The conceptual transformation of IT organizations for a short- and medium-term cost reduction through Open-Source Software

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Throughout the last years many organizations worldwide cope with higher demands in delivering faster and flexible business processes to internal and external customers. To satisfy this demand, the corresponding IT divisions must find answers to this increase in speed and demand and features. Additionally since the financial crisis IT budgets are decreasing, but the consumerization of IT still grows constantly. By implementing the Open Source paradigm within the IT department, it may be possible to get access to more feature-rich software faster and cheaper than by the use of COTS (commercial off-the-shelf-software). Although certain measures have to be set up, in terms of working structure and role definitions, in order to establish a sustainable change within IT. Especially the new role of the Technical Business Analyst play an important role in a Hub & Spoke like relation to internal customers and 3rd party providers.

1.1 Introduction

Since the financial crisis, international organizations have been under great pressure to provide faster services and more efficient products. They also needed to provide distribution and maintenance services. In particular, the sub classification, under the slogan of globalization, has contributed to changes in the last few decades to a crucial high-pressure change [Poep02, p. 142-143]. Logically and literally, the pressure for change led to high internal organizational requirements for effective resource and process design.

The IT Division of organizations are, therefore, often under the pressure of resources – especially costs, quality, and time control efficiency [Dous07, p. 125-127], regardless of the level of the organization and outsourcing. Organizations with little outsourcing have

changed over this initial mass as a completely different setup in IT organizations; e.g., at an IT demand-and-supply separation [MaRa06, p. 23-25].

This increased historically since the 2000s; therefore, IT budgets are under great pressure to justify costs, which are split into the various departments with different cost centers including hardware, software, development, and maintenance [Masa06, p. 54 -- 58]. Projects are therefore in a crisis situation and are often identified as a key cost factor, and are then stopped, without questioning the medium-term benefits. There seem to be responding organizations that for now are drastically cutting and even stopping ongoing projects with costs and ROIs of less than three years [Marc09, paragraph 1-7]. There have been discussions in the software maintenance community about the software in the ERP domain, where costs have been known to shoot up by 30%. This cost increase has led to much dissent in the user community [of a few oligopolists EnPa04, p. 4-5] for many years now, especially in the corporate environment, which has clearly dominated. Hardware is seen as a C-Class good [LeRe03, p. 28] [Hora06, p.35] , and its importance is seen as decreasing in IT cost allocation.

IT has now been "consumerized" [Cloe05] in a broader sense. There has been a proliferation of collaborative work on Open-Source Software (OSS) for projects fulfilling the available software requirements to support enterprise architecture. The chances of IT organizations of providing short- to long-term periods with greater flexibility to use fewer resources depend on the specific boundary conditions and assumptions on Open-Source Software itself:

- effective knowledge documentation;
- a normatively desired reverse substitution of capital through manual labor and customizing performance;
- lean-sourcing of IT knowledge and an innovative management of department requirements; and
- new IT-role profiles.

These are important premises relevant to the successful deployment of OSS.

1.2 Properties of Open Source Software

Looking, for example, at the number of open-source projects deploying code lines in known software repositories [AAS08, p. 11], an almost exponential increase can actually be assumed [Deri08]. With further reference to work by Torvalds in 1996, only quantitatively reduced lines of code [Tane09, p. 840] for the Unix derivative of Linux, which is truly remarkable technology, and an especially interesting sociological development. A possible central question in this respect would be the motivation of the deployment itself. That is, how it occurred that a large number of individuals (current numbers: more than 2 million developers on SourceForge in February 2009 [SF09]; over 30,000 for the development of Linux [BrSt03, p. 619]) worldwide cooperatively defined targets to invest in work.

New slogans included *Social Media*, *Web 2.0*, *Folksonomy*, and *Collaborative tagging* [Gass10], which tried especially to apply information technology with these issues and share content. The result would be to raise the review of the open source idea to begin a technical dimension – in this case, the existence of the Internet itself, and the existence of mechanisms for the collaborative, interactive elaboration of code (SVN, CVS), as well as the sociological non-monetary incentives through "Street Credit" in the programming area by professional peers, possibly as a kind of individual increase, accessible by others, and may also be Faustian (keyword is land reclamation) in Faust II [LaWe04, p. 24-28]), inherent motivation in a digital world to create something permanent.

The paradigm shift in this case refers to the [borrowed from the manufacturing industry idea of “assembling” instead of “building”) [HeHo08] standardized p. 180] customizing of compatible elements. In the IT perspective, this would often be open and documented interfaces, such as LDAP, HTTP, WebDAV, and JSR 170. Examples are opening CRM applications with DMS or ECMS [EiEn07, p. 82-85] on these systems and implementing systems with faster interfaces, with less effort to be as proprietary, and with usually not free marked licensing costs such as documented interfaces.

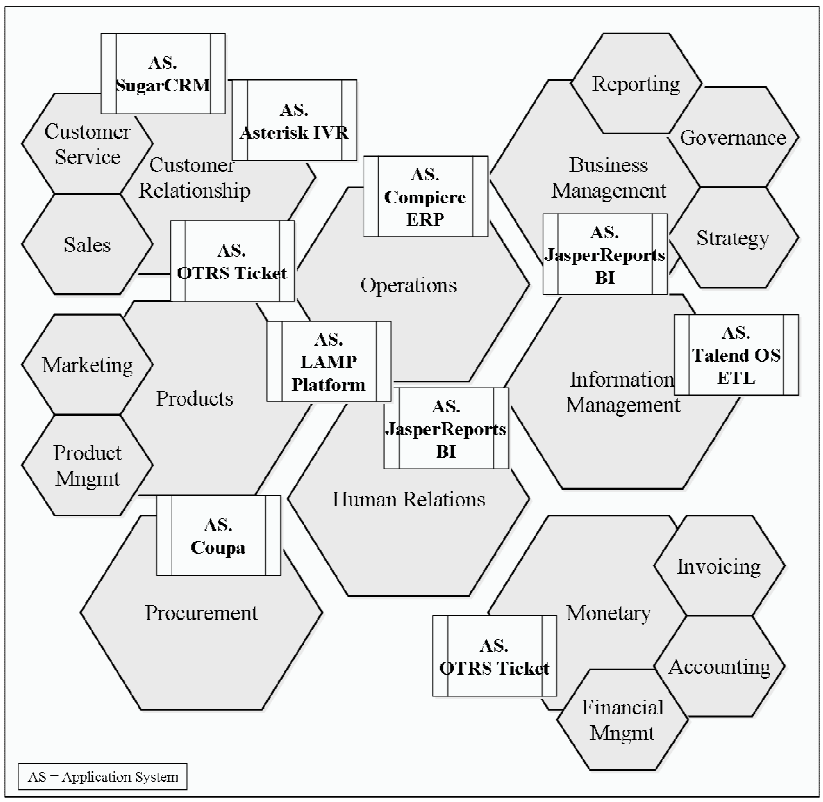

Fig. 1: Business domain model and possible IT Open Source applications (Source: own composition)

Important core functionality within software projects (e.g., a LDAP authentication), if necessary, take into account their perceived "size" more than the reputation of the “implement” – such as when, for example, fixing a dozen smaller "annoying" bugs, which field users have tested and noted in a “scrum sprint” [Mart09, p. 31-32]. This may be true to the heart of the characterization of the use of Open Source Software in the enterprising environment, and the difference with commercial approaches: 80% of the features, often with an eye to commercial products as a model, manufactured, or even reverse-engineered technology [NSH07, S . 1082] are as large functional blocks, created quickly, while the remaining 20% are often not realized by the community, and in enterprise ventures, the case must be implemented manually, and with costs to the project.

This appears to be guided by the Pareto Principle [Hoff08 follow p. 267-269], and can therefore be effective, but it is precisely this 20% that makes up after-implementation costs and professional relevance that affects the decision to accept this tool. Features are perceived in many open-source communities as more important than usability [Muek05, p. 1-5].

This gap in open-source software is currently either by large system integrators [Luek04, p. 70] with commercial open-software vendors, or local and regional open-source IT providers filling in to supplement the lack of community features on a project. A return implementation in the community is technically feasible, but it depends on the client as to whether that policy is intended – a USP would be reluctant to leave it to the competition. In summary, one can say that 20% of missing features by manual work in terms of customization and for additional programming to be replaced, as compared to a commercially acquired software asset, or capital, through individuals work with Opex / Capex.

1.3 Usage scenarios - between office suites and ERP

Analysts [Opta09, p. 8-10] share the belief that open-source software is currently arranged into three domains: the set Microsoft environment for office automation; an ERP domain, identified by the large players like SAP and Oracle, as well as the area not covered by these two domains. This includes the necessary "balance" of users' problems - from network infrastructure issues, such as LAN, VPN and PBX via DMS / CMS themes, CRM, SCM, knowledge management, and BI and reporting, to mail and groupware applications and systems.

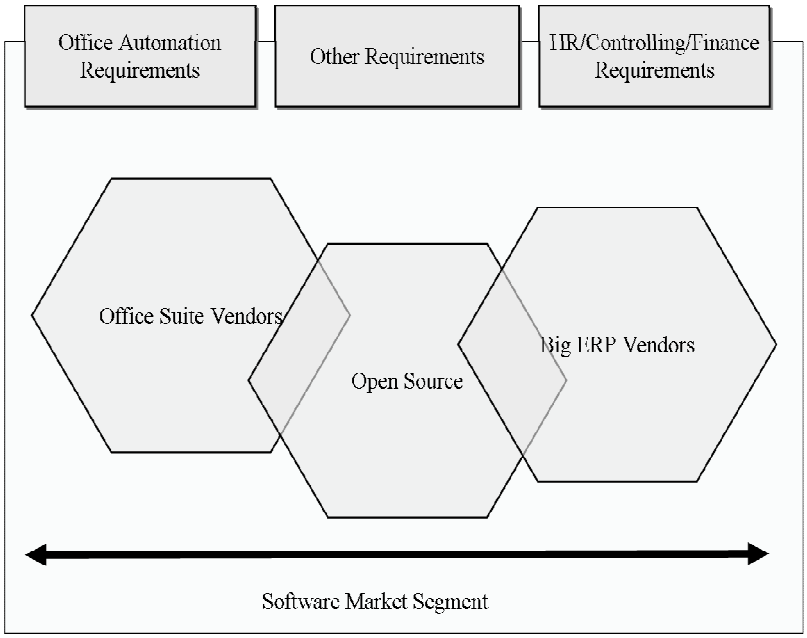

Fig. 2: Domain overview Open Source usage (Source: own composition)

Which parts of the organizational value chain of open source components will be supported is currently a much-debated issue [Gasi10]. It seems to have generated sales, marketing, and after-service concerns bordering on the domain of the customer relationships with very powerful solutions in the OS environment, especially in the commercial open-source area (Sugar) [Kueh09], as analysts warn against the use of the ERP environment, more so [Hoff09, Paragraph 1-3] meta-themes, such as reporting and BI [Geye09, p. 7-8]. In contrast, however, the external evaluation is often sufficient as functionally, as well as ticket-and helpdesk systems [Boet10]. In the area of network infrastructure, file and groupware infrastructure, as well as powerful and evaluated available alternatives [ITSY07] and also in the DMS/ECMS environment, are already very successful web platforms [Sale05, p. 98]; an idealized open-source environment of assembled ‘’best-of-breed’’ solutions is shown within Fig.1.

1.4 Organizational Requirements

It is precisely this substitution that is seen by many as a paradigm shift [Mout04], and whose impact on the IT organization’s program and project and service management issues call for an understanding of this dimension regarding its intention. The following questions must be satisfactorily answered here:

- Is there a desire to build internal knowledge: organizational structure and "insourcing" of IT knowledge? There should be no "pure" IT-Demand/Supply-Separation in a Web 2.0 IT organization.

- Risk assessment of OS projects and applications (OLTP: MySQL vs. Oracle) - Who is liable in case of failure?

- How do you guarantee the operation? What service levels are really required?

- Selection of open-source service: large multinational system integrator, with a global service, but also more overhead vs. local, non-international service; faster, more flexible, and less secure in its existence. Are these requirements fulfilled?

- Is everything documented?

Domain	Role Function	[FTE]	[MO]
Marketing/Sales/Web/CRM			
	Head	1	80
	Team-Member	2	70
		3	**150**
	3rd Party OS Developer*	8	50
		8	**400**
	Sum	./.	**550**
BI & Reporting			
	Head	1	80
	Team-Member	0	70
		1	**80**
	3rd Party OS Developer*	6	50
		6	**300**
	Sum	./.	**380**

Domain	Role Function	[FTE]	[MO]
Production			
	Head	1	80
	Team-Member	0	70
		1	**80**
	3rd Party OS D	9	50
		6	**450**
	Sum	./.	**530**
	Overall Sum		**1460**

* Available person days are dependent from different influecing factors: decreasing factor (DF) - margin of provider - increasing factor (IF) - nearshore/offshore price decrease possibility

FTE = Full Time Equivalents

MO = Money Unit

Fig. 3: Possible ressource allocation in a Open Source based IT division (Source: own composition)

There is certainly a threat here, because by nature, there is a 20% risk and, unfortunately, very high danger to the project management business. Extrapolating the documentation and dissemination of knowledge within organizations of knowledge providers, and organizational readiness to develop IT software knowledge internally can certainly be the most critical point in a completely separate IT-Demand/Supply-Organization where incidental expenses can certainly weigh against each other. This does not necessarily go hand in hand with an increase in R & D; the keyword “lean” here seems to be clearly marked. It should not necessarily be done with high wages, but virtual communities, collaboration, and instant messaging can also remotely be approached to support; but without any technical in-house knowledge, in this case, the software update needs to be handled manually.

For this to be established, organizational and operational structure changes are necessary. The existence of a new role in the operation, particularly within IT - the Technical Business Analyst -needs to be realized. This individual should carry an enrichment of existing IT skills in his or her profile, which may contribute to the successful deployment of OS software. Current open-source software projects are partly created on a high level of abstraction with multi-layered software architectures and possibly an MVC separation [Chle06, p. 16-167] of logic, and representation of data

storage; so bear in mind, particularly when customizing, that this can be undertaken by non-engineers.

Many open-source tools provide simple, text-based configuration options (e.g., config files, *.conf) [GuLa07, p. 216-217], which can also deal with technically skilled business consultants who can document and customize this. Alternatively this can also be developed, or acquired from his former role as a software developer, who, in addition to having good communication skills should also have good business skills. But focus is clearly on the technical skills, not on the business know-how. One could describe him as a "script kid" [Muel08, p. 461] or “script jockey”.Central criteria should be like the average IT organization with an eight-hour day, 365 days per year, with a portion of the working time made available to innovative support, new projects, and business processes that can ensure a stable operation.

1.4.1 New role profiles in the IT organization

The central key point is therefore within a central Open Source IT Organization which is dependent on the existing delivery of the model; i.e., in-house demand–supply model, either separately or in mixed forms, as well as on the relevance of system documentation and the roles and skill profiles of individual employees. In the very volatile and fluid open-source software (image), the future development of an OS project appears to have the following dimensions:

- The content or code creation,
- The roles of the owner, and
- Future roadmap concerns.

Precise knowledge of the established in-house versions, technical assumptions, and dependencies (e.g., glibc version, kernel) are therefore of great importance for a sustainable, but also medium-term risk reduction. Ideally, this role by the aforementioned Technical Business Analyst is required in a multiplier role in documenting the one who can guide the other, as well as in the project manager software assembly, regardless of whether in-house or physical delivery takes place in the IT supply. He or she is here for a centrally controlled agency, documented in accordance with its classification in the IT organization.

It could be systematic, but the role of the respective Technical Business Analyst, due to his/her special role and prominence in the organization, is a kind of center in a hub-and-spoke architecture [Dint08, p. 149-150], and is even a risk to the organization if he/she leaves due to illness or termination by the organization.

This leads to a crucial premise of the open-source delivery concept and that of its divisions and establishes the need for decision making and software documentation in particular because of the uncertainties listed in the community development of free software in itself, and the appointment arrangements. Attempts should be made with great urgency so that this resource or skill profile can be tied to the organization for a

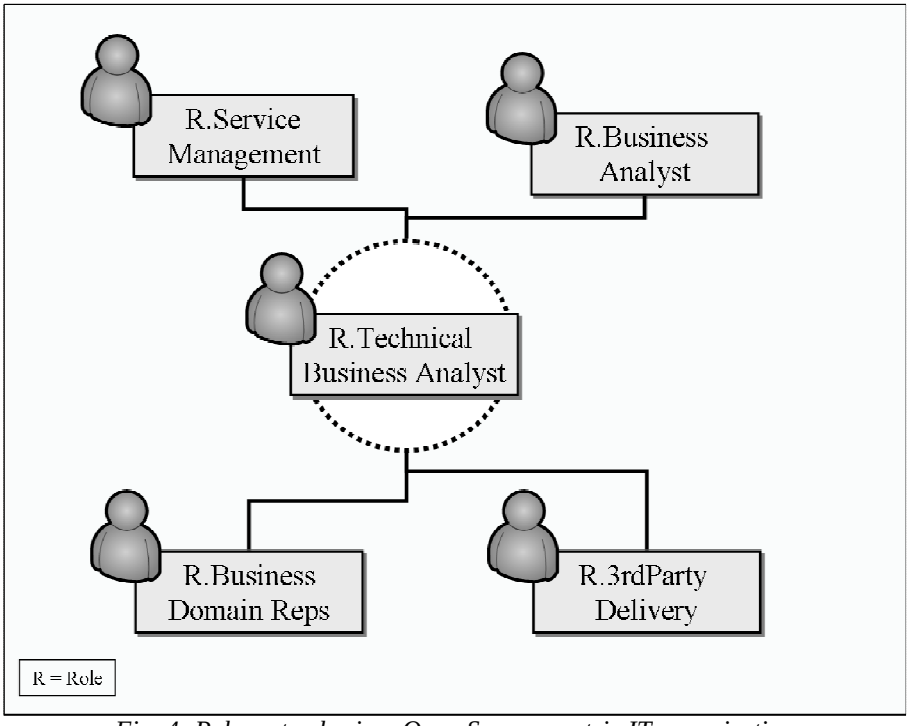

Fig. 4: Relevant roles in a Open Source centric IT organisation

medium- to long-term period since they can be represented as a central knowledge hub. This can be achieved through HR activities of a particularly positive reward (keyword:

bonus), but also allows for legal action where this has happened, especially with long notice periods and penalties within the legally permissible system (keyword: malus). If this solution of special conditions is not entirely possible, the periodic knowledge transfer methods, such as the 360-degree feedback [HoKo09, p. 201-204] or the structured interview/mentoring scheme is used to maintain the knowledge, so that even after departure of the resource, the knowledge remains in the organization.

1.5 Organizational structure of a centralized Open Source IT

If one's professional entities within the overall organization are accordingly divided, you can amass, by calculation, for the purposes of business domains [BLJM08, p. 116-119], the respective number of necessary Technical Business Analysts. The following organization chart (image: Organization) shows the structures of an OS-centric organization once shown as exemplary and sketchy.

Going from one end of the principal domains of an organization to the other, this

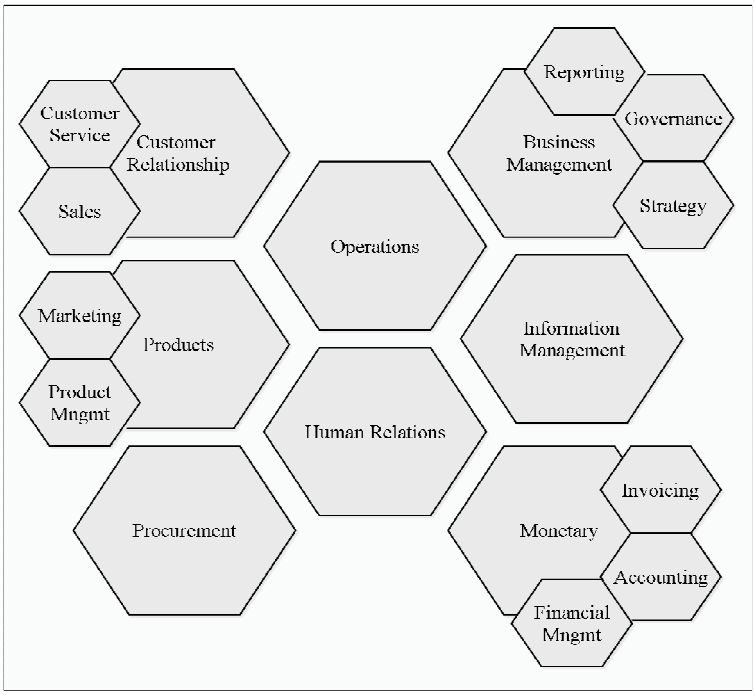

Fig. 5: Common business domains (Source: own composition)

roughly corresponds to the main elements of a value-chain diagram, as well as a clustered end-to-end process in itself; i.e., “marketing”> “sales”> “production”> “service”>. In the case of an IT demand/supply a separate list of the IT departments of a bigger SME (in the logistics sector) is represented by the following image:

- *Marketing/Sales/Web/CRM*: 2–4 FTE Technical Business Analysts serve 3–15 Open-Source Developers/Assemblers for CRM and Web-themes (e.g., SugarCRM, Drupal CMS)

- *BI & Reporting*: 1 FTE Technical Business Analyst serves 3–8 Open-Source Developers/Assemblers for Business Intelligence (BI) and reporting issues (e.g., Pentaho, Jasper Reports)

- *Production*: 2–3 FTE Technical Business Analysts supervise 3–12 Open-Source Developers/Assemblers for Operations issues (e.g., Openbravo, OpenERP)

There needs to be a regular review of the context of proven project management methods such as PMI. In addition, the Technical Business Analyst should study the development of each tool and look into the community well through study of mailing and release plans, if necessary, for future corporate requirements/change requests (CR). Change requests should be given early, and risks should be assessed for a reasonable risk minimization, as would Enterprise Architects [Hans09, to work S.185]. The application roadmapping [Fair08, P 3-5] is the more useful part of many IT organizations. A return to the community is within the meaning of the GPL Open Source. The concept certainly makes sense on the social/normative level, either by improving or worsening the internal tool but not successfully. Some companies see the assembled solution as a competitive advantage and just do not want external

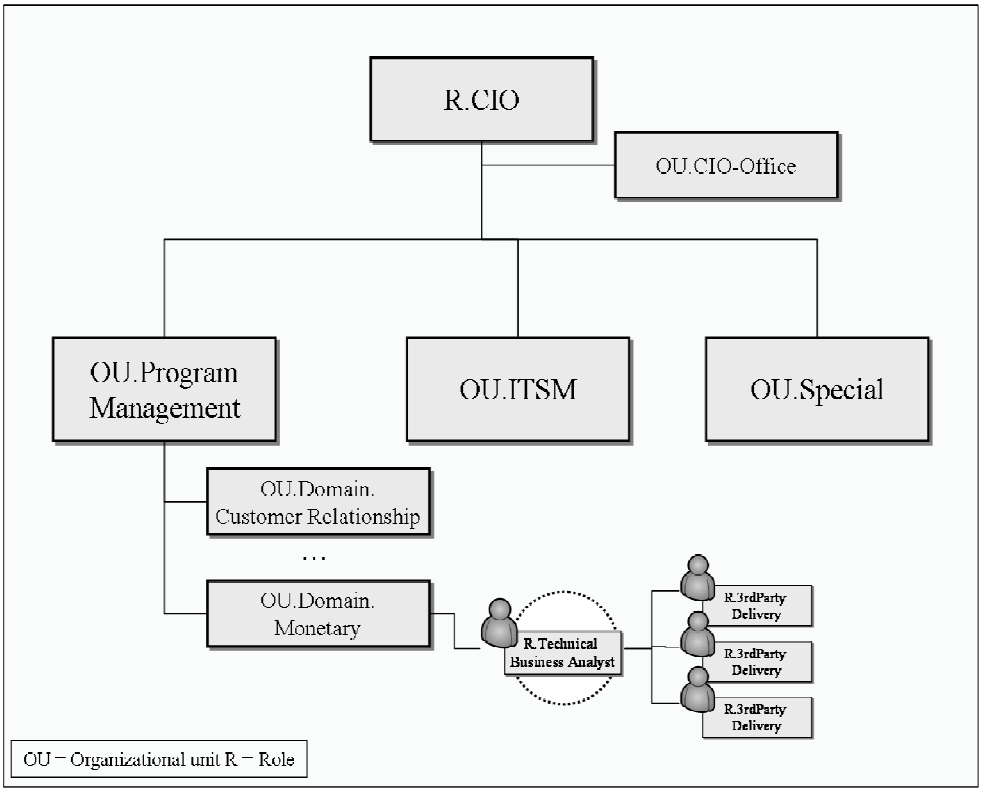

Fig. 6: Structure conception of an Open Source based IT division (Source: own composition)

publication. However, it seems questionable as to what extent a purely technical solution can be to gain a competitive advantage without taking the individual processes of the organization into account on this point. Regardless of the chosen delivery model, i.e., whether commercial COTS software, commercial, or pure open source, open-source software will be adopted and implemented. However, the risks of the business as a relatively pure project to assess are equal. Thus, it seems at least possible, even in practice, to be able to implement open-source software due to the advantages of lower costs, net of additional local adoption costs.

1.6 Political dimension and impact

The IT organization is set to be transformed into a lean, open-source market via the normative, political dimension due to the establishment of the necessary open source market through externally purchased service providers. This consists almost exclusively ofvery large and well-established international system integrators [Pers06, P7-9] such as IBM/HP, as well as very small, purely local SME development companies operating below 30 RTD [Krum05, p 48-50]. If you want Ad Hoc advantages to act quickly and cost effectively, it will make sense to use local SME-open-source development companies by taking the known risks, e.g., survival and development of security, into account. This must always be integrated into the IT strategy of the entire organization. If we choose this path, there is a casual logic to a strengthening in the regional labor market of which PR and communication aspects can easily be considered as side issues.

1.7 Summary and Outlook

In summary, it can be postulated that the pressure on IT organizations to deliver software projects more efficiently and cheaply has grown more than ever before because of the economic crisis; it was also because of the increasing consumerization of IT, including further increases in distribution/allocation of the global value chain.

Discussions about 20-30% of maintenance costs, especially in the ERP environment, also contribute to increasing alternatives for examination of CTS. Open-source software with an assumed 80/20-Pareto-share of software features instead of 20/80 shares on licensing costs (compared with COTS) make this branch of software development especially attractive in economically difficult times. Projects costs, including features

implementation and inherent risks that increase upon purchase, should not be overlooked as OPEX is still by far the largest share of the overall IT costs.

The organizational structure should adapt accordingly, in particular through the role of Technical Business Analyst as a central monitoring person who can control open-source assemblies. Advanced technological skills are thus vital and necessary. The most important function of this new key role is the participation of the involved software communities, as well as the documentation of individual projects, technologies, release levels, etc. His commitment has to be secured through possible appropriate and legal HR activities, whether through a penalty for a premature departure, or through an attractive salary. When these conditions are met accordingly, it seems possible to achieve a competitive advantage through an open-source software-centric IT organization, where costs and response times to business requirements are lowered, and where already existing features or realized Change Requests (CR) by the related open-source community are reused.

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