Supply Chains and SCOR as Reference Model

Research Seminar in the Module 10-202-2309
for Master Computer Science

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Systemic Structure of (Enterprise) Organisations

The systemic understanding of an (entreprise) organisation, which can be read off from the normative documents (APQC-PCF) and practically relevant enterprise modelling (Business TRIZ) examined so far, assumes two systemic levels to be distinguished – **operational** and **strategic** management.

From the **perspective of strategic management**, the system is the whole enterprise, divided into strategic business units as components (APQC-PCF levels *category* and *process group*).

APQC-PFC provides here for a company-wide division into 13 *categories* as strategic business areas.

Systemic Structure of (Enterprise) Organisations

The focus of **operational management** is on the concrete design and development of these individual business areas at the operational and thus at an intrinsically shorter time horizon.

APQC postulates at that level clearly more centralised management structures with corresponding authorisations and rights of intervention, but also responsibilities.

On the other hand, it also provides for differently designed intra-company structures through *variants of the standard* at the level of modelling processes, activities and tasks.

Systemic Structure of (Enterprise) Organisations

These standardisation efforts are thus directed at the *strategic structural level* and a certain standardisation of *operational processes in their methodological meta-model* rather than structural model dimension.

Organise the comparison between process planning and real-world process execution as a contradiction between *justified expectations* and *experienced results* in a comparable way by regularly recording *Key Perfomance Indices* (KPI) (see 13.6 *Measure and Benchmark* in APQC-PCF).

Systemic Structure of (Enterprise) Organisations

This information is part of a *global conceptualisation* at this subsystem level, of a *cooperative world view* as an emergent phenomenon, which is inseparably linked to the development and strenghtening of the structure at this subsystem level.

Even if the KPIs are modelled and collected globally throughout the company, the possible uses of these instruments remain the same at the operational level, because the authorisation of the operational management is limited accordingly and thus *judgement practices* can be executed only within the subsystem.

Systemic Structure of (Enterprise) Organisations

In agile contexts with instruments of indirect control there are often more than two such system levels to distinguish, which can be read off from clearly differing time horizons. In Scrum, for example, the structuring units *Daily Scrum*, *Sprint* and *Product Backlog* or *Project* mark four systemic contexts – the *Project* as a whole as a component of strategic corporate development, the individual *Sprints* as components of the system *Project*, the contents of which are negotiated between the project owner as control component in the *system Project* and the team, and the agile implementation structures in the *system Sprint* by the individual team members as components (or resources?) with, e.g., their progress reports in the *Daily Scrum*.

Systemic Structure and Agent Based Systems

Most management theories do not say much about the issues

- maintenance of the emergent systemic resources as *infrastructure* and
- development of a *cooperative world view*

at the strategic level of the company. One of the (non-explicit) preconditions at that level seems to be a certain collective decision-making, since the managers involved represent different operational areas that are all important by their own, representing, in addition to *goals* as justified expectations, the various intrinsic logics of the operational areas.

Systemic Structure and Agent Based Systems

A radical answer to this problem is the transition to agent-based systems as presented in the seminar in the previous week. A system is built from agents as components whose internal reproduction conditions ("belief, knowledge, desire, obligation, commitment, state, thinking about past actions, learning, (internal) goals" – Slide 9) are decisive for what kind of systems can be assembled from them at all.

Goals or objectives of an overall system no longer seem to drive the development, but (solely?) the coordination achieved by "communication, negotiation, information sharing" (Slide 34) among the agents as system components.

However, later (Slide 35) a CEO with "guidance" appears.

Systemic Structure and Agent Based Systems

Essential "advantages of an agent-based approach in business environments" are summarised on Slide 37:

- Head business management focuses on higher-level decisions.
- Improved problem-solving capabilities through specialisation.
- Improved problem-solving capabilities through mutual support.
- Sophisticated goal-oriented communication.
- Improved physical organisation.
- Outsourcing of cross-cutting concerns.

Systemic Structure and Agent Based Systems

Hence, other aspects than the seeming ability of agents to act autonomously and the assertion that a separate optimisation of the agents leads to optimality of the overall system come to the front. These are primarily "beliefs" and "knowledge" as two properties of an **emergent system-specific conceptual system** – a "cooperative world view" – which allows to capture in language form the specific "reduction to essentials" of the system-internal relations between the components.

The temporal offset of the unfolding of conceptual systems at different levels is an essential characteristic of dynamics in systemic structures.

Systemic Structure and Agent Based Systems

In an agent-based approach the existence of such a (developed) conceptual system is **postulated** for the agents as components.

But it must also *unfold at the level of the system*. In view of the reduction of the component properties to their specification, the conceptual systems of the components enter into this new systemic conceptual system only in a reduced form, but must be expanded by conceptualisations and modelling approaches for the essential interactions between the components.

A Market-based Landscape of Independent Producers

Agent-based systems model a basic assumption of the free market concept – the contract-based action of economic subjects as homines oeconomici optimising private benefits leads to an optimal overall economic system by the "blind action of the market".

This belief is in apparent contradiction not only to the importance of institutionalised procedures in the **concept of technology** developed in the lecture, but also to all **practical** efforts to standardise business processes, which were addressed in two seminar presentations (APQC-PCF and Business TRIZ).

Production based on the division of labour is only possible if this division of labour is embedded in overarching institutionalisation processes, based on common conceptual systems which accompany the exchange of (meaningful for both parties) labour products and services between independent third parties.

Supply Chain Management

The exchange of products and services across company boundaries is not only oriented towards the induced money flows, but also towards the material properties – the *use value* – of the exchange products. The more detailed the corresponding conceptual systems for qualitative and quantitative parameters of the exchange products are developed, the more precisely these use value can be described.

Product quality and **process quality** – capability of a company not only to produce qualitatively adequate products, but do deliver them in predictable time and cost frames and offer required services during the use of the products in the operation by third parties.

Supply chain management focuses on such issues of assessing quality capability in supply chains.

SCOR as Supply Chain Operations Reference Model

Similar to APQC-PCF, SCOR as a *reference model* systematises the essential aspects that have to be considered in a structured way during such an assessment of partners in the supply chain.

SCOR 1.0 was released in 1996 and has since been developed in various versions.

Today, the further development of SCOR is coordinated by the ASCM Foundation – the *Association for Supply Chain Management*.

SCOR as Supply Chain Operations Reference Model

In its focus are

- definitions of **key performance indicators** that balance customer requirements with internal capabilities,
- the architecture of **processes** to leverage the technology,
- the adoption of **practices** that are more than just white papers,
- and development of **people** to have both the knowledge and skills to make it all happen with required performance to achieve the promised RoI.

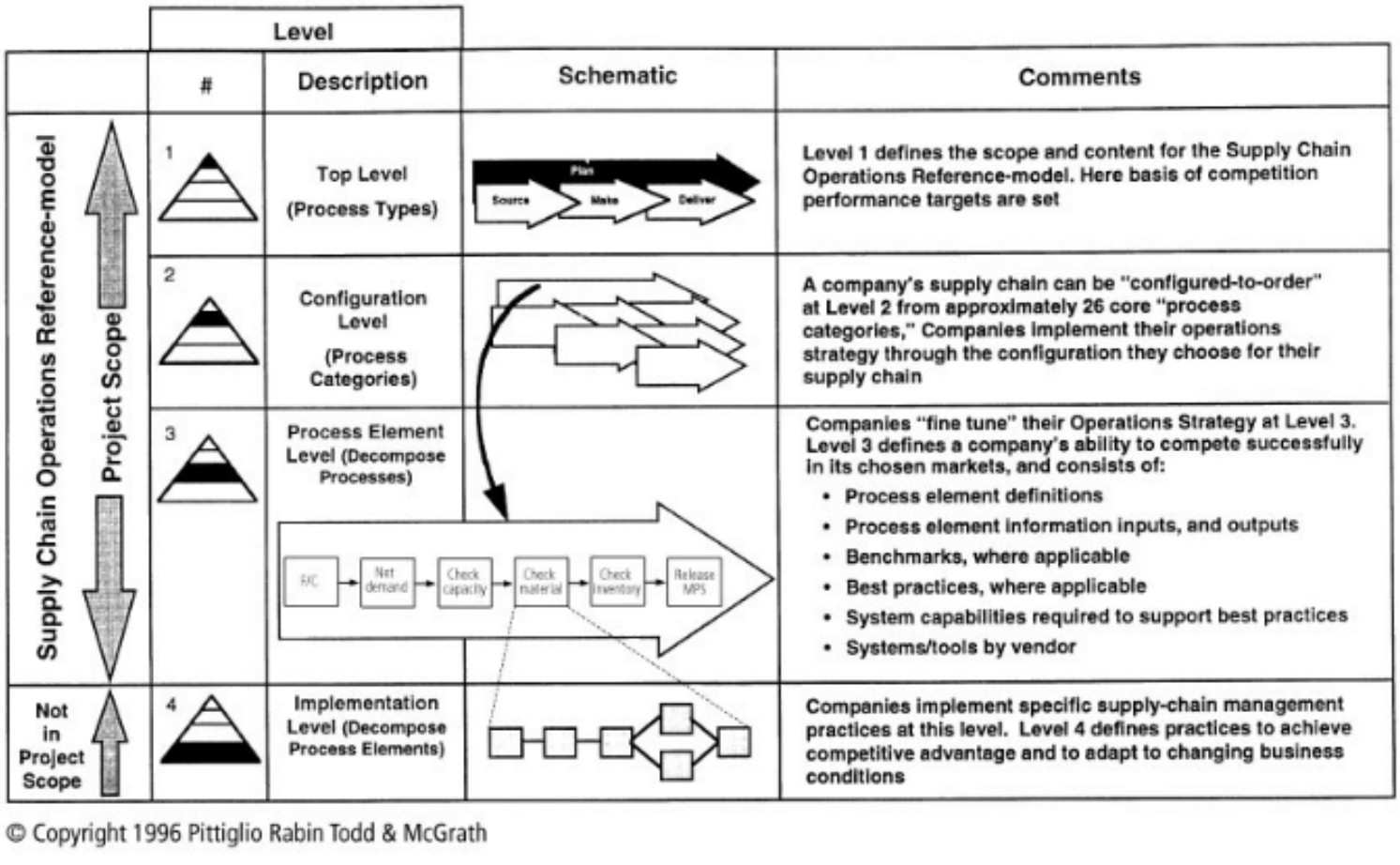
SCOR as Supply Chain Operations Reference Model

SCOR as the standard process reference model for supply-chain management brings order to the diverse activities that make up the supply chain, and provides common terminology and standard process descriptions.

The model allows companies to:

- evaluate their own processes effectively;
- compare their performance with other companies both within and outside their industry segment;
- pursue specific competitive advantages;
- use benchmarking and best practice information to prioritise their activities;
- quantify the benefits of implementing change; and
- identify software tools best suited to their specific process requirements.

SCOR as Supply Chain Operations Reference Model



The four level model of SCOR as displayed in (Stewart 1997)

SCOR as Supply Chain Operations Reference Model

SCOR focuses on four basic supply-chain processes as **top level process types**, defining the scope and overall content of the SCOR model, and 26 **core process categories** sorted in 12 groups as possible components of a supply chain.

(1) **Plan** with
- ▷ *Demand/supply planning*.
- ▷ *Infrastructure planning*.

(2) **Source** with
- ▷ *Sourcing/material acquisition*.
- ▷ *Source infrastructure*.

(3) **Make** with
- ▷ *Production execution*.
- ▷ *Make infrastructure*.

(4) **Deliver** with
- ▷ *Demand management*.
- ▷ *Order management*.
- ▷ *Warehouse management*.
- ▷ *Transportation management*.
- ▷ *Installation management*.
- ▷ *Deliver infrastructure*.