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EFFICIENCY OF VIRTUAL ORGANISATIONS --THE CASE OF AGI--

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Efficiency of Virtual Organisations--The Case of AGI—

“Computers everywhere, except in productivity statistics”

Robert Merton Solow

1. Abstract:

The emerge and increasing performance of new information and communication technologies (ICT) has enabled new organisational models of coordination and cooperation. Since the early nineties Virtual Organisations (VOs) as one of these new models have been in the focus of scientific research. Among the most frequently postulated characteristics and advantages of this new ICT-enabled organisational setting are:

- High flexibility in rapidly changing environments (like the internet world),
- customer-focussed business and service models,
- increased competitiveness.

These criteria seem to give evidence for VOs' potential to have better input/output ratios than other organisational arrangements. It is therefore an established assumption that VOs have the potential to be very efficient and effective. But these assumptions have hardly been challenged in literature.

This paper addresses the largely unexplored issue of efficiency of VOs as organisational setting and of ICT-use within them. The paper defines a theoretical framework for assessing efficiency. Starting from the established eclectic approach ITENOF [1, 2], elements from the standpoint of transaction costs, core competencies and from sociology are combined. Interdependences between use of ICT and organisational setting as major factors for efficiency are considered. The authors derive relevant criteria for both organisational setting and use of ICT while ICT potentials and its application receive a

special emphasis. Thus this paper widens the established framework ITENOF with strategic and efficiency-focused theories and extends the already existing aspects of ICT-use in the approach.

Due to the scientifically unexplored and highly complex problem of efficiency of VOs a qualitative research design is used. Therefore the paper closes by applying the approach to the case of AGI, one of the biggest privately held multimedia agencies in Germany. Based on the theoretical framework two projects within AGI are analysed in depth; one in a virtualised setting, the other one in an integrated organisational setting.

2. Introduction

Since the early nineties there have been myriads of publications on VOs. As new ICT emerges and its performance has been increasing for years, the possibility of overcoming time and space by using ICT has enabled new ways of cooperation [1-6]. Highly specialised units can easily collaborate according to their own core competencies and in order to fulfil a mission. Such an organisation, based on its members core competencies, can be considered as a “breed of best” [7]. In theory this “breed of best” organisation is highly flexible towards changing environments and customer needs as it can form and dissolve very easily and rapidly. But are these virtual structures as effective and efficient as these theoretical assumptions might make us believe? If so, companies probably would prefer to stay being members or parts of VOs. However recent trends, especially in the multimedia industry seem to indicate that VOs might just be a step on a growth track of organisations [8]. According to recent research [e.g. 9] there has been evidence that the

increase of projects triggers a tendency to move from virtualised, highly flexible and flat structures towards more static and hierarchical structures.

AGI-Think Tank Task Force Agency is a fast growing multimedia agency. Since its foundation in 1996 it has had triple digit growth rates (referring to employees, revenues and profits) and is therefore today among the top three privately held companies in this sector in Germany [10]. In its early days AGI started as part of a VO, today it is an integrated company that produces and delivers almost everything its clients want by themselves. But why have growth and success influenced AGI's structure? How is the organisational change to be evaluated from the standpoint of efficiency: What are criteria to evaluate efficiency of organisational settings and ICT use?

3. Purpose, Methodology and Structure of the Paper

3.1. Purpose

This investigation has been designed to extend some of the case studies conducted in the context of the NOF-project¹ and in order to give an insight into long term development of organisational changes. But why do VOs change, if they are as highly flexible, as customer focused and as competitive many researchers tend to make us believe? Companies with the objective to make profit should tend to redesign their organisational model in relation to efficiency, at least according to economic theory [e.g. 15]. But efficiency as one of the key objectives of economic activity seems to not have received the necessary attention in research. Therefore this paper addresses the largely unexplored issue of efficiency of VOs

¹ Since 1994 ICT-enabled new organisational settings have been in the focus of the Information Systems Department at the Hohenheim University. Starting with the project NOF (New Organisational Forms e. g.[1, 2, 9, 11-14]) various research programs, case studies and in depth analysis have contributed to a wide expertise of ICT-enabled organisational models.

as organisational setting and of ICT-use within it. Furthermore the paper brings a first insight to the long term development of VOs and to give some economically reasonable explanations for organisational changes within them.

3.2. Research Methodology

Today's research of VOs is characterised by a number of divergent approaches. Due to the lack of a common framework most of the available theoretical and empirical work cannot be compared and can for that reason hardly contribute to a general understanding of the phenomenon. It is therefore important to apply an established and empirically well assessed theoretical framework that can guide and structure this research [16]. This paper uses ITENOF - an eclectic framework for investigating **IT-enabled new organisational forms** [1, 11] and fills it with elements of transaction cost theory, core competence theory, competitiveness strategy and of sociology with elements of the resource-dependence-approach. Based on this eclectic background interdependences between use of ICT and organisational setting as major factors for efficiency are considered in detail. An explorative research design is used since there is hardly no expertise existing about the field of study addressed in this paper. It is applied in order to enlighten and structure the area of interest and to generate qualitative knowledge [16, 17].

This explorative and qualitative research design is used on the basis of case studies, since a better understanding of organisational behaviour can be made by intensive study of one or few cases of real employees interacting in real organisations before attempting to study a large number of subjects across controlled and standardized environments (e.g. [18]). The applied methods for the investigations underlying this paper are on one hand semi-

standardised interviews, on the other hand analysis of existing material like project reports, e-mails, product versions and of shared documents as well as server log-in files.

3.3. Structure of the Paper

The rest of the paper is organised as follows: Chapter four presents the theoretical background of this paper. Starting from a broad perspective on coordination, communication, cooperation and problem solving, we outline an eclectic framework and discuss its adoption to the assessment of efficiency. Thereafter we describe the role of ICT for cooperation and coordination, its potentials for benefits and approaches to determine efficient ICT-use. Chapter five describes the methodological approach and applies the model to the case of AGI. In closing we outline in chapter six our conclusions and implications on further research design.

4. Theoretical Background and Framework

4.1. Cooperation and Coordination

Cooperation can be understood as superordinate concept for different models of collaboration [19], e.g. intra-organisational and inter-organisational collaboration.

Cooperation are made, if they imply advantages that can't be achieved in other arrangements and if these possible advantages (like economies of scale and scope, access to critical resources, etc.) exceed the disadvantages (like cost for coordination, information and decision making, etc.).

Coordination refers to the alignment of single activities within a system/organisation based on division of labour towards a superior common objective [20]. So it is an elementary part

of cooperation. Coordination has two dimensions, a communication dimension and a decision dimension. Both underline the importance of information processing and therefore the potential of ICT to improve the quality and efficiency of coordination and consequently the efficiency of cooperation [21-23].

4.2. Approaching Efficiency

In order to evaluate efficiency of organisational settings and ICT used in this setting it is first of all necessary to introduce a common understanding of the notion of efficiency. We define efficiency as valued ratio between input and output whereas effectiveness can be defined as assessed success of political programs or degree of achieving objectives [24]. Measuring efficiency and effectiveness is a problematic objective. A pure focus on cost is not sufficient [24, 25], a process evaluation, where certain business processes are quantitatively registered, cannot be done ex-post and would be cost intensive. Besides that, several influencing and disturbing factors that lie in the analysed organisation itself might make it impossible to transfer the results of such a process analysis to another organisation. Thus a statement concerning the superiority of one organisational setting against the other from the standpoint of efficiency cannot be made. Therefore we analyse two similar projects in the same company: One in a virtualised organisational setting, the other one in a setting with rigid structures and internal hierarchies.

4.3. Understanding Virtual Organisations

The different levels and types of virtualisation can be explained by two directions of change: Governance and dispersion ([1, 2], see figure 1). Starting point is a process oriented organisation which is state of the art for most organisations today.

The trend “dispersion” refers to the internal level of organisations. The tendency to stronger teamwork in combination with dispersion of activities over several sites leads to “global teams” [26] as one direction of change in organisational settings.

The trend “governance” refers to the inter-organisational spread of tasks between units/companies towards a (external) network organisation. It puts emphasis on the question of power and dominance as well as the question of spreading tasks within a network, that formed itself according to its members’ core competencies.

Characterizations of VOs vary a lot and range from technology- focussed approaches (e.g. [27]) via approaches with institutional focus (e.g. [19]) to approaches emphasising basically the purpose or mission of VOs (e.g. [7]). Since all these approaches seem to have weaknesses in certain areas we use a synthetically assembled approach. We define Virtual Organisations as form of cooperation of legally independent companies, institutions and/or persons, that join forces on the basis of a common economic sense and/or objective in order to create a service and/or product. The units cooperating participate basically with their core competencies. Towards clients they appear as one holistic unit. Central management functions for design, guidance and development of the VO are generally not institutionalised, as appropriate ICT is used as substitute (see also [28, 29]). Thus VOs can be considered as problem- focussed and innovative networks.

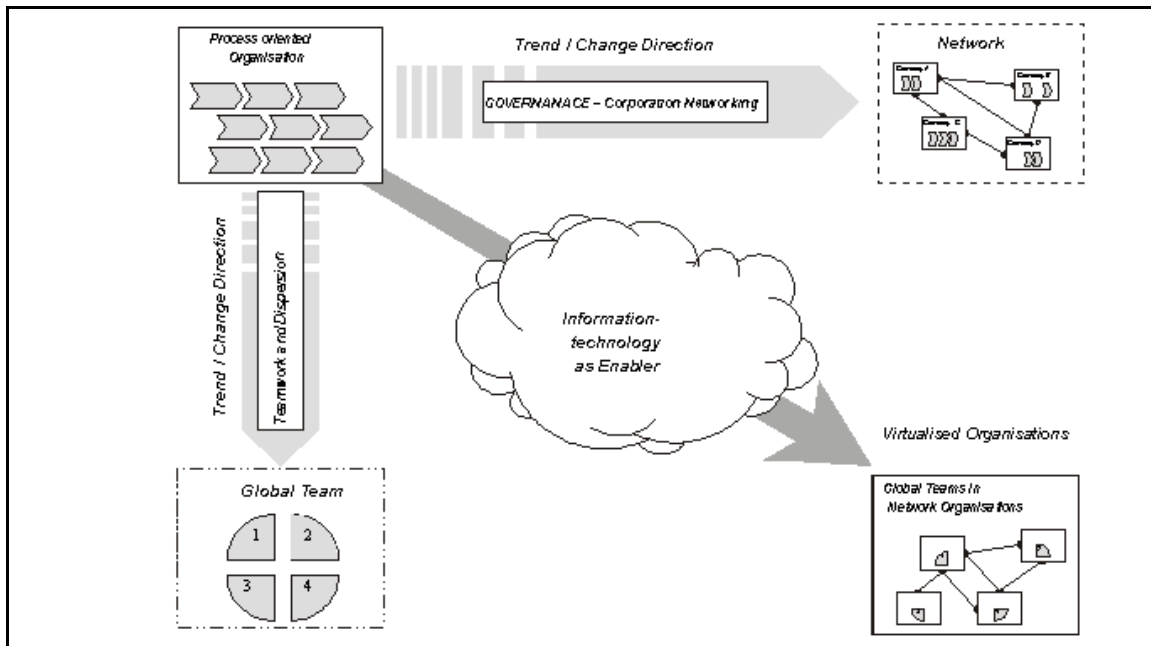


FIGURE 1: NEW ORGANISATIONAL FORMS THROUGH ICT (ADAPTED FORM[1, 2])

4.4. A Framework for Analysing VO's

In the following we introduce the eclectic framework ITENOF (**IT-Enabled New Organisational Forms**). We will describe the **Political Economy Approach** as an integrative umbrella. **Resource Dependence Approach**, **Core Competence Theory** and **Transaction Cost Theory** will be used as different yet complementary approaches to investigate IT-enabled organisational forms under the political economy (PE) umbrella [1]. **The Political Economy Approach** is based on the work of Zald and Buchanan [30, 31] and has been intended to analyse organisational changes. But already Zald [30] emphasises its ability to be used as an integrative theoretical frame for comparative investigations on organisations. The approach distinguishes (see Figure 2) between the focal organisation (internal political economy) and its environment (external political economy). As a consequence it is obvious, that the organisational form is considered as an open construct interacting with its environment. The organisational form itself is divided into economic and socio-political factors, each of them is again divided into structures and processes.

Thus the PE-approach improves interdisciplinary investigation and structures the analysis of research of organisations [32].

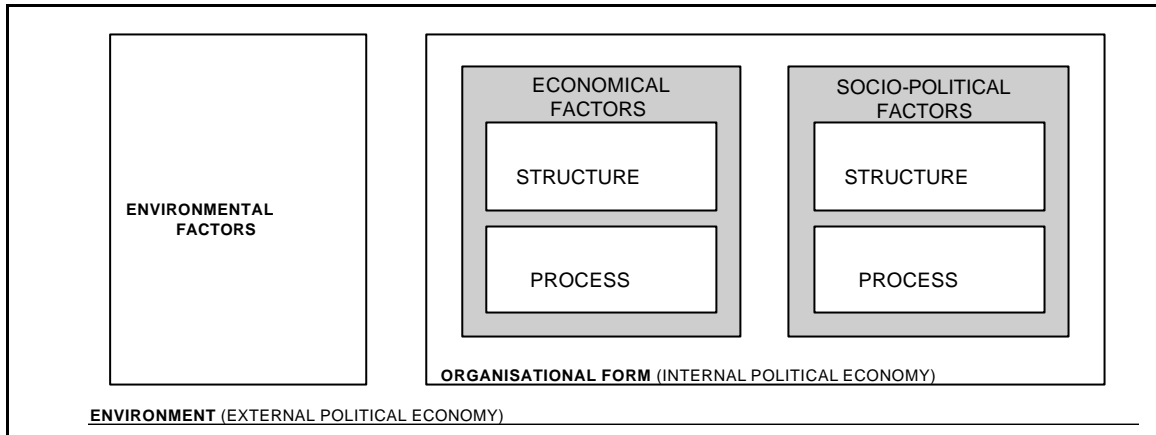


FIGURE 2: THE POLITICAL ECONOMY FRAMEWORK

The contribution of the PE framework to the present context consists of the structure it provides and its holistic approach: The PE approach has no theoretical content by itself.

However, it serves as an integrative framework for the eclectic approach used in ITENOF in general and in this paper in particular.

Transaction cost theory focuses on economic efficiency aspects and explains the development and selection of governance mechanisms. Transaction cost theory is based on a concept for economically evaluating transactions [15, 33]. It analyses single transactions, which are defined as transference of property rights. Transaction cost are incurred for information and communication during initiation, arrangement, realisation, control and adaptation of the interchange of services or goods [19]. The extent of transaction cost is defined by the characteristics of the service/product, the behaviour of the actors involved and the organisational setting in which the transaction takes place. Thus transaction cost can be considered as a scale for efficiency of organisational settings, efficiency can be stated at the transaction cost minimum [19, 34].

But limitations to the approach apply: Quantification of transaction cost is hardly possible,

besides its currency, adequacy and relevance has been challenged various times in academia [35, 36]. The contribution to this eclectic approach consists of the determination of economic factors in the internal political economy. Socio-political structure and environmental factors are also considered in parts and the impact of ICT on processes is also registered. Regardless its problems and deficiencies, especially concerning socio-political structures and processes and quantification of intangible assets, the heuristic contribution of the approach remains unchallenged.

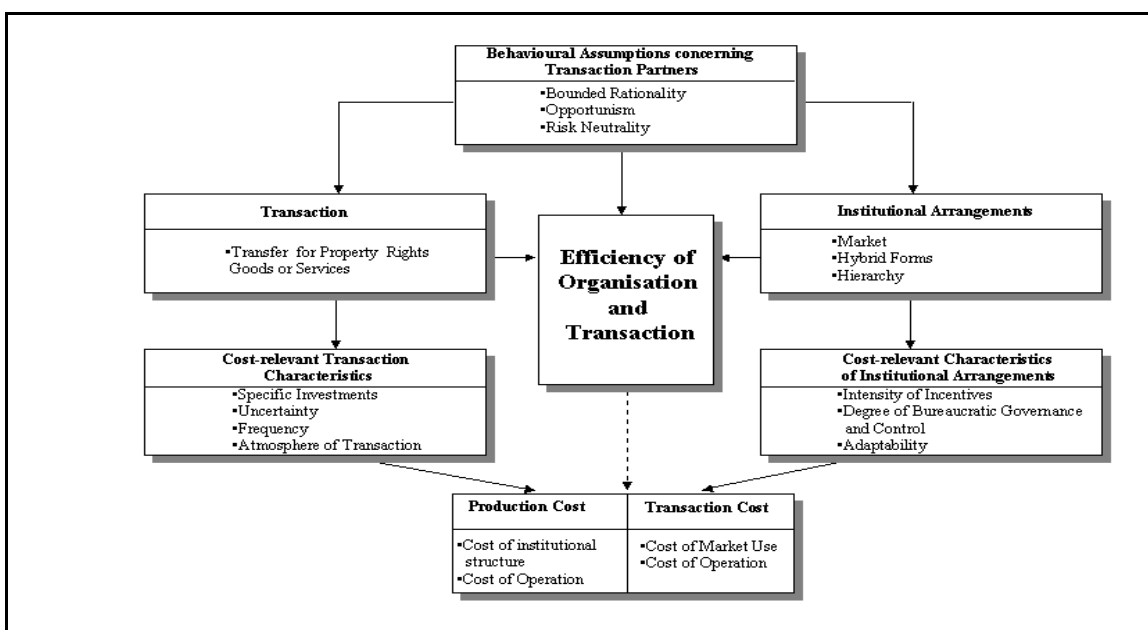


FIGURE 3: BASIC MODELL OF TRANSACTION COST THEORY (ADAPTED FROM [37])

Core Competence Theory outlines that success and failure of an organisation are necessarily based on its unique or specific potentials, assets or resources [38]. Core competencies can be identified as follows: They should provide access to a wide range of markets; core competencies should substantially contribute to the benefit of the product and should be visible for the client. Last, but not least a core competency should be hard to copy and should be kept out of competitors’ reach [39]. Core competencies need accompanying measures that provide economies of scope and scale, so-called complimentary competencies. Complimentary competencies are not as critical to success

as core competencies and therefore they don't necessarily have to be provided by the company itself. A strategy based on core and complimentary competencies implies very often different types of cooperation, as especially complimentary competencies can be provided very often by third parties in a much more cost efficient way [40]. Based on this it is possible to identify an ideal size for organisational settings [41]. As the approach has to be called very young it faces some teething problems. Improvable theoretic foundation, a lack of concrete criteria for identifying, classifying and maintaining relevant competencies and ambiguities concerning abstract terms have to be mentioned [11]. Nevertheless the approach puts emphasis on differences between organisations and derives organisational settings and strategies from capabilities and competencies. This new focus on structure and processes of socio-political factors as well as economical factors widens the framework and it is a valuable enrichment for the eclectic approach.

The **Resource-Dependence Theory** belongs to the inter-organisational theories that try to explain the development of inter-organisational relationships and to provide recommendations for their design. In contrast to economic approaches they do not assume that organisations necessarily try to maximize their profit. Instead, they believe that organisations strive to reduce the complexity resulting from resource dependence [1].

The idea from sociology, that social relationships are only built up and maintained, if they are considered as valuable or as a reward [42] can be adapted to inter-organisational relations. Thus it can be concluded, that the intensions of independent companies to ally or cooperate with partners are based on their assumption to perceive a benefit exceeding the cost of interaction. As social interactions (compared with economic interactions) do not have fixed prices and comprise only unspecific obligations, trust is a key issue for partners' motivation to cooperate. Another highly relevant aspect is the role of power in exchange-

relations. A disequilibrium of power results from the control over critical resources and organisations have a range of possibilities to deal with such dependencies. Resource-Dependence-Theory focuses on avoiding, exploiting and developing of such dependencies as driving forces for organisational evolution [43]. Even though this sociological approach faces problems with its hard to quantify variables, its premises and assumptions, it enlightens socio-political structures and processes within the framework. If social relations are the basis for organisational settings, the way they collaborate and how their work is coordinated can be explained by analysing subjects like power, exchange relations and dependencies and in consequence conclusions about the efficiency of organisational settings can be derived.

4.5. The Role of ICT

The despatch of the components of our framework has mentioned several times the special role of ICT for efficiency of organisational settings in general and for VOs in particular. Orlikowski [44] has pointed out that ICT, decision makers and organisational context are interdependently influencing each other and that adoption of technology is a key issue to ICT-success and thus to the assessment of ICT-potentials in general. We acknowledge this by considering explicitly the industry/domain the analysed organisations come from. The multimedia branch is characterised by fast adoption of technology and very open-mindedness for new technologies in general. Therefore we do not transfer the results of this investigation to other organisations or industries as is.

Unchallenged remains that corporate strategy and ICT-systems are influencing each other. In academia and practice there are several evidences that information systems can enable specific corporate strategies and that corporate strategies might align information systems (e.g. [3, 45, 46]). Especially in the context of VOs it seems to be obvious that ICT lie at the

heart of the whole organisational setting. One approach to categorize ICT refers to ICTs' potential to overcome time and space [47]. Even though these approaches seem to outline potential productivity gains if ICT is used, the correlation between ICT-investments and productivity is hard to prove. At macro economical level this positive correlation between ICT-investment and economic success of organisations cannot be stated.

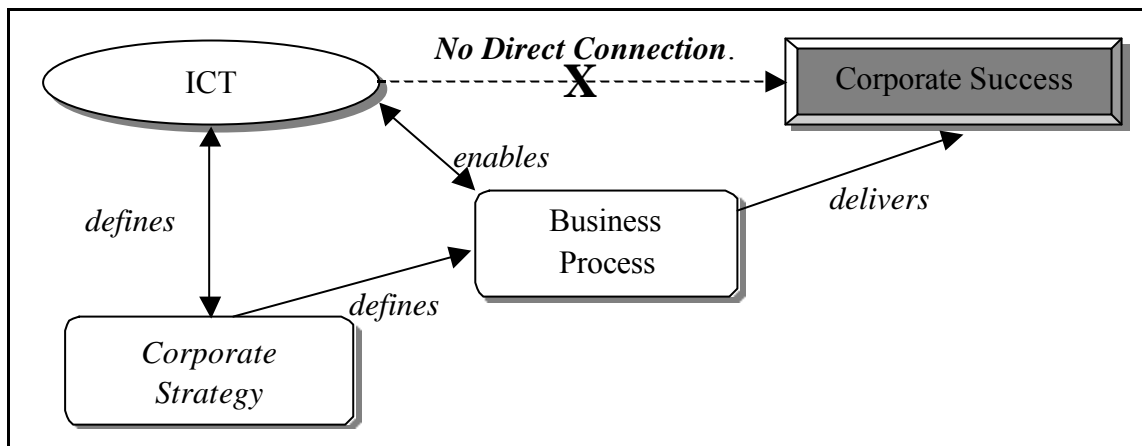


FIGURE 4: RELATIONSHIP BETWEEN ICT AND CORPORATE SUCCESS (ADOPTED FROM [19])

This problem is a.k.a. “Productivity Paradox of ICT” [48]. Nevertheless this problem has to be analysed on a more concrete level than just from the macro economical point of view. If mere ICT-use itself does not imply potential productivity increases, then the way it is used, applied, run and administrated has also to be taken into consideration. The alignment of ICT, corporate strategy and business processes is crucial to efficiency and effectiveness of ICT and thus to the whole organisational setting itself (see Figure 4; [19]).

In order to describe potential benefits of ICT (if applied acknowledging its interdependences with business processes and corporate strategies, see Figure 4), the following categories can be used ([49, 50]; see Table 1):

ICT-POTENTIAL	ORGANISATIONAL INFLUENCE/BENEFIT
AUTOMATIC	REDUCTION OF MANUAL ACTIONS
INFORMATIVE	AVAILABILITY OF HUGE QUANTITIES OF DETAILED INFORMATION
SEQUENTIAL	NATURAL ORDER OF ACTIVITIES OR EVEN PARALLELING PROCESSES
PRECISELY/TARGETTED	CONTINUOUS PROCESS MONITORING
ANALYTICAL	COMPLEX ANALYSIS OF EXISTING INFORMATION
INTEGRATIVE	POOLING OF HETEROGENEOUS ACTIVITIES
KNOWLEDGE CREATING	CREATION OF KNOWLEDGE AND EXPERTISE
SIMPLIFYING	REMOVING OF INTERMEDIARIES AND BUSINESS PROCESS REDESIGN
GEOGRAPHICAL	OVERCOMING SPACE

TABLE 1: ICT-POTENTIALS AND THEIR ORGANISATIONAL IMPLICATIONS

Unfortunately these categories of ICT-potentials cannot help to decide which ICT in detail shall be used in order to be efficient. Therefore the question is: which media is for which situation or task more promising. This question lies at the heart of Media Synchronicity Theory [51-53]. A basic conclusion of this theory is that almost only the specifications for the communication process may be used to rate the appropriateness of media used, regardless of the task that is being worked on. Communication processes are analysed on a fundamental level and categorised as either “Conveyance“- or “Convergence“- processes. Conveyance-processes aim at a fast exchange of easy to process information in order to allow individual interpretation of these information and thus their application for supporting individual’s task processing. Convergence-processes aim at a shared, common understanding of the information between communication partners.

According to this communication process classification the appropriateness of media for communication situations can be made [52, 53] and in consequence conclusions about efficiency of ICT-use and efficiency of organisational setting can be derived. The Media Synchronicity Theory has been heavily discussed in research and has also been vitiated in parts. Other factors for the appropriateness of media (e.g. the cooperation partners

themselves, their ideas about the adequacy of media used, etc.; [11]) are not considered and the empirical foundation of the theory should be broader. Nevertheless its heuristic contribution to evaluate media use remains unchallenged and it delivers a helpful guidance for assessing ICT-use in practice.

Application to the case studies: The framework and the theories described are used to analyse qualitatively the different organisational settings and the different ICT-use. They are also applied to analyse if there might be a trend with an efficiency-based explanation underlying the organisational change.

5. Cases – The Application of the Model

5.1. The Multimedia Industry

In the multimedia industry we find a huge variety of companies of different backgrounds like e.g. telecommunications, media, entertainment, tourism and online retail. Companies in the multimedia area deal with a wide range of subjects: from online marketing, e-commerce, entertainment to business-tv and strategic consulting [54]. The industry has experienced an incredible growth throughout the last couple of years with triple digit growth rates. But with the stock market decline starting mid 2000 and thus the decline in demand and problems in refinancing, many companies are suffering their first serious crisis. Basic economic rules, that seemed to be somewhat meaningless to some of these stars of the New Economy are demanding now their tribute; above all the need for efficiency in the way business is conducted.

The two projects of AGI described in the following were both realized before the shakeout in the stock market and in consequence the analysis of their efficiency gets even more interesting.

Both projects are portrayed chronologically. Starting with some information about the company at that time, the project is described. The design for the project description is adapted from a stage model for specifying the life-cycle of a project by Schwarzer [55] and consists of the phases Orientation, Contact, Problem Solving, Coordination and Realisation. After the description of the projects the efficiency is compared and assessed.

5.2. The project IHK

The company structure

AGI business media productions GmbH was founded by three students in may 1996 in Stuttgart, Germany. The business idea was the production and development of internet applications and concepts.

The project IHK took place in march 1997. Due to the good business situation at that time, four freelancers were working with the three founders and a strategic partnership with an advertising agency was maintained. Since most contracts were made on the basis of recommendations this strategic partnership was considered as door opener for further deals. Conventional marketing concepts turned out to be inefficient. AGI defined itself as high quality offeror whose strategy was to avoid price-competition by offering unique and high standard solutions to its clients. As it still was a small company those days, the company organisation structure was quite simple: All three founders were managing directors and had equal rights concerning issuing instructions towards the freelancers (“all decided everything and almost always together”); a task sharing in the sense of defined responsibilities did not exist but some rough areas of activity of each founder could be

identified. The area “Text and Creativity” was occupied by two founders while “Technical Implementation” was run by the third managing director. The revenue of fiscal year 1997 was about 205.000 €. Cooperation between the managing directors themselves and with the freelancer was almost only made through personal conversation.

The Project

The Chamber of Commerce Stuttgart (IHK) initiated in early 1997 invited tenders for its internet presence. It should provide cheap and up-to-date means for publishing information for interested third parties as well as members of the chamber. It was intended to reduce the quantity of telephone inquiries that reached the chamber’s administration, a relief of work exceeding massively the work connected with the administration of a new web-site. Also part of the package was to take care of hosting the new web-site.

The order for the project “IHK” was given to AGI’s strategic partner, the advertising company.

The Orientation Phase: The features of the product were specified in detail by the ordering party IHK. Good usability, clear structuring and a professional roll out of the web-site were crucial to IHK. The ordering party planned to deal with only one contact partner at the advertising agency with the purpose of easier project controlling and delivery of necessary information and specifications. As the technical implementation exceeded the advertising agency’s capabilities a cooperation with AGI had to be settled. Besides that a service provider for hosting the web-site as well as a specialist for databases had to be integrated since AGI didn’t have enough competencies in that specific area at that time.

The Contact and Problem Solving Phase: The advertising agency had been depending on the competency of partners for internet-relied projects before. After some successful projects together with AGI both agreed to found a strategic partnership. According to the

type of contract and this strategic partnership the cooperation between the advertising agency and AGI was a logical conclusion. AGI had already existing contacts to and good experiences with a service provider who could deliver the demanded hosting capacities at reasonable prices. This service provider was contacted by e-mail and invited to join a cooperation for this contract. For the database solution none of the existing partners had the necessary know how. The search for an expert was finished with a recommendation of the service provider for a freelancer. This database developer was contracted by e-mail for this project.

In order to substantiate all features in detail with the client two meetings with AGI, the advertising agency and the IHK were held. AGI tended to deliver as many services as possible by themselves in order to avoid quality problems or dependencies. If a service couldn't be delivered by themselves, the decision makers at AGI tried to fall back on partners they already knew.

The Coordination and Realisation Phase: Since the technical features required an intense contact of IHK with AGI, IHK's former idea to deal only with one person at the advertising agency got obsolete. After the two kick-off sessions with IHK, AGI and the advertising agency the communication between the three was made by fax, phone and e-mail among all three parties involved, whereby at the beginning the focus was lying on the phone. As AGI tended to work more effective if suggestions and contracts were made by e-mail, a shift in the means of communications could be stated. E-mails were also used to document the progress of tasks and/or suggestions, in a way as a type of tool for supporting workflows. The fastest reactions could be delivered if only one means of communication was used. Also very useful for the coordination between AGI, the client and the advertising

agency was the idea to put the actual status of the product on a web-server. Thus the client as well as the partners could see it through the internet at any time.

Communication with the database developer was made exclusively by e-mail and the status of the database was exchanged by e-mail as well. Suggestions and product adoptions were made iteratively. After having finished the product and after internal quality checks the final product was after all accepted formally by the advertising agency and the client IHK. This final product was delivered to the service provider who publicised it in the internet and hosted it. Thus the project was finished successfully and on time in may 1997. Figure 5 shows the service and coordination flows during the IHK-project.

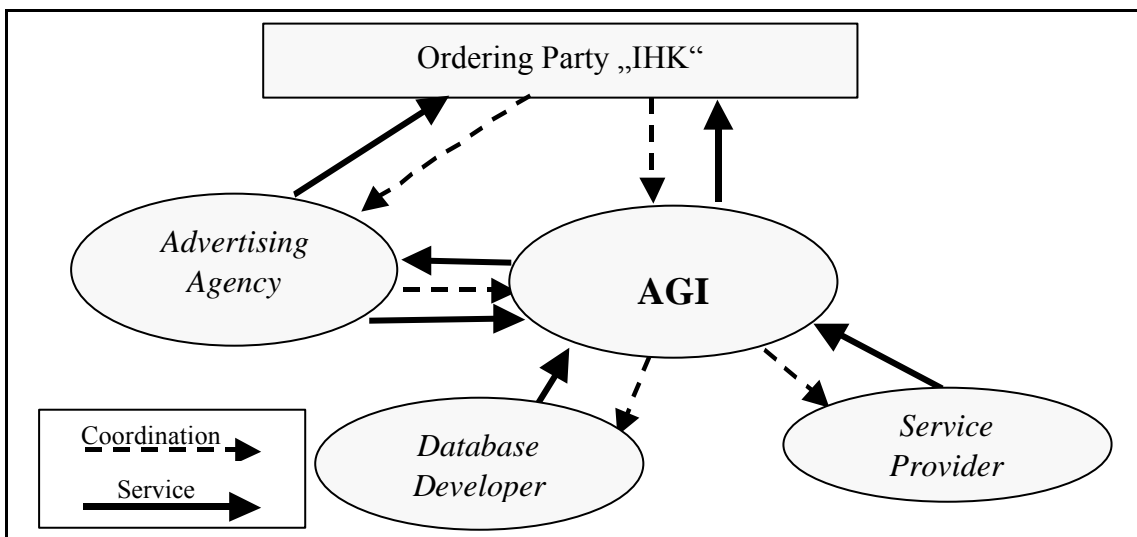


FIGURE 5: COOPERATION NETWORK FOR SERVICE DELIVERY DURING THE “IHK” -PROJECT.

5.3. The Project Wilhelma

The company structure

In October 2000 AGI (since September 2000 called *AGI Think Tank Task Force Agency*) had five managing directors, about 60 permanent employees and up to 25 free-lancers.

Since May 2000 another site in Berlin had been opened additionally to the headquarter in Stuttgart. Company revenues in 2000 exceeded 4 million €. Due to the quantity of projects and employees the company could not be managed the way it was run in 1997. Fields of

functions and duties had to be determined precisely. The company was organised in five divisions: Finance and Human Resources, Operative Business and Organisation, Creativity, Technology and finally Business Development. Each division lied in the responsibility of one managing director. Another hierarchical level could be identified, the level of project managers. They had the responsibility for all employees working in a project for duration of this very project. The rest of the time each employee was assigned to one of the five divisions and in consequence assigned to one of the managing directors. The development of the company had proven that most of the projects needed similar support in certain areas, that could be called support of general nature. Hence units for e.g. Service, Information Management, Public Relations etc. were established. Each staff was assigned again to one of the managing directors.

The Project

The zoological garden “Wilhelma” in Stuttgart contacted AGI after a recommendation of another public organisation in order to have its internet presence redesigned. The objective was to have an independent and competitive web-site. Information for clients and interested people as well as an attractive design in combination with good usability were some of the clients requirements. The benefit of the web-site for the administration should be a massive reduction of inquiries, a relief exceeding the work of administrating the new web-site.

The Orientation Phase: The ordering party formulated the requirements for the website explicitly. A clear structure, system independence, live streaming media, and a professional roll out were some of the criteria demanded by the Wilhelma staff. Another specificity concerned the very detailed requirements for the content of the web-site since the public zoological garden had to meet public education requirements defined by other

state agencies. Unfortunately Wilhelma's budget was very tight in consequence not all requirements could be implemented. In order to get to an agreement AGI developed together with the Wilhelma staff a booklet containing a draft concept for the website and the content, all before signing the order. This document was created with Visio and stored at AGI's web-server. In consequence all people involved (at that moment the project manager and a graphic designer) could access and edit the document. Besides that the coordination between the ordering party and AGI was realized by phone, by e-mail and personally/face-to-face. The Project manager and the graphic designer very often worked together at the same time on the same version of the story book from different places and were talking to each other on the phone about their work/changes. Finally the story book got approved and AGI received the order on the basis of this draft.

The **Contact and Problem Solving Phase**: Starting from the approved draft the following areas of work could be identified: Project management and maintenance, extension and control of the story book, development of a content management system, graphics, and HTML-programming. Since all these kind of tasks were part of AGI's service portfolio a cooperation with external partners was obsolete. It was AGI's philosophy to avoid external partners as long as the job could be done with own resources. Reasons here for were a common objectives, problem understanding and a common identity within AGI as well as compatibility of hard- and software used and trust and experience in cooperating with the AGI-internal partners involved.

The **Coordination and Realisation Phase**: For defining all detailed specifications of the product the AGI staff exchanged views several times. Tasks were defined by the project manager after having arranged it with the respective person first. The coordination was made basically through the project manager and the other members of the team, most of

the time via face-to-face conversation since all parties within AGI had a common office. When direct face-to-face communication wasn't possible, phone, e-mail and ftp were used. Very often members of the team sat together in front of the same computer to discuss a new idea; central coordination tool was the storybook which was also used to communicate new requirements. Basis for the coordination and thus cooperation was most of the time input from the client which was communicated via the project manager, either through changes in the story book or through face-to-face communication. Towards the client only the project manager appeared as AGI's "single face to the customer". Communication with the client took place by phone, e-mail and most of all conventional mail or fax, since the client didn't dispose over adequate ICT for other ways of communication. The retarding element in this project was the client. Nevertheless the client had the possibility to see all the time the actual product status through the web since AGI permitted its client access to its web-server. But the client had no editing possibilities, it was a "read-only" access. After finishing the product and after intense testing of the final version the product it was handed over to the client and the project was finished successfully² in September 2000. Figure 6 shows the service and coordination flows during the project.

² The web-site of „Wilhelma“ (www.wilhelma.de) won the silver medal at the Worldmediafestival 2001; see also <http://www.agi.de/preise/preise.php?lang=en>.

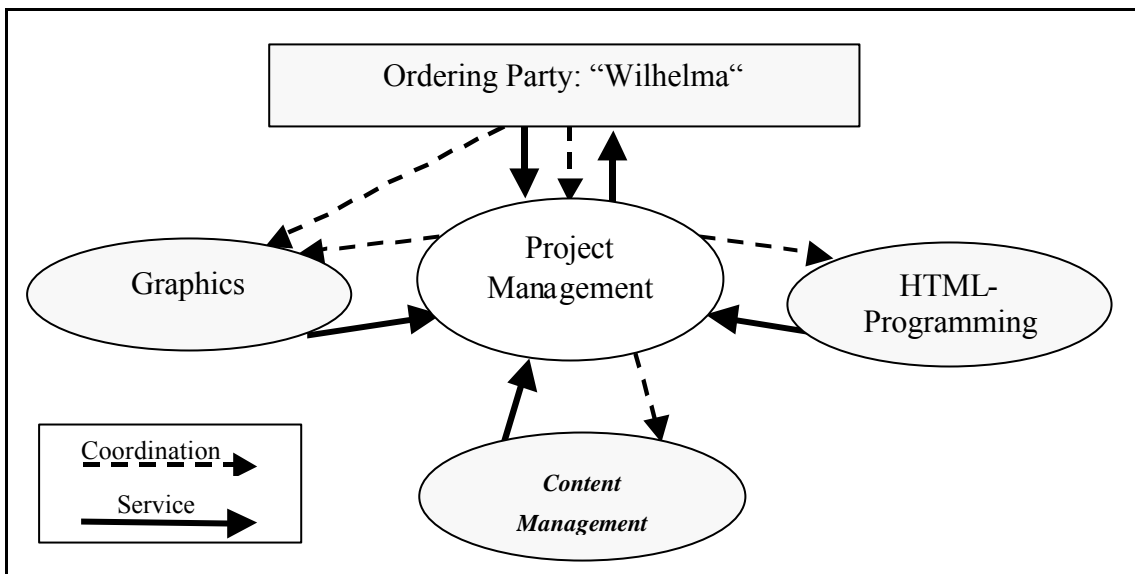


FIGURE 6: COOPERATION NETWORK FOR SERVICE DELIVERY DURING THE “WILHELMA”-PROJECT.

5.4. Classification of the two projects

According to the definition of VOs introduced before the organisational settings AGI worked in will be classified. In the IHK-project AGI worked in cooperation with other legally independent companies. A common economic sense can be identified between the advertising agency and AGI, the cooperation with the database specialist had to develop this over time. All participants brought in their core competencies but towards the client they didn't appear as one company. Merely the cooperation of AGI with the service-provider and the database developer was “invisible” for the client. This criterion for VOs is fulfilled to some extent. Central management functions for design and guidance were substituted widely by appropriate ICT, but not completely (e.g. the central coordination function was settled close to AGI, etc.). Recapitulating it can be concluded, that with a non-rigid interpretation of the VO-definition the organisational setting during the IHK-project can be considered as a VO.

The project Wilhelma was undertaken completely by AGI and almost all people involved were located at the same site. Thus the organisational setting has to be called integrated.

Figure 7 visualises the position of the two projects in the matrix of new organisational forms.

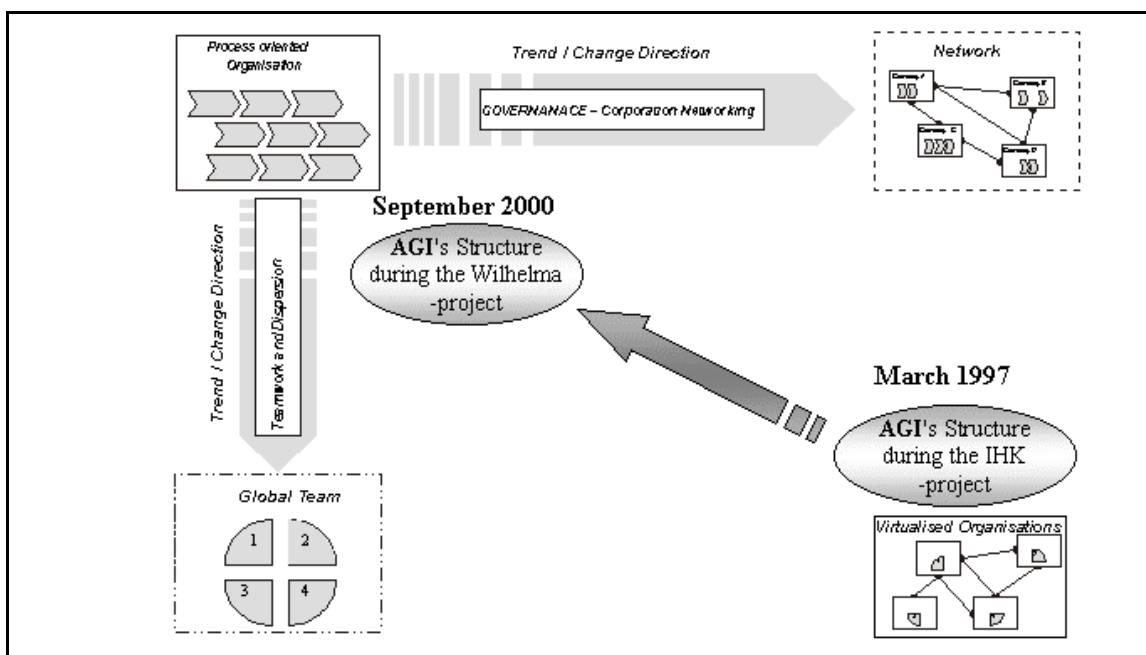


FIGURE 7: CLASSIFICATION OF THE PROJECT IN THE MODEL OF ICT-ENABLED NEW ORGANISATIONAL FORMS

5.5. Comparison of efficiency

Efficiency of Media used according to Media Synchronicity Theory: *Conveyance*

processes emphasise the fast interchange of information. Thus the partners involved in this communication process shall be enabled to interpret the individual fulfilment of tasks [53].

Conveyance processes require high levels of persistence as well as high rehearsability of the communicated content from the media used. In the IHK-project e.g. orders and statements from the client to AGI or statements from AGI to the database expert can be considered as conveyance processes. During the Wilhelma-project especially in-house orders and guidelines had to be considered as conveyance processes.

Convergence processes aim at the fast common interpretation of circumstances and they should provide fast feedback possibilities, high rehearsability and reprocessability of the communicated content ([53]). Convergence processes appeared in both projects during the

negotiation with the client at the beginning of the project and during reconciliation concerning the product status during the project.

Comparing the results of Media Synchronicity Theory for both projects it stands out that in the Wilhelma-project a storybook was used for internal convergence processes and that the quantity of face-to-face contact during the Wilhelma-project was also significantly higher.

The persons involved considered the media used in the Wilhelma-project as more effective, especially the use of the storybook was regarded as a great relief for communication processes. The face-to-face communication seemed to have positive motivational impacts exceeding possible negative side effects. Thus it can be concluded that the media used in both projects were similar efficient with the two described exceptions and therefore slight advantages for the ICT/media used in the Wilhelma-project.

Analysis of ICT-use according to Davenports ICT-potentials: Realised ICT-potentials can lead to efficiency as shown in chapter 4.5. Table two shows the application of Davenport's model to the cases.

ICT-Potential	Organisational Influence/Benefit	IHK- vsWilhelma -Project	Advantage for Project
Automatic	Reduction of manual actions	Low importance as digital products are produced. Use of HTML-Editors and other software tools, slightly more efficient tools used in the Wilhelma-project due to technical progress of used tools	Wilhelma
Informative	Availability of huge quantities of detailed information	Significantly more data were available during the Wilhelma-project since there were documented experiences from prior similar projects	Wilhelma
Sequential	Natural order of activities or even paralleling processes	Optimisation of processes was intended by using e-mails in order to structure workflows during the IHK-project but in the Wilhelma-project more standardised workflows were used and they were applied parallel wherever possible	Wilhelma
Precisely/targetted	Continuous process monitoring	The use of the storybook and special project controlling tools in the Wilhelma-project have no equivalent in the IHK-project.	Wilhelma
Analytical	Complex analysis of existing information	Analysis tools for network and server usage and controlling tools had no equivalent in the IHK-project	Wilhelma
Integrative	Pooling of heterogeneous activities	Of low relevance in both projects/handled similar in both projects	---
Knowledge creating	Creation of knowledge and expertise	Digital FAQ-lists, templates, and existing routines had hardly no equivalent in the IHK-project	Wilhelma
Simplifying	Removing of intermediaries and business process redesign	No relevance since there were no intermediaries in the Wilhelma-project	---
Geographical	Overcoming space	Of low relevance in both projects/handled similar in both projects	---

TABLE 2: APPLICATION OF ICT-POTENTIALS IN THE PROJECTS

Recapitulating it can be stated that according to almost all ICT-potentials analysed the Wilhelma-project had significant advantages. In consequence the ICT-use in the Wilhelma project has delivered more benefit.

Application of the eclectic framework:

After having qualitatively analysed the choice of media and the analysis of ICT according to their potential benefit we apply the eclectic framework for identifying the relative advantages (from the standpoint of efficiency) of the organisational arrangement.

Analysis based on **Transaction Cost Theory**: In the Wilhelma-project there was no need for cooperation with external partners thus no searching, negotiation or contracting cost occurred. Existing routines, templates, and even standardised workflows also reduced transaction cost compared with the IHK-project. Intense interactions were held within the AGI-organisation, thus trust or in general a positive transaction atmosphere could be identified. In conclusion the analysis shows significant advantages in all project phases for the Wilhelma-project.

Core Competence Theory leads to an almost indifferent result. During the Wilhelma-project core competencies of AGI and tasks were identical. Concept development, designing, management know how and roll-out experiences as well as technical expertise were required and part of AGI's core competencies while in the IHK-project some tasks AGI had to deliver were not part of their competence portfolio and therefore had to be fulfilled by partners. So it was in this case reasonable to cooperate with partners. Hence we can say that at the relevant time, each strategy/organisational setting was efficient as it stuck to AGI's core competencies.

Based on the **Resource Dependence Approach** advantages for the Wilhelma-project can be identified. A close look at possible dependencies shows the advantages of the integrated organisational setting. In the IHK-project AGI was as a new company dependent on the advertising agency for acquiring contracts. Since AGI was only co-leader in this project there was also the danger of losing control over the development of the project and to get into an even stronger dependency of external partners. AGI's corporate identity and philosophy were built on trust among each other and that's why there existed strong collegiality among all employees. This intense feeling of identity and trust couldn't be

identified during the cooperation in the IHK-project with external partners like the service provider or the database developer.

6. Concluding Remarks and Outlook for Further Research

Taking all different perspectives and approaches into account a surprisingly clear result can be formulated: The static comparison of the two projects shows according to almost all considered criteria better results for the project in an integrated organisational setting. But what happened to the possible advantages of VOs postulated at the beginning of this article? This can be answered by taking a dynamic perspective on AGI, a perspective that considers relevant context criteria for the organisational setting at the respective time. As a small and young company AGI had neither many references nor the capacity to deal with a contract of the size the two projects had. Many necessary capabilities didn't exist and the lack of experiences with such projects made coordination and cooperation somewhat laborious. Therefore it can be stated that for the IHK-project the virtualised setting was the efficient solution.

With the capacities and abilities AGI had in 2000 they really had a choice between being part of a Virtual Organisation or doing all on their own. Here it gets clear, that for the Wilhelma-project the integrated setting was the only efficient solution. Hence we can identify a growth track for AGI, that can be supported from the standpoint of efficiency and effectiveness. The

Virtual Organisation was merely a step during AGI's development; reasonable and right at the respective time, unnecessary or inefficient as soon as the circumstances changed substantially.

But where is the limit for growth or when do internalisation disadvantages exceed advantages of growth? The answer to this can only be given on the basis of efficiency: As long as there are incentives to grow, AGI will keep on growing. When other competitors, maybe small companies that unite to VOs, are able to do things better, AGI might have passed the critical size for being efficient as an integrated company.

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