosive telecommunication market [ITU, 1994]. In Germany as well as in Europe, GSM is already the largest segment within mobile communication and should further increase in share up to the year 2005, as it will become the most important tele-communication sector overall. [Kruse, 1992; Kirby, 1992; Eutelis, 1993]. Since 1992, GSM has been swiftly adopted by more than 85 nations world-wide.

GSM networks are cellular networks originally designed for voice communication. The cost of a call is based on the length of the connection between the two communication partners. Its international spread allows for 'international roaming', i.e. a GSM-user can be reached everywhere under the same 'telephone number'.[1]

In Germany, two GSM networks the 'D1' (operator: DeTeMobil, a 100% subsidiary of the German Telecom) and the 'D2' (operator: Mannesmann Mobilfunk) exist. Since their functionalities and price structures are very similar, they will not be differentiated further in this case study.

Modacom is a packet-switched network (payment based on the amount of data transmitted) for mobile data communication, offered by DeTeMobil. Since 1994, it has been available nation-wide; however, it does not allow for mobile speech communication.

Additional licenses for mobile data communication networks have been granted by the German Minister of Post and Telecommuncation. For example, the 'Gesellschaft für

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[1] In practice, 'international roaming' requires complex contracts between the network operators involved. While some contracts are still missing in some cases, the still existing problems should be solved in the near future.

Datenfunk' plans to enter the market in summer 1995 offering another packet-switched network. They see their competitive strength in providing integrated system solutions beyond the pure service of mobile communication.

COMPUNET - COMPANY OVERVIEW

CompuNet was founded in 1984 and currently consists of 21 subsidiaries at 20 German locations which are operating under the roof of a holding company, the CompuNet Computer AG. The company is regarded as the leader in resale, networking, and maintenance of personal computers in Germany.

Two aspects characterize CompuNet's strategic positioning: Firstly, CompuNet has given up its original focus on resale and maintenance of mainly IBM products and turned into a multi-vendor supplier. The company has recently included, besides IBM, brands such as Hewlett Packard, Toshiba, and Compaq. Secondly the company has increasingly shifted its 'value added' from the resale of hardware to services. With more than 1,200 employees it offers the full spectrum of services around 'the networked desktop' beyond the sale of computer hardware and software. About 75% of CompuNet's employees work in service-related positions including the technical customer service division, where staff numbers rose sharply to meet the strong increase in customer demand [Loebbecke, Jelassi (1993); Loebbecke, Jelassi (1995)].

In 1993/94, CompuNet`s turnover amounted to DM 925 million (a plus of 36%) with about 84,000 PCs and workstations sold [CompuNet, 1994]. It is expected to in- crease even further in 1995 to reach the mark of DM 1 billion.

COMPUNET'S BUSINESS ENVIRONMENT

The IT sector finds itself in the midst of a period of structural change. Sales of mainframes and medium-sized data processing equipment are decreasing due to world-wide over-capacity. Business with PCs[2] is suffering from the high-speed of technical innovation and drastically falling prices. However, in difficult economic times, many companies cooperate with external service providers to make their IT cost transparent and controllable.

Until recently, the standard guarantee offered in Germany was twelve months for defective parts. Travel to and from the customer as well as time spent was usually invoiced. Such conditions changed with the PC market`s price war. Guarantee conditions have become the latest weapon used by manufacturers in their struggle to retain market share [Loebbecke, Jelassi (1995)].

From a customer's perspective, the variety of manufacturer guarantee types has made the administration of a large organization's PC-inventory with products from various

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[2]   PCs in this case study stands for PCs and workstations.

suppliers much more complex and hence more expensive. Each producer has different guarantee conditions, which in turn can vary depending on the product type and purchase date. If the hardware fails, extensive checks have to be made in order to determine the right manufacturer, the contact person and extent of guarantee coverage [Loebbecke and Jelassi, 1995].

Furthermore, the PC maintenance business becomes increasingly time-oriented. For companies like banks, insurance companies, or 'just-in-time' producers, PCs have become a crucial prerequisite for smooth work processes. With the need to eliminate any major disturbances or interruptions, fast technical maintenance becomes a critical success factor.

COMPUNET'S ANSWER TO THE CHALLENGES IN THE PC-SERVICE BUSINESS

For CompuNet, the combination of switching to a multi-vendor strategy on the one hand and focusing on service on the other hand, led to chaotic situations in service management: CompuNet's suppliers had different guarantee conditions and prices for various products. The company passed these differences on to its customer which led to complex service administration and delivery requirements for CompuNet vis-a-vis each individual customer. The necessity for a redesign of the service management processes became obvious.

Since October 1992, CompuNet has been delivering all new equipment with a so-called **'Life Cycle Guarantee'**. It runs for 48 months, equivalent to the entire life cycle of the hardware. The guarantee covers all repair, travel and spare part costs relating to the damaged equipment.

When the customer calls because of a damaged hardware product, he only says the PC serial number, which then is the 'ticket' to the service system. Time-consuming searches for delivery notes or invoices are eliminated. Thus, the 'Life Cycle Guarantee' reduces the customer's transaction cost, i.e., his overall IT management cost.[3]

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[3]   To extend and further leverage the idea of the 'Life Cycle Guarantee', CompuNet also introduced two guarantees for customers' existing PC-inventory: the so-called **'Refresh Guarantee'** and the **'Life Cycle Guarantee for second-hand PCs'.** These guarantees for already installed PCs provide the customer with the same benefits as the guarantee on new equipment, but differ with regard to the date on which the guarantee begins. The four-year 'Life Cycle Guarantee for second-hand PCs' begins on the date the equipment was installed. For the 'Refresh Guarantee', the hardware is checked and updated by CompuNet before the equipment is declared operable, and a sticker is attached marking the start of the four-year guarantee period. For CompuNet, both guarantee types hardly require any additional management efforts beyond the life cycle guarantee concept, but lead to increased 'Front-Loaded-Cash' [see also Hollier, 1980]. Altogether, the reduction and simplification of transactions led to a 75% decrease of CN's maintenance cost.

CompuNet also offers a 'Support-Guarantee', which enhances the 'Life Cycle Guarantee' by a time component. Comparable to the life cycle guarantee concept, CompuNet assures to reduce system downtimes - depending on the contract - to one day, eight, four, or two hours.[4]

SPECIFIC REQUIREMENTS OF THE PC-SERVICE BUSINESS

The cost dominated 'time business' in the service segment requires a specially developed management of personnel and spare parts [Davenport, 1993]. Due to CompuNet's multi-vendor approach, well trained technicians and the appropriate selection of about 6,000 to 7,000 spare parts need to be available at the customer's site within a few hours (depending on the support guarantee contract). At the same time, technicians need to be busy all day ("the customer doesn't pay for waiting"), and the capital bound by spare parts (DM 13-14 million) needs to be minimized.

To run a profitable service business under these circumstances, a precise planning and monitoring based on reliable and fast information transfer between technicians and management is crucial [see also Frese, Heppner (1995); Gaitanides (1983)]. Furthermore, CompuNet needs to monitor its own service performance to be able to 'sell' it to its customers. Altogether, the following aims of the PC service business can be summarized:

- Professional order management ("making the service business controllable")
- Personnel management (technicians need to reachable by the management, and vice versa)
- Cost efficient spare part logistics that suit CompuNet's business needs
- Time monitoring at the customer's site (early warning)
- Performance measures and performance based accounting.

These goals can only be achieved by an efficient use of mobile data communication networks.

Regarding the technical field personnel, it is crucial that the management unit always knows who is where, in what engagement, using which spare parts, and which additional engagements have to be completed until the end of the day. CompuNet administers its technical field service with a central system called 'CallAS' (Call Administration System), which is based on Lotus Notes and SAP. All relevant information about a PC, the customer, the guarantee contract, and previous guarantee activities are accessible through the PC serial number. The system allows CompuNet to monitor agreed-upon service levels and to accordingly allocate its 250 technicians as well as to optimize the spare parts management.

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[4]   Due to impacts in the business enviorement which are beyond CN's control, one usually assumes a 95% degree of conract fulfillment / accomplishment; the last 5% are generally considered too expensive.

To ensure that information is always up-to-date and any problems like delays due to traffic jams etc. are taken into account, technicians call an 'Automated Call Operator' before and after their customer visits to report where they are. Precise monitoring requires complete and up-to-date data sets in the system. However, technicians found only in about 70% of their engagements easy access to the public phone network.

NEW SERVICE PROCESSES BASED ON MOBILE DATA COMMUNICATION

Regarding cost efficient service processes one has to distinguish between 'Next Day Contracts' and 'Same Day Contracts'.

For **'Next Day Contracts'** a technician used to get orders and spare parts in the morning in 'his CompuNet subsidiary'.[5] The first draft of the new service management concept foresaw technicians to be equipped with laptops and a mobile communication gateway. They were to see their planned engagements for the day in the morning at home. This would have saved about one hour 'commuting time' in the morning freed to be spend 'productively' at the customer's site. Furthermore, the technician would not have been dependent on making phone calls from the customer's site any longer. After each engagement, he would have entered all necessary data into his laptop and transmitted it via mobile communication to the central management.

The introduction of '**Same Day Contracts'** and their enhanced usage by CompuNet customers[6] sharpened the requirements for short term service engagements. Technicians and spare parts have to be at the customer's site within a few hours. If a customer calls with a '2 hour support guarantee' to report a system failure, the management unit needs to decide which technician

a) is close by,
b) has the necessary know-how and expertise, and
c) would not have to postpone other time-critical engagements.

The most appropriate technician selected by these criteria should then have received his engagement order with the appropriate urgency warning via mobile data communication.

OPTIONS FOR THE TECHNICAL IMPLEMENTATION

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[5]   Until 1993, spare parts were stored in the various subsidiaries. Since 1994, however, most of them are kept in the central warehouse in Kerpen near Cologne, and are then brought over night to where they are needed. Thus, the volume of spare parts could be reduced significantly, or, differently speaking, twice as many serfvice appointments are fulfilled with the same amount of stored spare parts.

[6]   Currently, measured in volume, 'Same Day Contracts' still play a minor role (10 - 15% of customers' calls), but are expected to increase exponentially.

CompuNet needed a nation-wide infrastructure for mobile data communication to allow for up-to-date information exchange between field personnel and management, and thus for a comprehensive use of CallAS. At the launch of the service process re-design project, the two German GSM networks 'D1' and 'D2' as well as the MODA-COM seemed to offer this sufficiently.

TECHNICAL AVAILABILITY

MODACOM was announced to be available nation-wide by the end of 1994 as a mobile data communication network.

GSM networks, designed for voice, could also transmit data. However, since the data transmission via the GSM data channel was not available nation-wide in the fall of 1994, CompuNet analyzed the possibility of using the GSM voice channel as a temporary solution to transmit its data.

Due to the limited bandwidth in the voice channel, a concept was developed that did not require to transmit full service documents of about 100 kilobytes. Only selected sentences with a volume of up to 1 kilobyte were to be communicated. Since both network operators had announced a transmission rate of 9,600 baud, this GSM voice channel option was considered technically sufficient as a temporary solution for about six months (until March 1995) until the data channel would become available nation-wide.

ECONOMIC ANALYSIS

To ensure results valid beyond the six months 'temporary solution', the economic analysis was run for the full-scale communication concept with a transmission volume of about 100 kilobytes per exchange.

- Concerning rather large data volumes of about 100 kilobytes per transmission, the packet-switched MODACOM network was too expensive.
- Using GSM - with the available transmission rate of 2,400 baud - a transmission of 100 kilobytes would have taken about 30 minutes or DM 300,-.

None of these figures were acceptable, neither in terms of time nor in terms of cost. As a result, CompuNet invested in improving its data compression software and decided to store the relevant service database fully on each laptop. Consequently, only the relevant information was to be transmitted. Even this abbreviated procedure was calculated to take about 15-20 minutes per transmission, resulting in roughly DM 150,- to DM 200,-; still unacceptable figures.

Furthermore, the GSM operators' promises to offer a nation-wide transmission rate of 9,600 baud by the end of 1994 turned out to be not feasible. Therefore, CompuNet started to rethink its overall service management concept as far as mobile data communication was concerned.

RETHINKING THE SERVICE PROCESSES

Instead of aiming at a full-scale transmission of complete documents, the idea of just transmitting selected pieces of information regained importance even for a permanent solution.

According to the revised concept, technicians receive their engagement information over night via the fixed network in their subsidiaries. In the morning, they can either stop by the subsidiary or access their computer account via a modem. The only application of mobile data communication left in the revised concept is that technicians transmit their status reports via mobile data communication from the customer's site to the management (uni-directional transmissions).

Based on such limited data volumes, MODACOM has proven to be significantly more cost efficient than GSM. Included in the monthly rate per technician (license) of about DM 70,- is the free transmission of 40 kilobyte. Also, additional data volumes can be transmitted much cheaper than it would be the case with GSM.

Especially taking into account the next development stage which implies bi-directional mobile communication (also from the management unit to the technician), MODACOM offers important cost advantages over GSM. As a packet-switched network, the user can be logged in all day paying only for the rather rare instances of actual communication.

DEVELOPING A PILOT

Having chosen MODACOM, CompuNet wanted to develop the necessary (company-wide) software for its service management, while different subsidiaries employed different processes. Struggling with the trade-off between customization and efficiency, the CompuNet's top-management decided to follow a rather unified approach. A lot of work became necessary to convince each subsidiary of the advantages of unified processes in terms of efficient software development, system operation, and maintenance. Each subsidiary wanting 'its processes' as the basis for the company-wide system caused additional delays. In spite of some missing agreements regarding selected details, CompuNet's software group began designing pilot software in March 1995. The nation-wide roll-out is scheduled for the fall of 1995, about one year later than originally planned.

SOME LESSONS LEARNT

The lessons learnt can be grouped into two clusters:

- Design and development of applications that exploit newly available technologies are, from an organizational perspective, often more challenging and time-consuming than the technical implementation.

After all the discussions about the most appropriate network, business/service processes (and especially their great variance among different subsidiaries) turned out to be the main obstacle to 'compete in the fast lane' [Jelassi] with a company-wide application of mobile data communication. In the case of CompuNet, the need for unified business processes and the implied oraganizational changes slowed down the implementation of mobile data communication as a new company-wide IT/telecommunication backbone significantly.

The profit center concept had been of major success factors during CompuNet's fast growth during the last twelve years. With the introduction of mobile data communication applications, successful service processes of a subsidiary need to be unified. Therefore, considerable resistance to change must be foreseen in the context of this 'imposed' centralization. (This problem is similar to any situation in which originally decentralized processes are centralized to achieve economics of scale.)

- Technical availability does not mean economic suitability:

When CompuNet started the service redesign project, not only network operators and service providers, but also 'experts' and the public press talked about mobile (data) communication as an available technology that a company/customer just had to sign-up for. However, detailed investigations showed that several announced features were available only under certain conditions, e.g., regional limits, high error rates, bandwidth constraints etc. These difficulties made the exploitation of the technology in a corporational context rather difficult.

Furthermore, the mobile data communication usage cost (telecommunication fees) even outweighed the cost reduction achieved through lean businesses processes. For example, in the case of CompuNet, the pure transmission cost could not make up for the possibility to spend more (productive) time at the customers' sites.

Generally speaking, especially in the case of very innovative applications, companies have to be aware of situations in which increased customer orientation and reduced labor cost (less unproductive time) are more than outweighed by fixed and/or variable system costs[7]. While variable system costs had lost relative importance in the context of classical information systems, they (still) amount to significant percentages of overall cost when it comes to the use of technologically advanced telecommunication networks.

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[7]   Excluding system related labor cost.

OUTLOOK

From CompuNet's perspective, being a technological innovator has often led to new, successful product offerings over the last decade [see also Griese (1991)]. Again, CompuNet has been the first major company which tried to base its service management processes on cutting-edge technology and telecommunication infrastructure.

Struggling early with the arising difficulties should provide the company with a competitive advantage for at least two to five years [Porter (1985); Porter and Millar (1985)]. Furthermore, telecommunication costs are likely to be lowered within the next years due to liberalization and deregulation trends in Germany and the European Union. This is expected to offer additional potentials beyond CompuNet's current plans, mainly in the field of remote PC (and software) maintenance.

From the perspective of the mobile network operators, CompuNet provides an example of using mobile data communication beyond financial applications. The design of business processes based on mobile data communication in the service segment, promises a significant increase in demand for mobile data communication [Loebbecke (1995); Loebbecke, Bui (1994); Szyperski, Schmitz, Kronen (1993)]. The business world could regain its position as driver for additional demand of mobile communication [Loebbecke (1994); Loebbecke, Bui (1994)]; tremendous market growth seems to be a safe prediction.

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