

From Small World to Hierarchic Business Information Networks by Reorganizations – A Real World Study of a Failure

Markus Christen*, Georges Bongard+, Attila Pausitz°,
Nobert Stoop*, Ruedi Stoop*

*Institute of Neuroinformatics, University/ETH Zürich

+Swisscom IT Services, Bern, Switzerland

°Donau Universität Krems, Austria

Overview

- General Framework
- Definitions
- Toy Example
- Business Reorganization
- Example: Projekt Management Process
- Summary & Outlook

General Framework

Business units with a defined **organizational structure** perform business processes, which have specific **operational structures**.

A **reorganization** is an adaptation of the organizational structure of a business unit to a new set of operational structures due to an internal or external motivation.

The **effectiveness** of a reorganization is measured by its efficiency (~ time needed to perform a business process).

Question: Why do some reorganisations fail?

Answer: Analyse the information flow network.

Definitions

Business process P : A sequence $p_1 \dots p_n$ of n processing steps associated with a specific product.

Business unit $B(k)$: A social network of k nodes associated with a class of business processes.

Process unit B_{p_i} : The part of $B(k)$ that performs processing step p_i .

Process operating expense E_P : $\sum_i e(p_i)$: The sum of the times $e(p_i)$, associated with each p_i , needed to perform P .

Process runtime T_P : The total time from initiation to completion of P .

Robustness $R(l)$: Defined as $R(l) = 1 - I_{P(l)}$, where $I_{P(l)}$ is the probability of process interruption in dependence of the relative fraction of node outage of a business unit B (l/k , where l is the number of nodes that turned out).

Toy Example (1)

Two definitions of robustness:

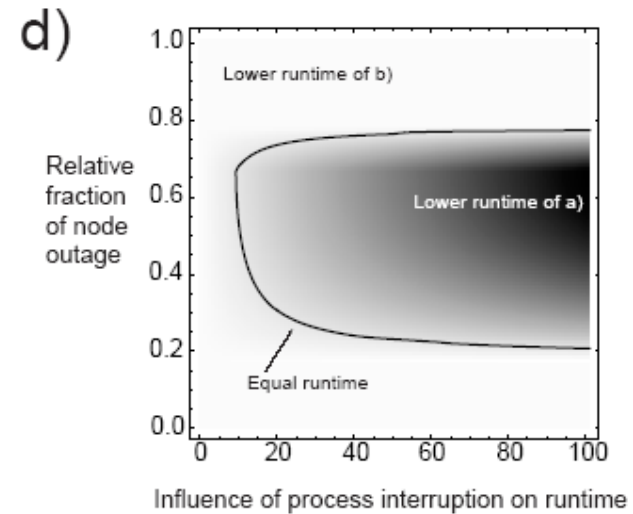
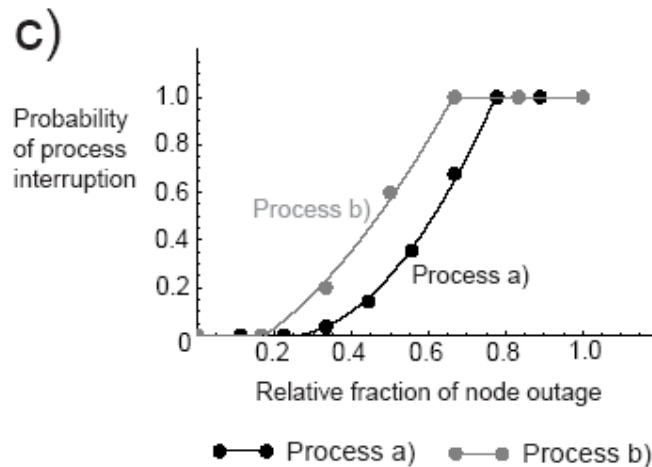
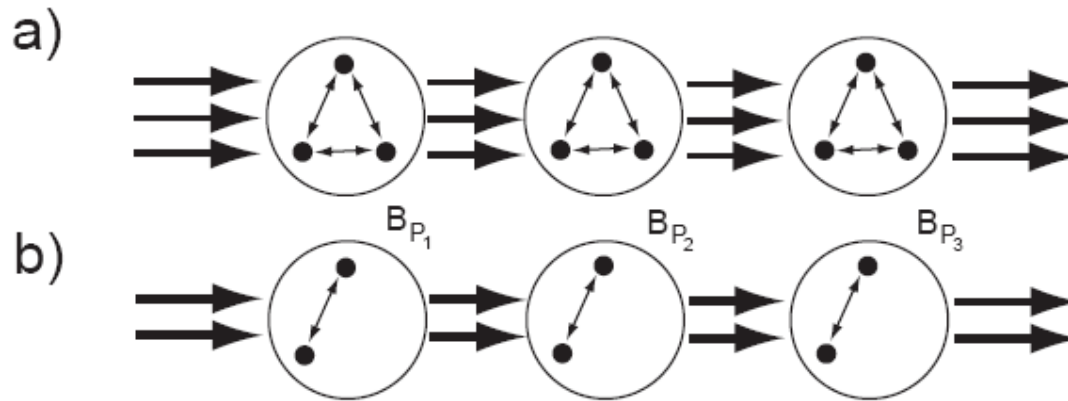
Static robustness refers to the influence of deleting nodes without redistribution of information flow.

Dynamic robustness allows redistribution of the information flow. In business units, it basically reflects the informal network of information flow that are formed in the business unit within the boundaries given by the organizational chart.

The robustness of a business unit can thus be approximated as the static robustness of the network of process units by means of the **hypergeometric distribution**.

$$I_{B_{p_i}}(l) = \frac{\binom{r}{x} \binom{k-r}{l-x}}{\binom{k}{l}} \stackrel{x=r}{=} \frac{\binom{k-r}{l-r}}{\binom{k}{l}}$$

Toy Example (2)



Business Reorganization (1)

We investigate the IT division of a Swiss telecommunication company (1400/1250 employees before/after reorganization) that develops products for telecommunication and insurance companies.

We focus on an business unit within this division. B was organized as profit center and acted autonomously on the marked in terms of client relations, budgeting and accounting (turnover: 16.5 Mio. CHF, profit: 2 Mio. CHF).

Four classes of P were performed by the unit: project management, application development, operations and maintenance of IT services.

Problem: Internal competition between several B 's

Solution: Increase control by a more precise mapping of business processes on the process units.

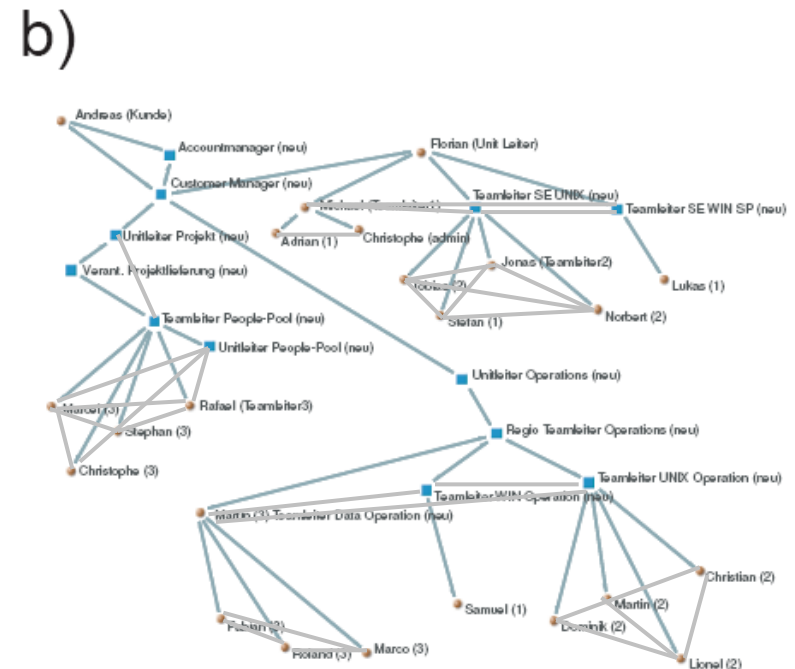
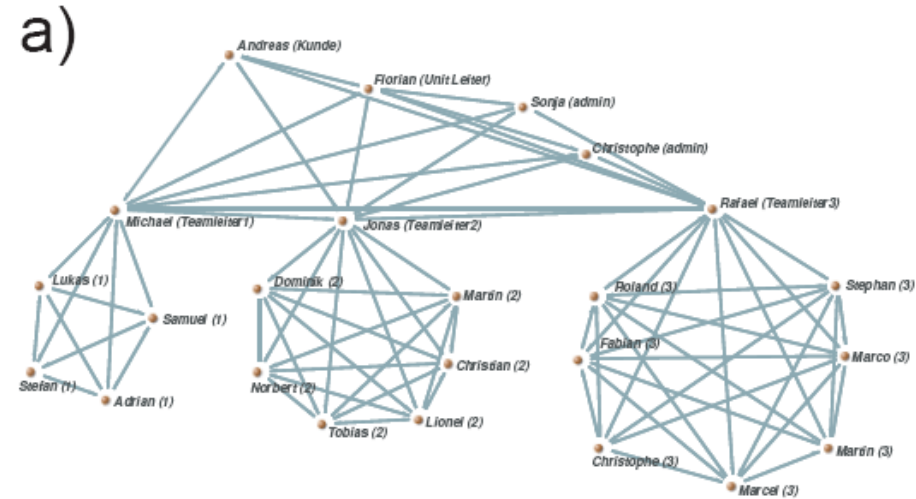
Business Reorganization (2)

L C

before 2.05 0.92

after 1 4.72 0.07

after 2 4.33 0.73



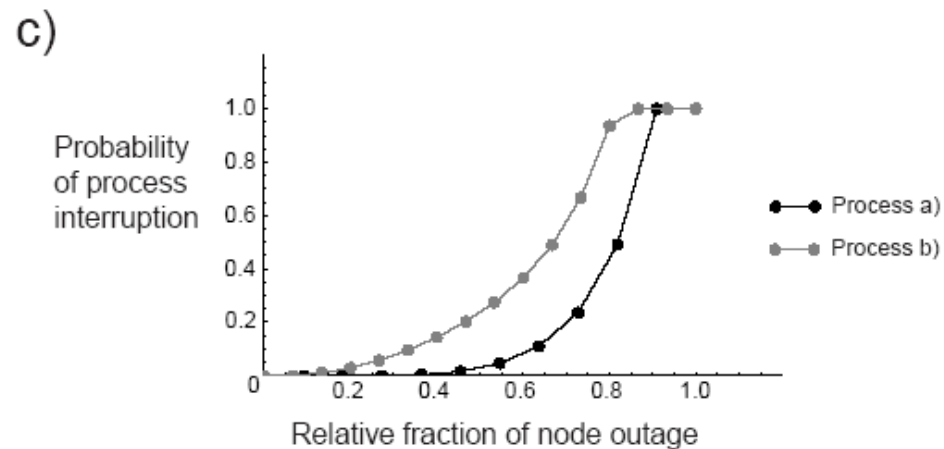
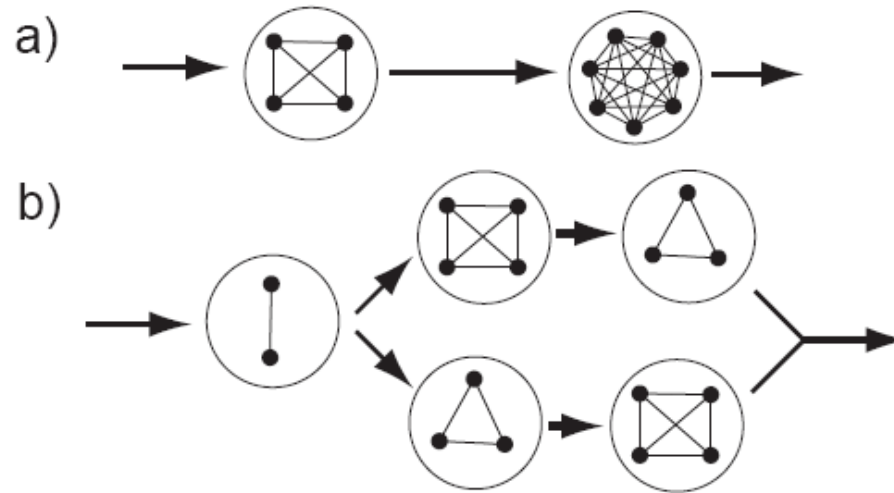
Project Management Process (1)

Project management processes are performed according to general procedures (Hermes-method). This widely distributed standard has been used by the business unit before and after reorganization, so that basic comparability is given.

One task was to develop tender offers for large IT projects. Whereas realization and implementation of such projects largely depend on the individual character of each project, the tender phase was much more uniform, allowing to compare process operating expense and process runtime before and after reorganization.

	E_P	T_P
Before reorganization	88 hours	19 days
After reorganization	86 hours	35 days

Project Management Process (2)



Summary & Outlook

Robustness can be a critical parameter that tends to counteract the intended gain in efficiency by reorganizations.

Reorganizations that focus on efficiency by optimizing the division of labor may have the effect, that the network loses small-world properties in terms of information flow networks associated with business processes.

However, our analysis did not include a complete survey of other aspects that may have influenced process runtime (e.g. sustained opposition against the reorganization by the employees).

In our real world example, the management acknowledged, after some time, the negative effects of the reorganization by pooling separated process units and thus by increasing the robustness of the information flow network, that underlies business processes.

Future projects

In autumn, we start a project on moral agency (if approved by Swiss National Science Foundation), where experts from humanities, neuroscience and complexity science cooperate.

Furthermore, we have contact to an institute implementing decision making systems in medical institutions acting on “ethical minefields” like neonatology and intensive care units.

We can think of several interesting questions concerning aspects like “robustness” of moral belief networks, ethical decision systems, interaction of moral agents etc., where others might want to work with us.

Interested?

markus@ini.phys.ethz.ch

<http://stoop.ini.unizh.ch>