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New Directions in Technology Management: Changing Collaboration Between Government, Industry and University

The 2004 Conference will discuss the most important issues facing policy makers, industry managers and the academic community. Attendees will focus on the new directions in technology management and their influence on innovation and the creation of economic growth and prosperity. Special attention will be given to the necessary mechanisms of knowledge generation, science and technology policy, and the collaboration required to accomplish national and organizational objectives. Best practices in technology development and utilization will be presented. The academic institutions role in preparing the needed human resources for the technological environment of the 21st century will also be addressed.

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Aligning Business- and Resource-Strategy: An Interdisciplinary Forum for Investments

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Abstract: In the past, investments in technology were driven by technicians or an organisation invested in technology simply because its competitors did so. Nowadays, the investments have to be based on business cases. Therefore the technology must be in function of the grand strategy of the organisation. We have approached this subject by studying the (western) Art of War, because of the extreme circumstances military are confronted with. Our definition of strategy (translated for civilian organisations) is the art to concentrate (combine) all resources of an organisation or network of organisations, to achieve its main goals.

The direct alignment on the grand strategy however, works only for the business units, which are part of the core business of the organisation. Corporate business units support the core business. In this way, each specific resource (technology) has to develop its own resource strategy, but in function of the core business, mostly via service level agreements. If the corporate strategy is to be open for collaboration (high process integration) with other organisations, then e.g. the ICT-strategy may not be of a closed information system without any standard interfaces.

Through a system of an interdisciplinary forum (with business and technology people), an organisation can prioritise the investments in technology. It has to be interdisciplinary because a change in the “organisation of resources” may affect the efficiency or effectiveness of the entire organisation or a part of it.

Keywords: Business strategy, Resources strategy, holistic, alignment, Interdisciplinary forum, investment, technology.
Introduction

In the past, technicians drove the technology-investments or a company invested in technology, as Information and Communication Technology (ICT) because its competitors did so. Nowadays, the investments are mostly based on business cases. However, not all technology-investments can be directly linked to business cases. Almost by definition, this is the case of the ICT-infrastructure. The problem is that the ICT-infrastructure is quite a large amount of the ICT-budget. Moreover ICT becomes a commodity; parts of applications are "infrastructurerised". This has been made possible by Internet technology, such as web services (Rabaey et al. 2003).

Another problem is the ever faster evolving of the environment of the organisation. The reaction time to adapt to this situation is a big challenge for a technology department to deliver the business people with adequate support for the changing business needs. Paradoxically, Business Process Re-engineering (BPR) introduced by Hammer and Champy (Hammer et al. 1993), was not always a success because of the resistance of people to change. A consequence of this is that ICT-investments were not effective (Rabaey et al. 2003).

Moreover different management techniques became hypes and organisations with their information systems had to be frequently adapted. The same story can be told for other technologies.

Solution

To find a solution to these problems, we have studied the Art of War, because of the extreme circumstances military are confronted with (Bernard 1976). In difficult situations, the military leaders need to combine different troops and weapon systems, all with their own needs and properties, into a set of actions to attain the goals (derived from the political strategy). They define also the feedback they need to adjust the plan to the reality on the battlefields (conduct of battle).

The communication of the plans is done by operation orders (Bernard 1976, Bower 1990). Briefly, an operation order gives the actual situation (foes and friends); the mission; the execution of the plan (of the units=resources) and the needed feedback.

In Figure 1: Business Governance and Intelligence, we have translated the different techniques into a civilian context. The conduct of the battle is the Business Process Management. Each business process must have an information system (manual, automated or hybrid). Different management techniques are "integrated" in a business governance system. The needed feedback is stored in a Feedback Information System (data warehouse) and can be grouped by management techniques, technologies or topics (datamarts). The
exploitation of this feedback is done by a system of Business Intelligence and can be operational (Management Information System) or strategic (Balanced Scorecard) (Vasconcellos 1999).

![Diagram of Business Governance and Intelligence]

**Figure 1: Business Governance and Intelligence**

**STRATEGY AND TACTICS**

The first principle of the Art of War is to adjust the end to the means (resources) (Bernard 1976, Liddel Hart 1991): too much means to attain a goal is not efficient. If the means are not sufficient then the chosen strategy is not effective. The two other principles are “liberty of action” and “economy of forces” (Bernard 1976).

A lot of definitions exist for “strategy”. Strategy as such is about effectiveness, “are we doing the right things?”, thus achieving goals. The term is quite generic and situational, meaning that an adjective is needed to define what kind of strategy we are talking about. We have transformed the military situation (Bernard 1979, DOD 1999) to the civilian context.

The Grand Strategy is the art of developing and using political, economic, psychological and financial forces as necessary to afford the maximum support to policies, in order to increase the probabilities and favourable consequences of victory and to lessen the chances of defeat. Since the first principle is to adjust the end to the means, we can derive from the Grand Strategy two other strategies: Business Strategy (the end) and Resources Strategy (the means). Both strategies must be aligned. The Business strategy is deployed towards the business process (business units) of the core business. Each business unit manager will develop an operational strategy to combine his resources in a logical set of activities to attain the given objectives.

So, our generic definition of strategy is the art to concentrate all resources of an organisation to achieve its main goal (Paret 1986, Rabaey et al. 2003). Here
we see the importance of strategic business goals and the use of resources (Collis et al. 1995) (strategy of resources).

Once the strategy is determined, the objectives are communicated by operation orders to the subordinated units. Every level transforms the operation order from the higher level to another operation order given to the lower level. In a civilian context, (a cascade of) balanced scorecards (BSC) could perform this (Kaplan et al. 2001, Niven 2003).

But the direct alignment on the grand strategy works only for the business units, which are part of the core business of the organisation. Corporate business units -like a ICT-department- support the core business, but are not part of the core business.

However, since an organisation has to adjust the end to the means, each specific resource (financial, human, material, ICT, etc.) has to develop its own resource strategy, but aligned on the grand strategy (Figure 2). If the corporate strategy is to be open for collaboration (high process integration) with other companies then the ICT-strategy may not be of closed information systems (Rabaey 2004).

**Figure 2: Technology and Strategy**

If the production of services and goods and the related technologies are complex than the business cannot focus at the same time on business problems and on resources problems. In such situation a Chief Technical Officer (CTO) must align the different technologies on each other, given the business context of the company (Figure 2). In Figure 3, the CTO is placed as the interface for the CEO between resources strategy and business strategy. Typically in the armed forces, the chief of staff of a great unit (division, brigade) is the CTO.

Efficiency (are we doing the things right?) is related to tactics. The adapted definition of Tactics is the ordered management and manoeuvre of units (resource components) in relation to each other and/or the competitor in order to use their full potentialities (DOD 1999). The specific resource-manager defines how its resource will be used in the business process (in military terms the weapon system tactics or weapon system employment concept (DOD 1999)), of course in
alignment with the Resource-strategy, which is defined by the CEO and the CTO according to the Grand Strategy.

**INTERDISCIPLINARY FORUM**

A (core) business process receives its objectives from the business strategy and it organises resources to attain these objectives (it consumes the different resources accordingly the respective resource strategies). If a lack of resources is detected or a change of resources is needed, then the business process owner would like to acquire the necessary resources. Since a change in the organisation of resources may affect the use of one or more resources, the impact has to be examined.

In an operation order the "core business" units receive their missions, the units of support have to deliver services to the core business. A support plan is defined and co-ordinated with the core business (Bernard 1976).

Therefore we suggest an interdisciplinary forum of business process owner and resource managers and possible CTO and partners (Figure 4). The discussion framework we propose is a self-assessment technique as Malcolm Balridge or European Foundation of Quality Management (EFQM). These frameworks take into account topics as strategy, process management, leadership, partners and personnel. In the results, indicators are defined to check the critical issues (Rabaey 2004).

**Investment**

![Diagram of Interdisciplinary Forum]

*Figure 4: Interdisciplinary forum*

At this point, we have a second adjustment of end and means leading or not to investments in resources, such as ICT. A result of the interdisciplinary forum is also the definition of service level agreements of the respective
resources, which are objectives in the balanced scorecard of the resources, beside those of the strategy of resources.

The third alignment is in the delivery of feedback for the operational use of the resources in the processes (balanced scorecards, activity-based costing, self-assessments).

Figure 7: Holistic business approach gives our holistic approach. We still have research to do on how the investments have to be collectively decided. The two other principles of the Art of War “Liberty of Action” and “Economy of Forces” will be integrated in further research.

Investments are traditionally expressed in financial units (money). However the eternal problem in techniques as Return On Investments (ROI) are the intangible costs and benefits. Therefore we suggest a two-layer discussion system: one non-financial layer (business layer) and one financial layer.

In the business layer we transform inputs into output (objective(s) of the business process or unit). The production of the output may have an outcome on the market or in segments in the market (Leclercq 2004). Using a variety of combinations of resources and different technologies can do this transformation. The interdisciplinary forum will evaluate and prioritise the possible solutions (Rabaey 2004). This prioritisation will be in function of available resources and the objectives (Business Equation).

\[
\text{Output}_i = f(\text{HR}_i, \text{MR}_i, \text{FR}_i, \text{ICT}_i, \text{Objectives}_i)
\]

Of course the combination is also determined by the technologies that can be used. In Figure 5 "Technology" is a list of possible technologies that are not directly linked to a technology of a resource. Then the list of the prioritised alternatives is discussed in the financial layer, where the resources are expressed in financial terms (financial equation) and if possible, also the output. This may cause that some alternatives will be rejected or that the prioritisation on the business layer must be reviewed. As a matter of fact, this is an iterative process, which ends if the optimisation is reached.

Business and Financial Evaluation

![Diagram](image)

Figure 5: Interdisciplinary forum - business and financial evaluation
Another consequence may be that earlier decided projects of improvements or investments must be reviewed or rescheduled. This is called the harmonisation of the business plan (Leclercq 2004).

An enterprise or a network of enterprises has more than one business process. This interdisciplinary forum will also treat all investments in the enterprise, certainly when a lack of resources exists. This implies an overall evaluation of the entire enterprise and its projects.

Figure 6: Interdisciplinary Forum - Global evaluation

Steering plans
The result of the decisions of (de)investments in the business processes are put in an business-resources table. If we put all core business units (BU) in rows of a matrix, and the different resources domains (RD) in the columns, then we can place in the section of the row of BU (A) with the column of RD (Y) all needed resources of RD (Y) for the BU (A) with the SLA (Service Level Agreement) for the resources.

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<th>Steering plan Resources</th>
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Table 1: Steering plan resources for BU/BP

Table 2: Global Steering plan Resources
The horizontal aggregation gives the use (tactics, cost) of all resources for a business unit (for Activity Based Costing). The result of the vertical aggregation is the steering plan of that resource for the business processes (SPB-X). Each resource manager utilises also resources for the functioning of his own processes. So a second table presents vertically and horizontally the resource domains (SPR-X). The vertical aggregation gives the steering plan for the resource domain. Together with the steering plan of the business domain (SPB-X), a global steering plan is formed (SP-X). All these global steering plans describe a model for the functioning of the enterprise.

One resource manager can optimise investments in his domain. As an example, by doing this for ICT, infrastructure can be taken into account and the ICT-investments (infrastructure and applications linked to business processes) are in accordance with the grand strategy.

If new technologies are emerging for a specific resource or business domain, then the responsible manager(s) can simulate the impact of this new technology on the functioning of the enterprise (i.e. productivity, costs). If relevant, the new opportunity is discussed in the interdisciplinary forum. The global managers of the resource and business domains are informed and can cause changes in the strategy (this is called tacticisation of strategy).

![Diagram](image)

**Figure 7: Holistic business approach**

**BPM AND ICT**

Through the system of balanced scorecards (BSC), strategic objectives are communicated towards the business units. Their processes are by definition managed by Business process management (BPM) that also takes care of the information need of the processes.
So if a process is strategically aligned, then the (ICT) applications are also aligned. Moreover, these applications may give the right feedback for the BSC (check effectiveness = are we doing the right things?). Accounting systems like Activity Based Costing Management (ABC/M) may also be linked through BPM. In this situation, the supporting ICT-application can deliver the necessary feedback for the ABC/M (check efficiency = are we doing the things right).

From the technological point of view, each technology may introduce some attributes to the activities in a process, which must be filled out. Technology indicators may also be defined through BPM to receive feedback.

Our research will also examine the role of ICT in the linked system of BSC, BPM and ABC/M, in the delivery of feedback of efficiency and effectiveness, in accordance with the self-assessment techniques used by the interdisciplinary forum. This has to result in a quality definition of feedback systems and their data (in Figure 1: Business Governance and Intelligence: Feedback Information System).

CASE STUDY: BIRB (INTERMEDIATE RESULTS)

BIRB is a Belgian government company (200 people) that pays restitutions and interventions (export and import) to Belgian operators in the agriculture industry (650 million Euro).

The ICT-director has implemented a business process management to align the applications on the business processes. His actual problem is the prioritisation of the investment in ICT and the ICT-infrastructure, because of the fact that the corporate strategy is implicit and informally communicated. This is also the case for other resources.

The objective of our study project is to have a plan of investment in ICT that is aligned on the strategy of BIRB. First we have described the strategic context of BIRB and then rendered the strategy of BIRB explicit. In January 2004 we have presented these results and we have proposed a matrix-organisation, where in one axe the core business units are placed and in the other axe the support units. We are now building the business-balanced scorecard.

In February 2004 we will define with all the managers of resources “the strategy of resources”, which will be the first input for the resources-balanced scorecard. At the same time, we will form an interdisciplinary forum with one business unit and the resource managers to determine the procedure of defining service level agreements, the second input of the resources-balanced scorecard. As self-assessment technique, the Common Assessment Framework (a dialect of EFQM excellence model for public organisations) has been chosen by BIRB.

In the spring of 2004, the procedure will be executed for whole BIRB and the final product (plan of investment ICT) should be ready for mid-2004.
CONCLUSION AND FURTHER RESEARCH

By using principles of the Art of War, we have defined a framework to align the investments of resources on the grand strategy of an organisation via an interdisciplinary forum of business managers and resource managers. Research has still to be conducted on:
- the decision process of investment of all resources in the interdisciplinary forum
- the role of ICT in gathering feedback in an integrated framework of BSC (strategy) – BPM (operations) – ABC/M (costs).

REFERENCE

Additional Information

(i) A short title (less than 50 characters and spaces) for use in running headlines.

Aligning Business- and Resource-Strategy

(ii) The name and address to which communications should be sent.

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