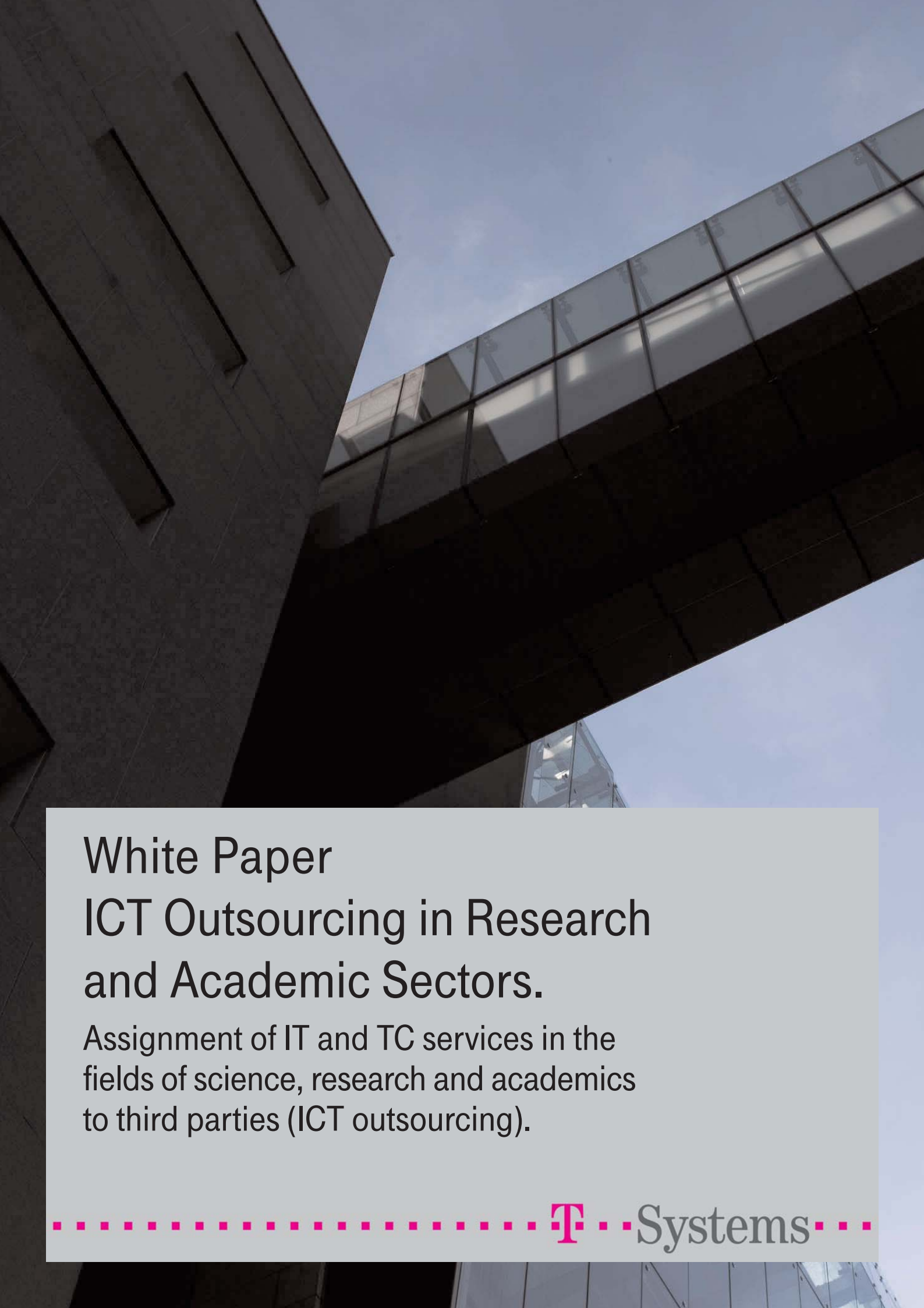

White Paper
ICT Outsourcing in Research and Academic Sectors.

Assignment of IT and TC services in the fields of science, research and academics to third parties (ICT outsourcing).

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Contents.

1. Relevance of ICT outsourcing.

Competitive pressure is also rising continuously in research and teaching. In this case, however, the nature of the competition is different to that in the economic sector. A university or research institute which is more “competitive” than others is able to convert funding into more useful knowledge and better teaching. Good scientific management creates the manoeuvring room which scientists need for this purpose. This is not an easy task in an environment characterized by scarce resources as well as increasing responsibilities and requirements. One way of meeting this challenge is for research institutes and universities to concentrate on their core competencies while performing the necessary adaptations to their organizational structure. This includes a critical examination of whether it would be more economical to assign services provided for many years by the institutes themselves to external parties. At the same time, research, teaching and the efficiency of internal administration are being influenced increasingly, either directly or indirectly, by more and more complex information and telecommunication (ICT) environments. A logical consequence of this is a growing tendency of universities and research institutes to assign basic ICT services to specialized, external service providers, so as to be able to focus more on their own core competencies. By exploiting economies of scale and concentrating on basic services, the subcontractors can perform equally well or even better than the outsourcing institute by lowering costs and raising flexibility.

Portfolio matrices are often used to help decide which services should continue to be provided internally and which ones should be relocated outside. The advantage of these portfolios is a reduction in the complexity of decision making to two dimensions, which makes it easier to manage. One example of 2D analysis is the comparison between proximity to core business (the service) and difficulty in finding suitable suppliers on the market (Figure 1). A comparison between these dimensions yields the following four options:

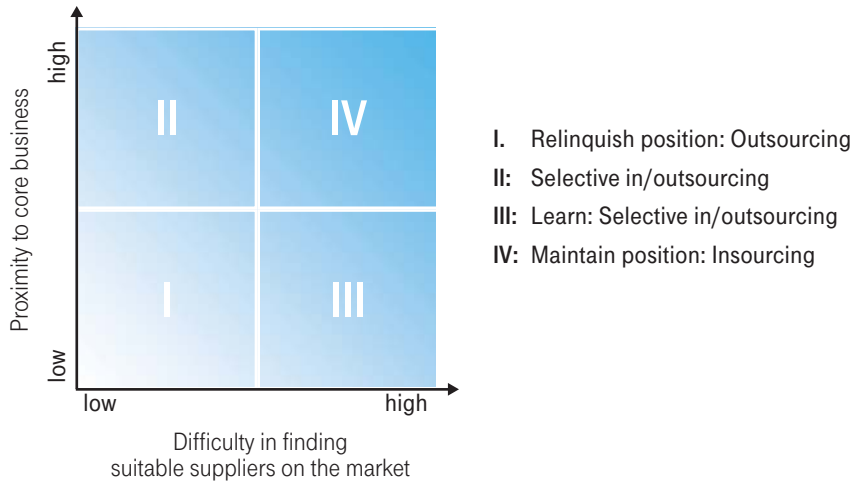

Figure 1: Decision portfolios on in/outsourcing; Source: T-Systems Solutions for Research, SfR

Special significance of ICT outsourcing to research, science and academics.

Information technology is essential to the majority of universities and research institutes today. A university's or research institute's scientific competitiveness relies heavily on effective and efficient use of information technology for supporting business processes. The greater the support for a university's or research institute's administrative and research and teaching processes using ICT services and solutions, the more important the role played by ICT in ensuring and raising the university's or research institute's scientific competitiveness.

Unlike the industrial sector whose product portfolio (e.g. foodstuffs) is clearly separable from information technology, universities and research institutes have been somewhat reluctant to outsource ICT due to the often close relationships between existing ICT systems and research fields. Another reason for this is the scientific organizations' frequent lack of adequate cost transparency in terms of cost/performance accounting, thus preventing a critical appraisal of the currently independently rendered ICT services.

There will be increased pressure from industry to conduct research projects in a professional manner. The ideal service provider for ICT outsourcing will also act as a partner for innovation.

Often too, internal ICT departments have to deal with increasingly diverse, complex and extensive tasks while human resources diminish steadily. In some cases, the proper qualifications required for assuming new tasks are either absent or not obtainable within a reasonable period of time. Under such circumstances, it is very difficult to guarantee a lasting provision of demand-oriented ICT services.

In the absence of global management and coordination, universities and research institutes often have a highly decentralized provision of ICT services and solutions. This results in high staff outlay for managing systems, uneconomical procurement, inefficient administration processes and unreliable operation of systems. Highly decentralized ICT service provision also necessitates redundant infrastructure (climate control, power supply etc.), which could otherwise be avoided.

Especially in view of this, it is advisable for a research institute's management to carefully assess the potential for relocating ICT services to third parties and examine the extent to which this strategy can optimize the use of IT at institutes and facilities in the scientific, research and academic fields in order to maximize the benefits of funded research and teaching.

Experiences of the industry.
In the industrial sector, outsourcing has for many years been a proven method of ensuring competitiveness in numerous variations.

Instead of being commissioned merely for the production of individual components, suppliers assume responsibility for delivering entire systems and modules, sometimes even including in-house development. If performed thoroughly, this style of optimization allows outsourcing of production sometimes even to full depth. Virtual companies like Nike never had, or no longer have, their own production facilities.

ICT tasks can be outsourced just like production tasks. This includes basic ICT services such as:

- Operation of computer centers,
- Provision and regular operation of infrastructure systems like mail, groupware, file, computing and archive services,
- Internet, Intranet etc.,
- Provision and regular operation of decentralized infrastructure (workplace systems),
- Provision and regular operation of (enterprise-wide) networks,
- Security services,
- Service desk (user help desk),
- Installation and maintenance of standard software,
- Application development in the administrative environment,
- Maintenance of administrative application software (application management)
- ...

The growth in outsourcing business bears testimony to the high acceptance of this type of service provision at least in the industrial sector, and many market research companies forecast a further rise in demand for ICT outsourcing.

2. Opportunities and challenges posed by outsourcing of ICT services.

Properly practiced ICT outsourcing is meant to increase a university's or research institute's productivity without affecting its future. Decisions concerning IT outsourcing are complex, however. Because such decisions can rarely be revoked without problems, considerations in the preparatory phase must cover the largest possible number of variables.

2.1 Basic motivation for outsourcing ICT services.

Surveys in the industrial sector have revealed the following main reasons underlying ICT outsourcing:

- Cost reduction / cost flexibility
- Improved services and solutions; reliable and lasting provision
- Ability to concentrate on own core competencies
- Cost transparency
- Easier access to specialized staff
- More efficient project management with more punctual results
- Continuous adaptation to technological advancements while reducing technological risks
- Standardization of processes and consolidation of different technologies and platforms
- Lower investment costs

Though these fundamental aspects also apply in the research and teaching environment, they do so in a more specialized manner. Professional knowledge management creates the manoeuvring room necessary for scientists to remain competitive, a difficult undertaking especially if resources are scarce while demands and standards rise. One approach worthy of closer attention is the concentration by by universities and research institutes on their core competencies through the assignment of so far independently rendered ICT services to third parties. This permits productivity increases of up to 25 % in the ICT area. The result can directly benefit research and teaching activities.

2.2 Strengths of ICT service specialists.

Compared with universities or research institutes, ICT specialists providing services to clients in the fields of science, research and academics have several strengths and advantages:

Cost factors.

Thanks to their better market access, external ICT suppliers can purchase one or more production elements (ICT equipment etc.) at lower prices compared with the universities or research institutes.

Economies of scale.

ICT service providers can deliver the necessary or similar performance in higher quantities, thus lowering unit costs and raising efficiency.

Productivity.

The ICT service provider often possesses further significant organizational and motivational advantages (e.g. processes, methods, staff identification with the business model, performance-based staff management and related works agreements etc., geared toward the requirements of ICT services).

Universities and research institutes are bound by public sector contractual regulations. Ensuring continuous ICT operation (24x7) is therefore difficult to achieve as is the rewarding of good performances by individual staff members with positive employment incentives.

Staff performance is improved, in particular, by a combination of objective aspects and psychological factors. Firstly, ICT staff at the newly formed company act as like-minded specialists, no longer playing the role of a cost driver. At the same time, the ICT staff remaining as a core team at the research institute also benefit from the outsourcing measure. Their tasks such as planning, management and controlling of ICT services and solutions carry special

weight vis-à-vis the external ICT service provider. For this reason, a selection of the right staff members is especially important to ICT outsourcing: Staff with mainly operative activities tend to relocate to the outsourced partner (role = ICT services) while staff focusing on planning and controlling tend to remain within the organization (role = ICT & IT management).

Expertise.
The ICT service provider's staff is often equally or even better qualified, being able to train and deploy highly specialized people. The service provider is able to maintain critically-sized staff groups for each area of expertise.

Technological innovations.
The supplier strives to use the latest, i.e. best technology in order to provide services of the agreed quality in the most efficient and economical manner to maximize customer satisfaction.
The supplier has the critical mass necessary for continuously adapting their spectrum of services to changes in market conditions, i.e. is able to make the necessary investments and carry the associated risks.

2.3 Challenges posed by ICT outsourcing.
When considering the outsourcing of ICT services, these advantages are naturally countered by risk factors and challenges requiring special attention.

Core competencies.
The proportion of outsourced services should solely serve as a "lengthened workbench". ICT outsourcing must strengthen the the university or research enterprise and rid it of ballast without taking with it any of the originally created value.

Establishment of ICT / IT management.
Dealing with an ICT service provider also means leaving an effective and efficient ICT management at the research institute. This ICT management is responsible for planning and managing ICT services and solutions. The services as such are rendered by the ICT service provider.
ICT management organizes cooperation with the IT service provider and is in charge of continuously adapting the necessary services to the university's or research institute's needs. This capability (planning & management instead of execution) must be learned.

Functioning procurement market.
The act of ICT outsourcing must not make the university or research institute unduly dependent on the ICT service provider. Every outsourcing measure reduces influence on the relevant segment of the value chain. A functional procurement market for ICT services accordingly favors outsourced relationships.
Any necessary change in supplier (e.g. due to inadequate fulfillment of obligations) on a functional procurement market is expedited, for instance, if the provision of services has been agreed on the basis of ITIL-compliant business processes. ITIL (IT Infrastructure Library) is a collection of guidelines which has established itself in recent years with a large number of ICT enterprises and service providers. It describes how to provide qualified and cost-effective ICT services.

Supplier loyalty.
Cooperation with the ICT outsourcing partner must be dependable, practical experience having shown that not all details can be governed contractually. Good contract management also entails good confidence management.

Supplier stability and performance.
Constancy of service provision is more important than attractively priced new suppliers.
The supplier's performance must also be adequate for adapting quickly to market changes.

Return to insourcing.
In addition to a functioning procurement market, there should be an option to re-integrate outsourced services into the university's or research enterprise's own environment on expiry of a contract or inadequate fulfillment of obligations.

Another aspect must be noted especially in the case of public universities and research institutes: ICT outsourcing is usually accompanied by cost savings. A university or research institute which has decided to outsource ICT services and thereby introduced structural changes to raise productivity must be assured by its sponsors that the resultant cost savings will be invested in core business to make research and teaching more efficient.

2.4 Successful examples from research.

2.4.1 The German Aerospace Center (DLR).

DLR, Germany's largest scientific and engineering research institute, has been an outsourcing customer of T-Systems Solutions for Research GmbH since 1999.

Customer's initial situation.
The DLR engages in research and development as part of national as well as international cooperative projects. As a space agency, it also conducts German space programs. Aerospace projects now influence our daily life-style, whether in terms of mobility or worldwide satellite communication. Many industrial sectors benefit from innovations in materials technology, medical engineering and software development. As a registered private association with about 5100 staff members, DLR maintains 27 research institutes as well as testing and operating facilities at eight major locations in Germany.

Founding of the T-Systems Solutions for Research joint venture, of which DLR owns a 25.1 percent share, was a revolutionary step in Germany's scientific milieu. The reason was costs.
Though ICT, after scientific expertise, is the second most important basic resource for the DLR, it is also a significant cost factor.

Customer's statement.
The advantages of ICT outsourcing clearly outstrip those of an internal profit center. ICT staff learn from the partner's expertise, have fast access to the latest technical developments, and are more aware of costs and service standards due to exposure to competitive pressure from the business world outside.

ICT outsourcing works extremely well when the service provider and users are in contact via continuous processes, e.g. according to ITIL (IT Infrastructure Library).

Realized customer benefits.
By increasing IT efficiency and flexibility, the German Aerospace Center promotes the success of its own core business. Furthermore, the DLR profits from access to Europe's most flexible and powerful computer network (basis: grid) and cost savings of about 25 percent in the high-performance computing sector.

Solution.
The outsourcing contract covers development, support, operation and optimization of:

- Scientific and administrative workplaces (Windows, Linux, Unix, Mac), including related back-office environments
- Server and file services
- Web-server hosting
- Backup and archive services
- Networks (LAN, WAN and telecommunication)
- Corporate directory services
- Mobility solutions (VPDN)
- Supercomputing services, including solutions for complex simulations and their visualization, grid computing
- Administrative applications (basic environment: SAP)
- Internet/Intranet (MS IIS and Apache) and cooperative platforms (Microsoft Sharepoint Portal Server, service-oriented architecture)
- Mail and Groupware systems based on MS Exchange.

2.4.2 Society for Plant and Reactor Safety (GRS).
The GRS has been a customer of T-Systems Solutions for Research GmbH since 2002.

Customer's initial situation.
The situation and future of information and telecommunication technology (ICT) at the GRS seemed somewhat bleak at the end of the 1990s. ICT staff were scarce in Germany. A type of "green card" was used in an attempt to attract ICT specialists from abroad. GRS was threatened by a loss of ICT expertise in two respects, firstly through retirement of ageing employees and secondly through headhunting of younger staff by other enterprises. The management at the GRS was not pleased with its high ICT costs and inadequate re-financing of internal ICT services. The model employed by the German Aerospace Center (DLR) also held appeal for the GRS. Intensive contractual negotiations between the GRS and SfR in 2000 and 2001 led on 21st December 2001 to conclusion of a contract for deliveries and services in the fields of information processing and communication technology. The contract came into effect on 1st January 2002.

Customer's statement.
"After several years of experience at the GRS, ICT outsourcing and the IT service contract have proven extremely profitable, performance and user-friendliness both having risen equally in this period." (H. R. Seel, IT manager at the GRS).

A cost-effective ICT service contract is of little use if the offered services do not satisfy users.

Realized customer benefits.
Since the service contract came into effect, the ICT management has therefore surveyed users of ICT services to estimate and assess efficiency in an effort to increase user satisfaction. The excellent overall results obtained sanction the original decision. Furthermore, the financial expenditure of the GRS has dropped continuously despite rising wages and other costs. This favorable cost situation also directly benefits the clients of the GRS. Already in 2005, the break-even hourly wage of the GRS was several euros lower than the value calculated in the absence of ICT outsourcing. GRS customers also benefit from the wider spectrum and higher quality of the offered services.

Solution.
ICT services are rendered in two categories: basic and on-demand. Basic services, encompassing installation and administration necessary for operations as well as modifications, come in the following packages:

- Workplace systems and laboratory computers
- Administrative IT applications and systems
- Infrastructural IT systems
- Networks and telecommunication
- Technical / scientific IT systems

Costs of basic services are determined according to existing quantities (e.g. number of workplace PCs requiring support), individual prices being agreed annually. On-demand services are defined during ICT planning or commissioned ad hoc according to requirement, and invoiced in terms of man-hours accruing at SfR. The service contract specifies minimum annual quantities and upper price limits for basic and on-demand services. Besides the costs of the service contract, expenditures remaining at GRS after outsourcing of ICT services only include depreciation of PC workstations and network cabling, costs of consumables and ICT management costs. Though 2.5 staff positions were calculated for the latter on the basis of an external consultant's estimate, all related activities can actually be performed by a single staff member.
The remaining costs for GRS are thus agreeably low.

3. The path to ICT outsourcing.

Once a general decision to outsource ICT services has been made, further considerations and detailing are necessary.

Phase 1: Performance and cost analysis; rough concept of call for tenders (internal).
The first step is to decide which specific services are to be outsourced. The following rule of thumb applies: The closer the relationship between the ICT task and essential system operations, and the larger and more mature the supplier market, the lower the risk posed to the outsourcing university or research enterprise.

At all events, the university or research enterprise needs to know the likely improvements in service and the expected savings. This requires transparency of present and future services and associated (full) costs, i.e. a performance and (full) cost analysis (minimum assessment: good) of the ICT services intended for outsourcing.

The performance analysis shows which services are rendered by the ITC division. Here, it is also necessary to ascertain the specific requirements posed by each department presently and in future to the segment to be outsourced, e.g. as concerns availability, response & recovery times and security.

Also required is a rough forecast of developments in requirements for services in the coming years, ICT outsourcing contracts usually being concluded for long periods ranging from six to ten years. Because it is not easy to forecast either developments at the university or research institute, or technological advancements at the ICT, only rough estimates are possible here.

The final outcome is an internally determined ICT budget based on full costs and associated descriptions of performance and services forming the basis for comparing bids submitted by ICT outsourcing companies.

The early involvement of the works council or staff council is crucial to a transparent ICT outsourcing process and one that is acceptable to all parties.

Also advisable in this phase is early coordination with the works and staff councils. ICT outsourcing involving relocation of an enterprise's segment and accompanying transfer of staff from the original ICT division to the new ICT service provider comprises an operational change according to the works constitution act. This act governs the rights and responsibilities of employee representatives in such cases. The works council is entitled to detailed and timely notification by the employer to be able to negotiate settlements between it and concerned employees, the council's activities comprising entrepreneurial action. The works council is not able to prevent the measure of outsourcing. An important aspect here is the future ICT service provider's acceptance of the settlement of interests. However, this aspect has usually not been clarified by this stage. This can be solved, for instance, by merely agreeing an intention to negotiate a settlement of interests in order to assimilate the ICT service provider into subsequent contractual negotiations.

This phase also involves preparation of a rough concept of cooperation with the future subcontractor. The university or research institute performing outsourcing here defines the processes to take place between it and the external service provider (e.g. for change management of ICT services) as well as control mechanisms to be implemented (e.g. type and composition of committees and boards). Especially in the case of (public) universities or research institutes, it is also necessary to formulate the conditions to be fulfilled by the ICT outsourcing partner in order to permit a transfer of staff from the public sector to the private sector (e.g. continuance at the state and federal benefits agency, fundamental acceptance of a settlement of interests etc.). Also common in the public sector is the requirement for use of a suitable management system by subcontractors (e.g. ITIL/ISO 20000). These requirements are considered in calls for tenders.

Phase 2: Selection of an allocation process and invitation for tenders.
Universities and research institutes are generally considered public clients subject to contracting rules for services.

ICT services which are currently provided internally and are to be procured in future from an external source as part of a long-term contract are characterized, among other things, by the fact that determination of a total price or formulation of sufficiently precise global specifications is not possible in advance. This is especially because the term of the contract usually sees extensive changes to ICT equipment and overlying ICT services, whose specific features are not yet foreseeable at the time of process selection. Global user demand patterns, too, can only be forecast approximately.

Processes considered suitable by procurement laws for award of such contracts include, for instance, negotiation with announcement of award following competition between participants.

The general structure of negotiation preceded by competition is as follows:

a) Announcement of placing including conditions for participation
b) Evaluation of the competition results
c) Request to remaining suppliers to submit an indicative bid
d) Negotiations (modifications to service specifications, revision of offers)
e) Contract award

After the participants' competition is over and the submitted indicative bids have been considered and assessed, suppliers are selected for contractual negotiations. Evaluations of bids should give special consideration to the planned processes of integrating staff to be taken over by the IT outsourcing partner.

Instruments which have proven themselves for actual contractual negotiations include skeleton contracts supplemented by detailed performance documents, as well as an additional set of agreements on the separation of the current ICT division (contract on relocation of business units). The skeleton contract governs the content typical of a large service contract, in addition to a number of aspects related specifically to outsourcing: Customer's auditing rights, collaboration terms, rights on contract termination etc.

Phase 3: Rendering of services by the ICT service provider.
In this operating phase, the outsourcing partner provides the agreed ICT services. Service level agreements play a decisive role here. Standard procedures by an efficient ICT outsourcer must include regular reports on the service levels provided to the customer and consultations on service quality as well as any required improvements and advancements.

In this phase, the customer's IT management performs IT governance functions like performance controlling, cost controlling, change management, requirements management etc., after having set the internal conditions necessary for these tasks to be performed competently.

4. Ensuring permanent technological innovation.

As mentioned, of key significance to the university or research institute are the ICT services and solutions supporting research and teaching as well as and administrative business processes. At the same time, ongoing rapid developments in the ICT sector frequently give rise to new, increasingly complex ICT tools promising even better support for the university's or research institute's business processes.

Consequently, an important aspect of the operational phase is the ICT service provider's capacity to regularly propose innovative advancements to services and implement them in consultation with the customer. Shaping instead of preserving should be the ICT outsourcing partner's maxim here. Rather than being objects of research themselves, ICT services and solutions serve as tools for obtaining dependable scientific findings and improving teaching in addition to ensuring effective as well as efficient administrative processes.

The ICT outsourcing partner's aim is to deliver the specified service levels punctually at the agreed prices and in the agreed quantities while minimizing costs. From the ICT outsourcer's standpoint, familiar and proven technologies and processes are usually more reliable in achieving this goal. The introduction of new technologies promising more effective and efficient support for business processes can disturb established routines and hence poses a risk to ICT service providers. For the university or research institute, however, innovations can decisively influence competitiveness. Especially in the operational phase, it is therefore important not only to ensure the agreed service quality by means of continuous service level management, but also to establish a meticulous and regular pattern of innovation management. Service level management checks the conformity of each service level carried out using the agreed technologies and processes. Innovation management checks whether changes might be necessary in the structure of the service provision base. In practice, innovations can often be introduced much more quickly and easily in this manner, compared with the provision of in-house services without any outsourcing whatsoever.

From the ICT outsourcing supplier's perspective, the risk of higher costs and disruptions in service provision posed by (cautious) innovation is offset by the prospect of notably enhanced customer satisfaction and resultant customer loyalty.

List of references.

Web links to relevant market research institutes:
www.pac-online.com, Pierre Audoin Consultants
www.idc.com, International Data Corporation
www.input.com, INPUT

Other relevant web links:
www.dfg.de, German Research Society: This web page provides recommendations by the commission for computing systems for 2006 – 2010 titled “Information Processing at Universities – Organization, Services and Systems” www.outsourcing.com, The Outsourcing Institute: A professional Association and Executive Network for Independent Information and Expertise on the strategic use of Outside Resources.

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