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# SYNCOM, A Tool for Competence Management

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## Abstract

This paper addresses the issue of competence management in companies in the branch of Technical Communication. The problems these companies deal with concerns lack of specific education, more complex products, and a rapid change in how technical information is produced. Due to the rapid change the companies also need to be proactive and steer towards a desired future state. A design of a tool, SYNCOM, for competence management in modern high technology companies is presented. The tool is developed during a process based in idealized design. SYNCOM constitutes of a group of systemic models and techniques for competence management and competence development that has been used in earlier projects. The SYNCOM Tool presented is a general tool aiming to be a model for organizations. Implementation of the tool will require adjustments and adaptation to the specific organizations. The SYNCOM Tool has not yet been tested as a tool in any organization. The systemic models and techniques for competence management and competence development have been tested with good results in earlier projects where they in form of prototypes have been tested and verified.

**Keywords**: Competence, competence management, competence management system, technical communication, idealized design

## Introduction

Many companies of today are in a state of rapid changing due to technical development and other external influences. Due to these changes the companies are in need for competence development for their personnel or even personnel with completely different competence. For companies within the branch of Technical Communication this is even more pronounced. In Sweden as well as in some other countries there is also a lack of education for Technical Communicators.

The area of Technical Communication (TC) deals with production and use of documentation such as technical descriptions, user guides, installation guides, repair guides, and advanced interactive user manuals. TC can be prepared for technical devices, apparatus, and systems – from more simple devices to more complex systems with embedded sub-systems e.g. a lorry or a container dedicated for medical treatment (attendance) used for aid contribution in turbulent parts of the world.

There are several problems identified when working with Technical Communication, for example the increased complexity in the documentation demands a more structured way of working, the users of the documentation are disparate and may vary during the prod-

ucts life-cycle which demands a more elaborated requirements analysis, and as the tools for producing more than just text-based documentation are rapidly developed there also are a wish for more sophisticated TC containing animations and multimedia. To deal with the problems there is a need to allocate appropriate resources for the tasks. This means keeping track of the competences in the company, assign competence development when needed or recruit personnel with the competence needed.

With the intention to start up and bring the research on Technical Communication systems further, a research project called Technical Information Centre (TIC) was commenced in May, 2008 (Asproth et al, 2008). A posterior project was finished in January, 2014. The two TIC projects were a collaboration including Swedish Defense Material Administration (FMV), Mid Sweden University, and a number of companies that produce and manage Technical Communication. One of the aims of the project was to improve and streamline competence development and maintenance. Within the frame of the project a tool for competence management in modern high technology companies has been designed.

There exist many tools for management of competence within companies. Already in 1999 Dieng et al (1999) performed a survey of methods, techniques and tools aimed at managing corporate knowledge, analyzing problems and solutions related to construction of the corporate memory. An overview of 22 Competence Management systems and 18 learning management systems was made by Draganidis and Mentzas (2006). It defines *competence management* is the way in which organizations manage the competencies of the *corporation*, the *groups* and the *individuals*. It has the primary objective to define, and continuously maintain competencies, according to the objectives of the corporation. The Competence Management systems are more or less built to keep track of the competence in the company. It can be designed to consider the interaction between organizational and individual level competence and the role of technology in this process (Lindgren, 2004).

However, there is also a need for organizations to act proactive, to foresee changes in the environment and to steer the organization in a certain direction. The organizations competence profile is important in this case.

Hence, the aim of this paper is to present a design of a tool for competence management in modern high technology companies.

# Working Procedure

The SYNCOM tool is developed during a process based in idealized design (Ackoff, 1981, 2001). Idealized design (Ackoff, 1981) is a method or approach which is used for striving for an ideal condition. An idealized design includes the ideas and ideals by the designers. The designers are supposed to practice free thinking. The idealized design creates the potential for the designers to be free from restrictions and limitations.

An idealized design is a design of an ideal system from given prerequisites with technological feasibility and operational viability as the constraints, and the ability of learning and adapting the design in a rapid and effective way as the requirement. The design cannot be in contravention to any law of nature and it has to be viable if it should be realized (Ackoff, 2001).

The idealized design is an ultimate condition and it could never be reached. However, the design can be a goal for the ultimate condition and can contribute to unlimited advancements; “Aim for the sky and you'll reach the ceiling”.

The result of an idealized design should be the best possible ideal system the designers and participants can imagine in the design process from current prerequisites, i.e. the design produced is not the ideal design for ever, it is an ideal design for now and it has to be continuous improved ac-

cording to the changing environment and prerequisites. This continuous process of improving the design is strengthening the organization and the humans within it. A common discussion about the system and the possibility to have an influence on the future system is developing humans and organization and encourage new ideas and this is consequently enriching the design (Ackoff, 1981).

The idealized design consists of three parts and applied in this work they are:

- Formulation of a mission statement
- Specification of the organizations possibilities and needs for competence management stated by the designers.
- Design of a tool for competence management

The launching platform for the SYNCOM tool is methods and models concerning competence development which are grounded in a systemic holistic view. These holistic competence development methods and models constitute the ground for the SYNCOM tool.

In the SYNCOM tool Feasible Identified System Target (FIST) has been used. Every FIST is a concrete part of the idealized design which is possible to reach in a planned period. If there are several successive FISTs the idealized design is more possible to approach (see Figure 1). The FISTs guarantee the development step to be in the right direction and avoiding of deadlocks.

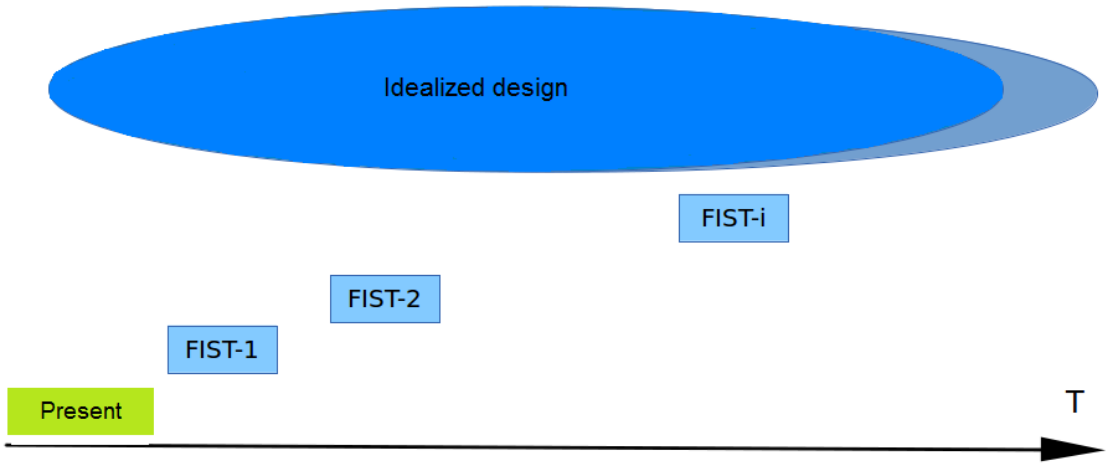


**Figure 1. Idealized design**

# Launching Platform

The basis for SYNCOM constitutes of a group of systemic models and techniques for competence management and competence development (Figure 2). These models and techniques derive from earlier projects where they in form of prototypes have been tested and verified.

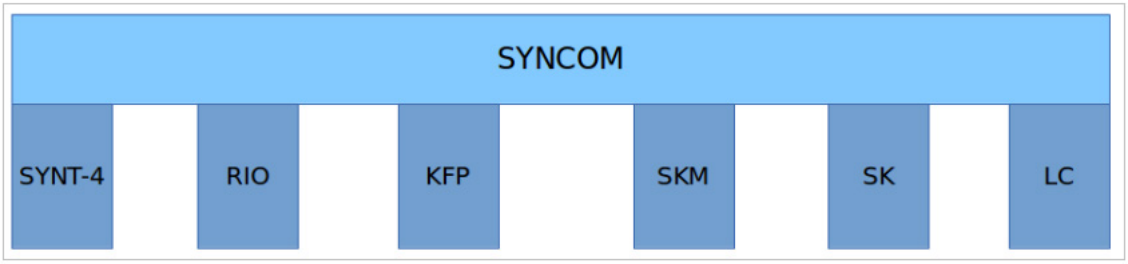


**Figure 2. SYNCOM and its theory base.**

## *Syntegrity-4*

SYNTEGRITY-4 (S4) is a general model for competence and organization development in companies and other organizations (Holmberg, 2001). Syntegrity-4 is inspired of Stafford Beer's Team Syntegrity (Beer, 1994)

The model is based on four synergetic parts: *Actors, Perspectives, Team Syntegrity and Systems perspective.* In SYNCOM we use the society model from Zetterberg "The Periodic Table of Social Reality" with six different categories of information managers (Zetterberg, 2013). These categories are "Makers", "Keepers", "Brokers", "Takers", "Providers" and "Procurers". The *Makers* creates new knowledge. The *Keepers* are those who preserve the information for future use. The *Brokers* transfer knowledge to new people. The *Takers* are those who use the knowledge. The *Providers* are responsible for that the information is provided to those needing the information. The *Procurers* finally, are those deciding upon new development projects. All the categories most likely exist in companies but SYNCOM will make them visible and explicit.

## *FIO: Framework for Intelligent Organizations*

The framework for intelligent organizations includes the following three models:

The model **Systemic control** (Espejo et al. 1996) emanates from the idea that there are objectives and control variables on three different logical levels in an organization. The three levels are operative (to create value for the organization), strategic (to create prerequisites for value creation), and normative.

**Viable Systems Model** (VSM) (Beer, 1979) is based on the principle that an organization is viable in the long run only if it contains a set of management functions with specific relations The management functions in VSM are connected to operational, strategic and normative management respectively.

The model **Team Syntegrity** (Beer, 1994) is a structured way to create coherence and synergy in larger groups of individuals.

To create or to augment intelligent organizations, the following framework with four synergetic dimensions can be used:

**Activities***: Policies, strategies.* This means for example to create profile and trust, objectives and guidelines and to develop core competence.

**Structure**: *Processes, systems.* This means for example transformation of the companies' structure including organization of management and creation of new infrastructure

**Behavior:** *Culture, Abilities.* This means for example development and empowerment.

**Identity/Vision**: This can mean a "paradigm shift"

To accomplish a development in an organization towards this framework the three models Systemic control, Viable Systems Model, and Team Syntegrity can be integrated and used. In fact, each of the models has a strong connection to one of the dimensions of the framework.

1. *Activity dimension*. Systemic control helps to distinguish between the three management levels in an organization and to keep control of steering variables at the three levels simultaneously.
2. *Structure dimension*. Viable Systems Model is a powerful tool to diagnose an organization so it can stay viable.
3. *Behavior dimension*. Team Syntegrity provides a tool for development of relations and interactions in an organization.

None of the three models are however limited to be used in only one of the dimensions but can be used for the whole framework.

## Competence Management Processes in Technical Companies

New competence is created by individuals in the company. The challenge for technical companies is to transform this often hidden and not formalized competence to accessible organizational knowledge. The first step constitutes of the new knowledge that emerges from problem solving by individual staff members. Development of high technological products requires cross disciplinary teams. The individual's tacit knowledge must be transferred to a form that firstly the team and outmost to the whole company. There is a need for a competence chain according to Figure 3. (Östlund, 2001)

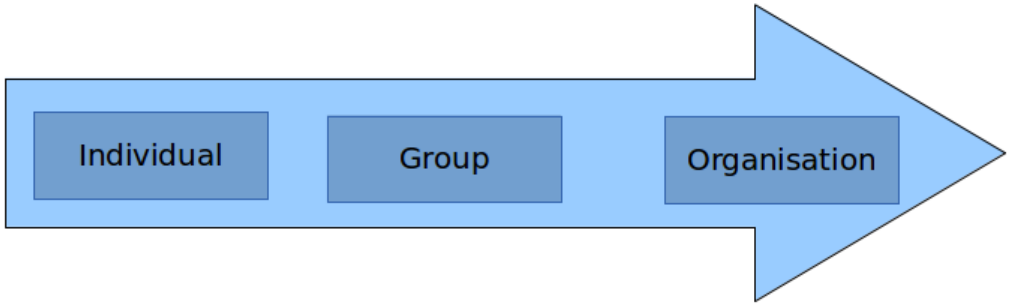


**Figure 3. Competence process in TI-organization.**

## Systemic Methods for Competence Development

In the project DCD (Double Competence Development) was noticed that systemic models, methods and approaches had a lot to contribute to the area of competence development. A number of guidelines and methods for competence development were developed within the project. The results are shortly listed here:

1. **Holistic Management – Guidelines for development of learning organizations**
   Example of relevant parts:
   - Structure: Roles in the organization, relations, flows of information

- Shared mental models: To transform individual learning to organizational learning
- Shared visions: A shared mental model of the future of the organization

2. **Establish participation: Organizational learning through coordinated actions**
   Design of a work process for continuous adaptation and change to support horizontal and vertical communication in an organization
3. **Holistic approach for competence development**
   Design of an approach for continuous competence development with help of a computerized information system
4. **Total Systems Competence (TSC): A method for competence development based on TSI (Total Systems Invention)**
   TSI is a general model for competence development which embraces both people and the organization.
5. **HCD (Holistic Competence Development)**
   Influenced by Holistic Based Learning (HBL).
6. **Living Competence Development (LCD)**
   Measuring of competence in the company and evaluation of the effects of competence development efforts.
7. **Competence analysis with Requisite Dimensionality Model (RDM)**

### *Talkactive Knowledge Gathering (TKG)*

SKI is a method for collecting knowledge. The first step is to create a covering and rich picture of the organization, the staff and the activities within the organization. Through interviews with all employees not only the individuals' competences are mapped but also structures and information flows within the company are mirrored.

## Tool Design

The SYNCOM tool has been designed with help of the idealized design approach discussed above in section two. That process has in a first iteration resulted in a design with 16 main dimensions according to Figure 4. Those dimensions include more than one hundred individual design points. This is substantially a design according to the Requisite Dimensionality Model (Holmberg, 1994; Löfstedt, 2001). It is ultimately based on the concept of Requisite Dimensionality, i.e. the theoretical design rational of Warfield and Christakis (1987).

This means that the idealized design represents a very detailed and concrete description, on a conceptual level, of the system in focus. However, not every question can be answered even in a detailed design and no designer is perfect. Consequently, the resulting design will not be flawless. Hence, the most important property of any designed system, so even ours, is the faculty of learning and fast and smooth adaptation to new environmental conditions. With other words, it has to be geared toward continuous experimentation, development and adaptation. The design, with other words has to define a goal seeking system.

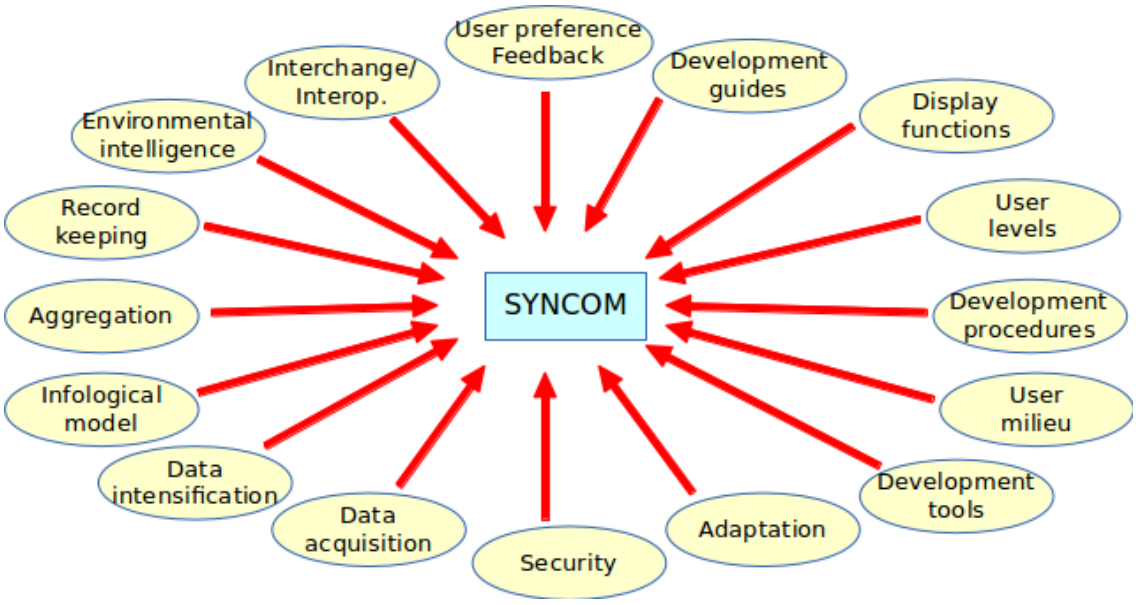


**Figure 4, SYNCOM with the main dimensions of its design.**

As an example, in the design the concrete value of one or several variables is expressed in the form:

> "*SYNCOM will be developed with help of Open Source Tools, such as PHP and ECMA-scripts. There will also be open tools according to the SQL and XML standards for data handling and the R package for statistics".*

Or, as another example:

> *"The individual employee is the basic unit in the SYNCOM system". "It is possible to aggregate the basic units into the different organizational levels of the actual company". "It is possible to make a multidimensional aggregation if the company has some sort of matrix organization".*

Here it is not enough place to quote all design points. However, some of the more prominent properties of the design are:

From a user point of view, as SYNCOM is a tool supporting planning and development of corporate competence. It can, among other things, be used in the following tasks:

- Career planning.
- Support of career and salary discussions with superiors.
- Surveying and displaying of key competence in the company.
- Support of competence management (right person on right place at right moment).
- Support of strategy and business decisions.
- Support of competence planning and recruitment of new employees.

SYNCOM can present information in form of standardized reports, tables, and graphs. The focus is put on graphical presentations in this way helping the user to see patterns and hidden relations. Further, in most graphs there is a time dimension expressing past, present and future states. This feature helps in detecting trends and change patterns.

SYNCOM is designed according to the already well-established principles of Soft Computing (Zadeh, 1994). Under this general umbrella we find several techniques which are well suited for handling the frequent imperfections of real life situations. In short, with this design decision the system becomes fairly robust and stable.

Based on the concept of Dynamic Competence (Holmberg, 2001) SYNCOM uses relation maps according to Figure 5 in order to display the frequency and quality of an individual's (Figure 5.a) or a competence group's (Figure 5.b) competence related communication.

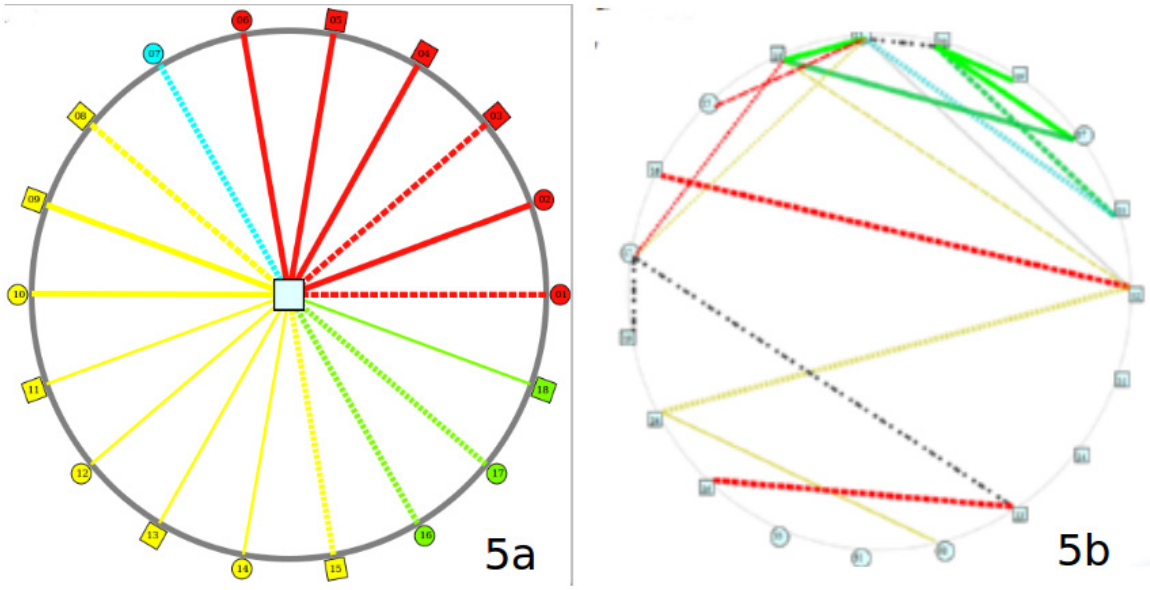


**Figure 5. Communication patterns with frequency (line pattern) and quality (line colour) on individual and group level.**

SYNCOM applies a system of user- and security levels in order to controlling the access to the information stored in the system. Each user organization can set those levels according to their own security and privacy policy.

There is an open user organization responsible for the continuous further development, adjustment, and refinement of SYNCOM. It is based on a collective development environment according to the principles of open source software (https://fsf.org/ , http://opensource.org/ ) . Ongoing development of SYNCOM is ensured through monitoring of research and development results within relevant fields.

SYNCOM is accessed with help of an ordinary web browser, primarily via computer but also via phone (Smartphone) or web plate. The application runs on the Internet or on a user's own Intranet.

Users should be able to register their reactions and requests directly into the system. Those data are used on a regular basis as input for refinement of SYNCOM.

## Implementation and Refinement

The SYNCOM Tool has not yet, entirely or partially, been implemented and empirical tested in any organization. This is the next step and the result of such a realization and empirical test of SYNCOM would accordingly be used to refine the Tool. Ackoff claims that the completed idealized design should be possible to comment on amongst the stakeholders and these comments should, if possible, be incorporated in the design developed. This should therefore be the next

step in the design process of the SYNCOM Tool. Experimental demo versions of SYNCON (http://www.C8labs.net/SYNCOM/demo) will be made available on Internet in the pace as they are developed.

For implementation in an organization, we recommend a step wise implementation of the SYNCOM Tool. The first step would be to proceed from one person and his network and the internal communication between members in one group. The SYNCOM Tool presented is a general tool aiming to be a model or source of inspiration for organizations. Implementation of the tool will require adjustments and adaptation to the specific organizations, i.e. every organization should from its specific prerequisites and goals modify the design of the SYNCOM Tool.

# Conclusion

The SYNCOM Tool presented is a general tool aiming to be a model for organizations. Implementation of the tool will require adjustments and adaptation to the specific organizations. The SYNCOM Tool has not yet been tested, as a tool, in any organization. However, companies involved in the research projects we have work with the last years have contributed with input to the content of the tool. The systemic models and techniques for competence management and competence development have been tested with good results in earlier projects where they have been tested and verified. The prototype will in a next step as a general model be tested in some organizations. The organizations that will test the SYNCOM tool will be companies mainly working with Technical Communication.

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# Biographies

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