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COMMUNIGRAM: FASTER PROJECTS AND PROCESSES THROUGH ENGINEERED AND CONTROLLED COMMUNICATION

Abstract: In this paper we present a novel approach to accelerating projects and processes by organizing and controlling the necessary flows of communication in a so-called "Communigram". After a short introduction to the state of the art in this field of management both in terms of available methodologies and IT tools, we expose how the Communigram is used to define the communication flows of a project or process. We then describe the main characteristics of the software components that have been developed to simplify the use of the Communigram and provide additional value to its users in terms of time savings, comfort, and motivation. Drawing upon real-life implementations of the approach using the new software tools, we discuss the advantages as well as the limitations and give an outlook as to where we believe future evolutions will be directed.

1. Introduction

Business success strongly depends on the right information getting to the right person at the right time [Brown et al., 2002a]. Recent studies confirm that managers find communication problems and inefficient planning and organizational structures to be the most important causes of productivity loss [Proudfoot, 2006]. This is precisely why more and more IT systems are being set up to help people communicate and collaborate, starting from mail systems and intranets all the way to ERP's and collaborative workplaces. Each of these systems has specific advantages and drawbacks [Oracle, 2006].

For example, the very reason for the success of e-mail, its ubiquity, low cost and ease of use, has long since become as much a burden for business communication as a benefit. Today, people spend hours of working time every day to read through e-mails, respond to them, and looking through them to retrieve specific bits of information they know are there. The same is also true for Intranets, collaborative workspaces and document servers. In a recent study carried out at a major

European automotive supplier, employees spend up to 30% of their time looking for information that is, in principle, easy to find [Communigram, 2007].

In our experience, the root cause for this paradox "too much communication kills communication" is that most electronic means of communicating amount to "unstructured communication". In this article, we will show how an innovative approach from the automotive sector has been developed into a methodology based on structured communication that makes projects and processes faster and improves business results. We will also show how specific tools have been developed that implement this methodology and discuss how these tools relate to the current state of the art in IT.

The paper is structured as follows. In the next section, we provide a short history of how the Communigram approach was developed. Section 3 overviews the state of the art in domain of project and process management. Architecture and functionalities of the Communigram software is described in Section 4. A few useful functionalities of the Communigram are detailed. In Section 5, the case studies illustrate real-life applications of Communigram. The final section concludes the research project and indicates some prospects.

2. The Origins of Communigram

In 1995, project SICPARI (Simultaneous Engineering in Car Producing and Related Industries) brought together the leading car manufacturers in Europe and their suppliers for production systems[1] [Gerhardt, 1997]. It was initiated to develop and implement the first operational method for External Simultaneous Engineering with the objective of decreasing development lead time.

In the early months of project SICPARI, it became increasingly clear that the parallel execution of the development of a vehicle and its production system is primarily a coordination problem. Indeed, here we are treating two highly complex development projects that are normally carried out one after the other for a very good reason: how can you develop and build a production system for a vehicle before its blueprint is finished? If you develop the production system of a vehicle *simultaneously* with the vehicle itself, certain bits of information need to be transferred every time a part of the vehicle is developed, modified or paired with other components. Due to the many interdependencies between the systems "Product" (car part) and "Production System", the highly complex processes to develop these systems needed to be coordinated, prepared and controlled meticulously.

Project SICPARI yielded a new concept to explicitly organize communication within the enterprise as well as between interdependent yet autonomous industrial

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[1] Car Manufacturers: Daimler-Benz, FIAT, PSA, Renault, Volkswagen, production system manufacturers: Comau, ExCello, KUKA, PCI, Renault Automation, Schneider, Télém* échanique, and several others.
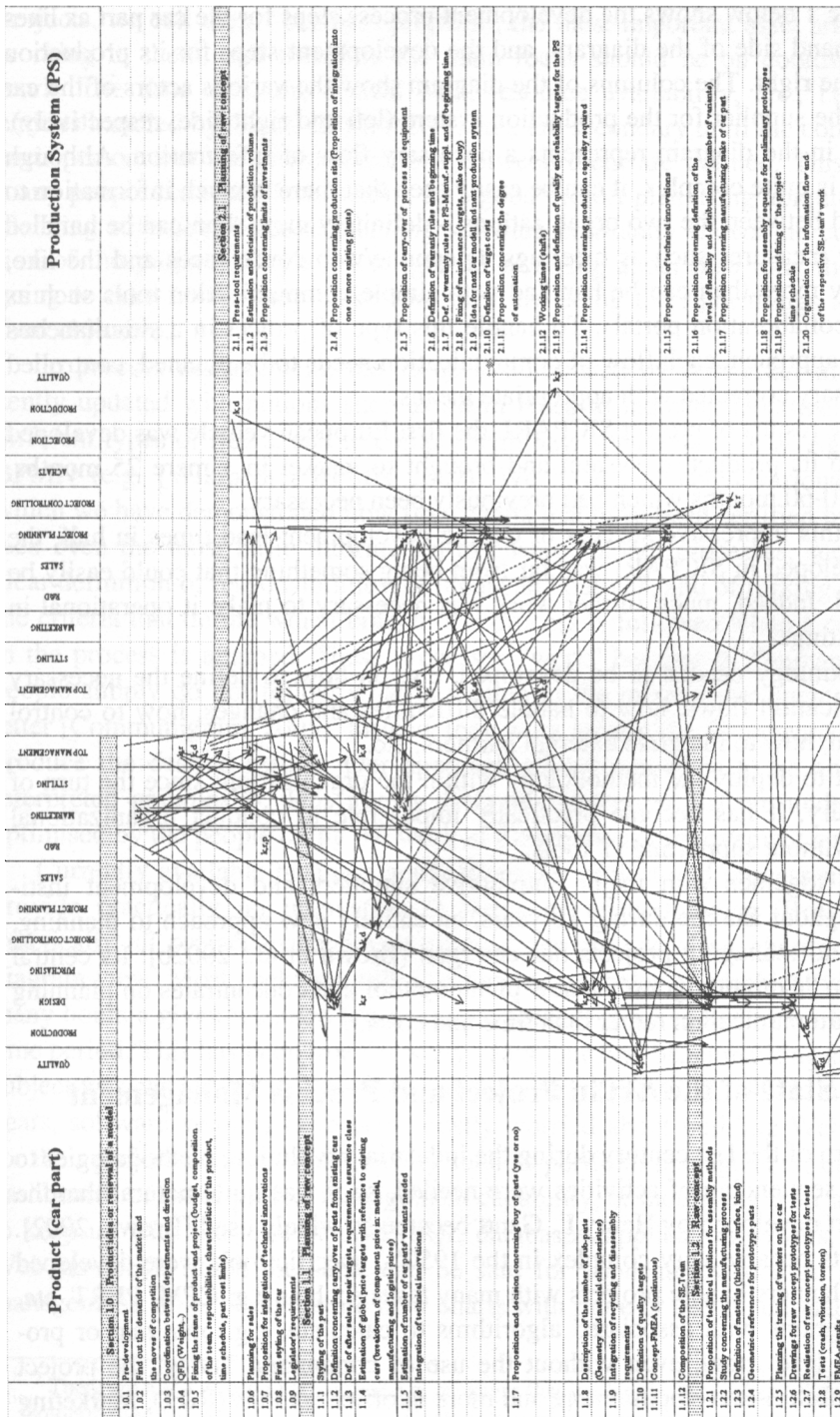
Figure 1. The result of project SICPARI: a new concept to explicitly organize communication between a car manufacturer and the respective production equipment supplier

Excerpt
Source: [Gerhardt, 1997].

firms. Figure 1 below shows the development process steps for the car part as lines on the left hand side of the diagram, and the development steps for its production system on the right. The columns of the diagram show the various actors of the car maker and the supplier for the production system (left and right side, respectively). Each arrow in the diagram represents a necessary flow of information. Although the diagram is quite complex, it can be easily seen that there is much information to be organized between the two organizations – definitely more than can be handled with *ad hoc* measures such as meetings, telephone/web conferences and the like, and certainly more than can be handled with simple communication tools such as e-mail and collaboration portals. To handle this type of project in a simultaneous engineering approach, each flow of communication needs to be planned, controlled and if necessary corrected with appropriate means.

Using the results of project SICPARI, the first European vehicle was developed in parallel to its production system and brought to market in a mere 25 months, rather than 50-60 months which had previously been necessary.

Despite this impressive success of cutting development lead times in half, the concept developed in SICPARI was far from being something that could easily be implemented. Indeed, much further work was necessary to make it operational in industrial settings:

- A methodology needed to be developed, e.g. on how to define the necessary communication flows, how to handle difficulties and changes, how to control execution, how to integrate external partners, etc.
- A toolset to deploy the methodology within the organization: since the turn of the century, it has become practically impossible to conduct organizational change without supporting IT tools.

Working together with major automotive suppliers and development institutions throughout Europe during 10 years, an entirely new approach to planning, controlling and managing projects has emerged [Brown et al., 2002b]. Its central element is the "Communigram", a new planning tool that concentrates on planning people and communication rather than time and costs.

3. The State of the Art in Project and Process Management

At the turn of the last century during the industrial revolution, methodologies to organize the sequencing of activities were needed, so it was quite natural that the time-bar chart developed by Henry L. Gantt became so widely used [Brown, 2002]. When projects became very complex in the 1950's, specific tools were developed that helped planners handle projects with many tasks such as e.g. CPM, PERT, etc. (network diagrams with associated algorithms to calculate, e.g., minimal or probable project lead time), even without the use of computers. Today, the project management field is developing more and more in office settings (R&D, Marketing projects, Mergers & Acquisitions, IT implementations, to name but a few). In such

projects, we call them "business projects", the most important asset are the *people* working in them, and therefore the main focus should be on coordinating their work. The time axis, the critical path, resource availability, etc., i.e. the main entities handled by Gantt, CPM, PERT, etc., are secondary until the contribution of each person and the interconnections between them are defined. This is why so many people have problems setting up a good project plan using ubiquitous project planning software: because planning software constantly shows the current duration of the project, people get caught up worrying about how long the project is going to take before they make sure they are doing the right things to reach the final objective.

In process management, the scene is dominated by flow-chart diagrams, recently updated with notions such as swim lanes to indicate departments or sites, different types of flows, and to comply with new standards such as e.g. UML and BPMN (e.g. [Wikipedia, BPMN 2007]. We have conducted various studies in which we have demonstrated how flow charts that have been certified by ISO 9000 lack even the most basic information to ensure smooth processes, such as e.g. a clear definition of responsibilities, of inputs and outputs, and of forking criteria, i.e. the criteria that define which branch of a process is followed when a certain point in the process is attained. These processes "work" because of "human glue": the people simply do not follow what is written in the process documentation to the letter [Communigram, 2005]. Instead, they work around the documented process to produce the desired results. Our approach allows processes to be analysed and interpreted graphically. This allows designing processes that are understood and optimised by the people doing the work in a continuous improvement approach.

Currently available business applications for project and process management provide practically no innovation in terms of methodologies [Brown, 2002][2]. Practically all project management applications provide a bar chart and network diagram view. Most packages will also provide a tabular or graphical view of how many hours a given resource (i.e. usually a person) is scheduled to work in a given time period. This has been true for many years: our first benchmarking study on the subject was carried out in 1997 and updated yearly [ERMITE, 1997]. In the last 10 years, software vendors have been mostly worried about building Web interfaces for their projects, adding functionality such as portfolio management, management dashboards or multi-project management capability, or modifying their architecture to keep up with the tests of time (SQL databases, application servers, API's and Web services). Much the same can be said for applications focused on process management: all of them feature flow charts with more or less functionality.

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[2] There are a few exceptions, such as e.g. packages that implement the Critical Chain approach of E. Goldratt (derived from the Theory of Contraints used in production settings) [Goldratt, 1997]. Notice however that it is the methodology that comes first, the IT applications then follow.

3.1. The Communigram Approach

Communigram is a methodological approach that allows a company to manage the dynamics of projects and processes through organized communication, amounting to a new way of thinking through projects and analysing them [Brown & Schmied, 2007]. The Communigram is a diagram that shows the communication which takes place (or should take place) within the organization, thus allowing communication to be *planned* and *controlled* so certain *objectives* are met.

Dimension One: Who with Who?

A project needs people (resources) with certain competencies to carry it out. The people and departments of the organization appear in the Communigram as columns. This is in fact a major difference to the diagrams currently used in project and process management (bar charts, network diagrams): in the Communigram, people are recognized as the central element of the organization and assume the central position in the diagram.

Dimension Two: Which Information and When?

The Communigram allows the activities of an organization to be streamlined around operational objectives. The project is then defined in the time dimension by breaking down the objectives into work sections and further into a series of tasks. For each work section and each task, the expected results are defined clearly in terms of an information deliverable. In the Communigram, tasks and work sections are represented by lines. Together with the columns representing the people and departments of the organization, the Communigram is thus a two-dimensional matrix in which communication may be planned and controlled.

Each task is carried out by one or several people or departments. They are called the "participants" of the task, and are noted as dots at the intersections between the line representing the task and the columns of the participating people or departments. The "participants" elaborate the information deliverable of the task together. A horizontal bar connecting the participants illustrates the communication and cooperation within the task. Since in operational reality, work tends to get done only when objectives are clearly delegated to a single person, a unique responsibility is defined for each task. This responsibility is depicted by a large dot (see Figure 2).
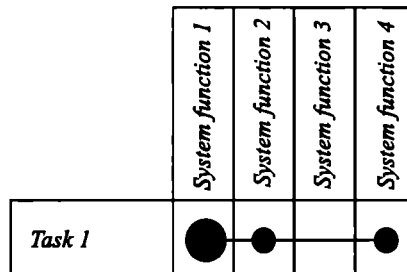

Figure 2. Example of Task Participation and Responsibility

The receivers of the information deliverable elaborated in a task are thus the succeeding tasks, or more specifically, the people responsible for these tasks. This transmission of the information resulting from a task is depicted in the Communigram by an arrow. By definition, this arrow goes from the person responsible for one task to the responsible people of the respective subsequent tasks, i.e. the receivers of the information (Figure 3).
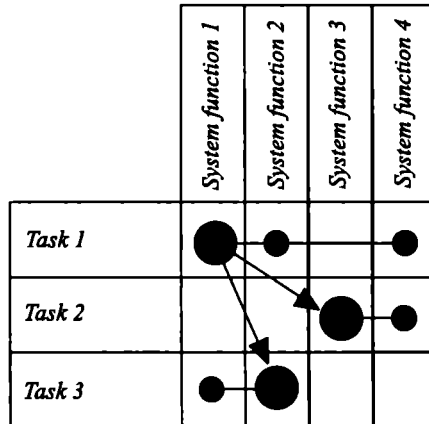

Figure 3. Transmission of Information Between Tasks

The arrows of the Communigram thus show the communication flow of the organization in an intuitively comprehensible form. Compared with the views commonly used in project management, the Communigram has the advantage of illustrating explicitly how information needs to be elaborated and distributed within the enterprise. Our field research has shown that this tool corresponds to the way knowledge workers intuitively plan projects, as it allows them to think through the knowledge-creation process by identifying the intermediate steps and the competencies (i.e. the people) needed to create knowledge.

4. Architecture and functionalities of the Communigram software

4.1. Architecture

The Communigram software tools were developed in the view of deploying the methodology persistently in organizations. The main visible component is the Communigram Java applet that runs in a Web browser. The Communigram applet can run in "planning" mode, or in project/process "execution" mode. In planning mode, it allows users to draw all aspects of a Communigram in a simple point-and-click manner. In execution mode, each user of the Communigram system receives an interactive personal excerpt of all currently running projects and processes in

which the user can access all needed documentation as well as provide feedback via traffic lights, comments, document updates and estimations (a.k.a. "myCommunigram").

The Communigram software solution is built up in a typical 3-tier architecture. Next to the Communigram client mentioned above (Java applet), the solution comprises an application server that runs various Communigram server components such as a scheduling engine, a WebDAV-compliant document server, a history tracking and archiving engine, and a workflow engine that allows the planning process and the communication flow defined in the Communigram to be automated. The third tier is a SQL database system[3].
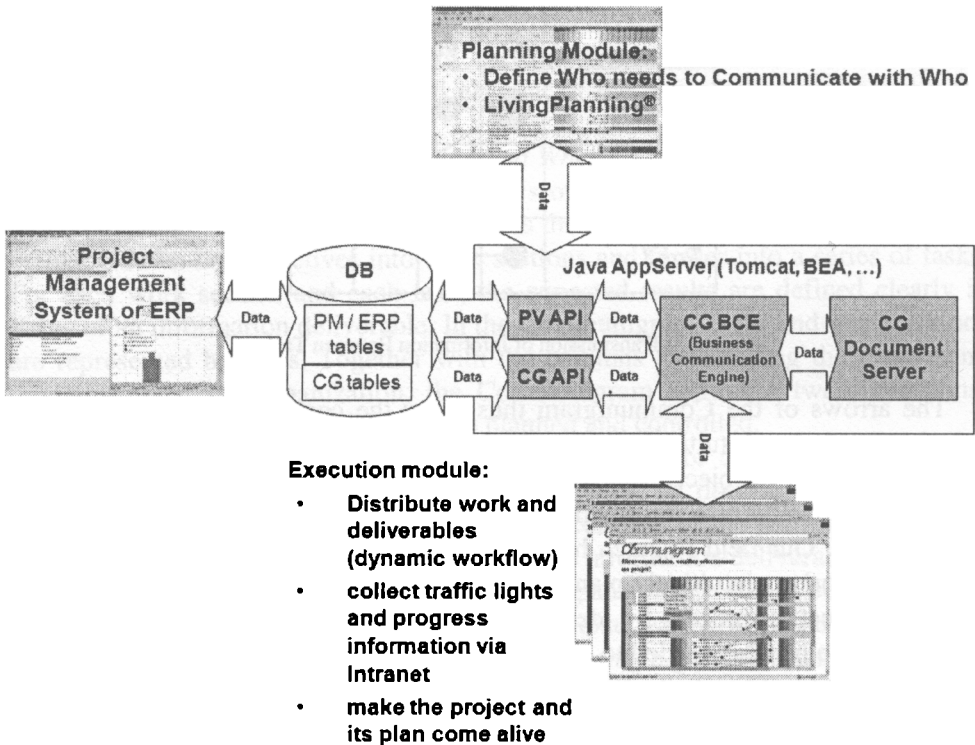
Figure 4. System architecture

Flexibility was a key point in the development of the system. Apart from functioning in an autonomous configuration, the Communigram system can work in unison with extensive project management systems such as e.g. Primavera or

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[3] To run the standalone Communigram toolset, only an application server with a Java application server installed (Tomcat or commercial servlet engine), an SQL database server, and clients (Windows, Linux or Mac) running IE or Firefox and a recent Java runtime are required.

Microsoft Project Server. Further configurations working with ERP systems are currently under development. Any other IT system (e.g. process management, quality management, ERP, or project planning applications) can be interfaced with Communigram thanks to a highly flexible API. This allows companies to use the Communigram approach to engineer the communication they need for business success, then use these systems for resource staffing, cost calculation, project pipelining, reporting, etc. Figure 5 shows how the Communigram system integrates within the IT landscape of organizations: the Communigram provides an interface to systems such as document management, product data and project planning data, but all within a single view, without the need to switch screens. We call this principle "un solo papel" – all on one "paper" – meaning two things: the Communigram system brings together all information people need to do their work in a single spot without needing to change screens *and* without creating redundant data. Furthermore, Communigram integrates technologies from the collaborative and workflow solution toolbox to allow people to use these technologies intuitively: people collaborate through Communigram and they use workflows (without knowing about them) to make sure people get the right information at the right time. This makes Communigram a central instrument to organize many types of enterprise communication (see also [Brown et al., 2003]).
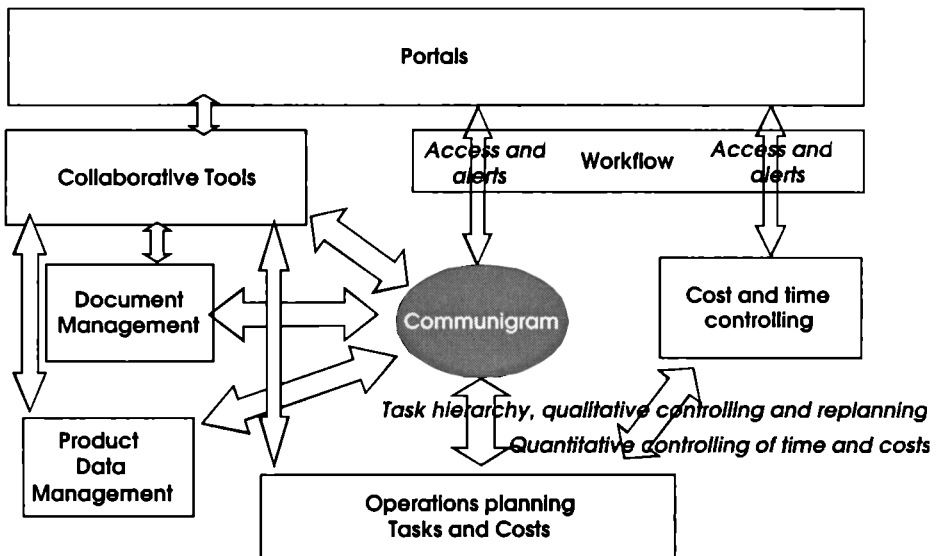

Figure 5. Integration of Communigram within the IT landscape of the organization

4.2. Functionality

Form follows function, or in this case: "functionality follows methodology" All functionality available in the Communigram tools serves the unique purpose of

making the Communigram methodology simple to use and to deploy. In using the Communigram tools, people "automatically" apply the principles of the methodology (although some training is nonetheless needed).

Engineering Communication (5 W's)

Using the Communigram, users can simply define the communication flows that are needed to attain the operational goals of a project or process by following the "5 W's of Communication":

Which Information? – Clear description of the expected output of each activity and the identification of needed input. For each activity of the project or process, the user adds a line in the Communigram. For each activity, the expected result (output) as well as its inputs are determined and managed during the life-cycle of the project or process.

Who with Who? – teamwork is clearly defined, with clear-cut responsibilities and (typically) cross-functional teams.

The user adds hierarchically ordered columns to the Communigram that represent companies and its entities, as well as individual people. For each result, the user can define several participants by adding dots at the intersections between the appropriate columns and line of the activity/deliverable. The user also defines one person as responsible for the deliverable (large dot). This allows cross-functional and even cross-company cooperation to be planned in a very simple manner. The line connecting the dots means that the people work together to produce the deliverable.

Who needs the information? – the customers for each information deliverable are defined, and clients can ask for deliverables they need to produce their own deliverables. These connections are shown as arrows in the Communigram.

When? – as in SICPARI, the time axis is secondary. But once the complete communication flow has been defined, it is easy to schedule the elaboration of the deliverables simply by calculating the critical path or chain.

To gain understandings of how business communication is engineered using Communigram, let us look at the typical "linear" development process of a vehicle and its production system (the usual process prior to SICPARI, Figure 6).

The diagram shows an aggregate-level view of the communication flow necessary to develop a vehicle (activities carried out by the car manufacturer "Car" in the diagram) and its production system (Production equipment supplier "Atok" in Figures 6 and 7). Only the main phases (yellow lines) and departments (blue columns) are shown. Each arrow shows how deliverables are passed from one phase and department to another. The horizontal bars show that various departments are working together within the phase.

Compare to this the diagram of the "simultaneous engineering" (SE) approach, as in Figure 7.
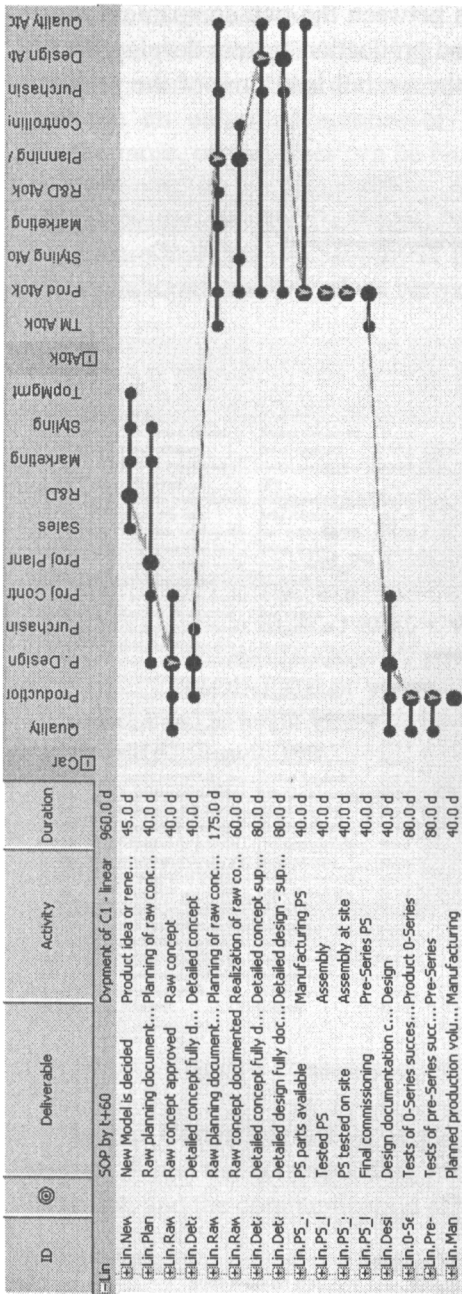
Figure 6. Linear development process
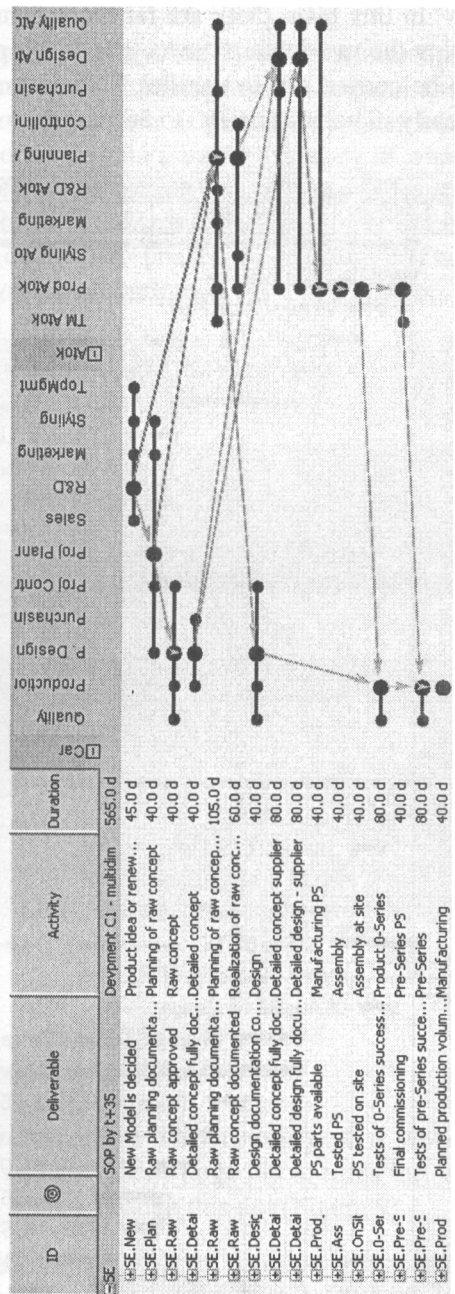
Figure 7. The same project planned using the Simultaneous Engineering approach

In this plan, there are far more connections between the two companies, allowing the two main projects (car development and production system development) to be carried out in parallel. This in turn cuts the overall lead time of the project nearly in half (from 960 to 565 days).
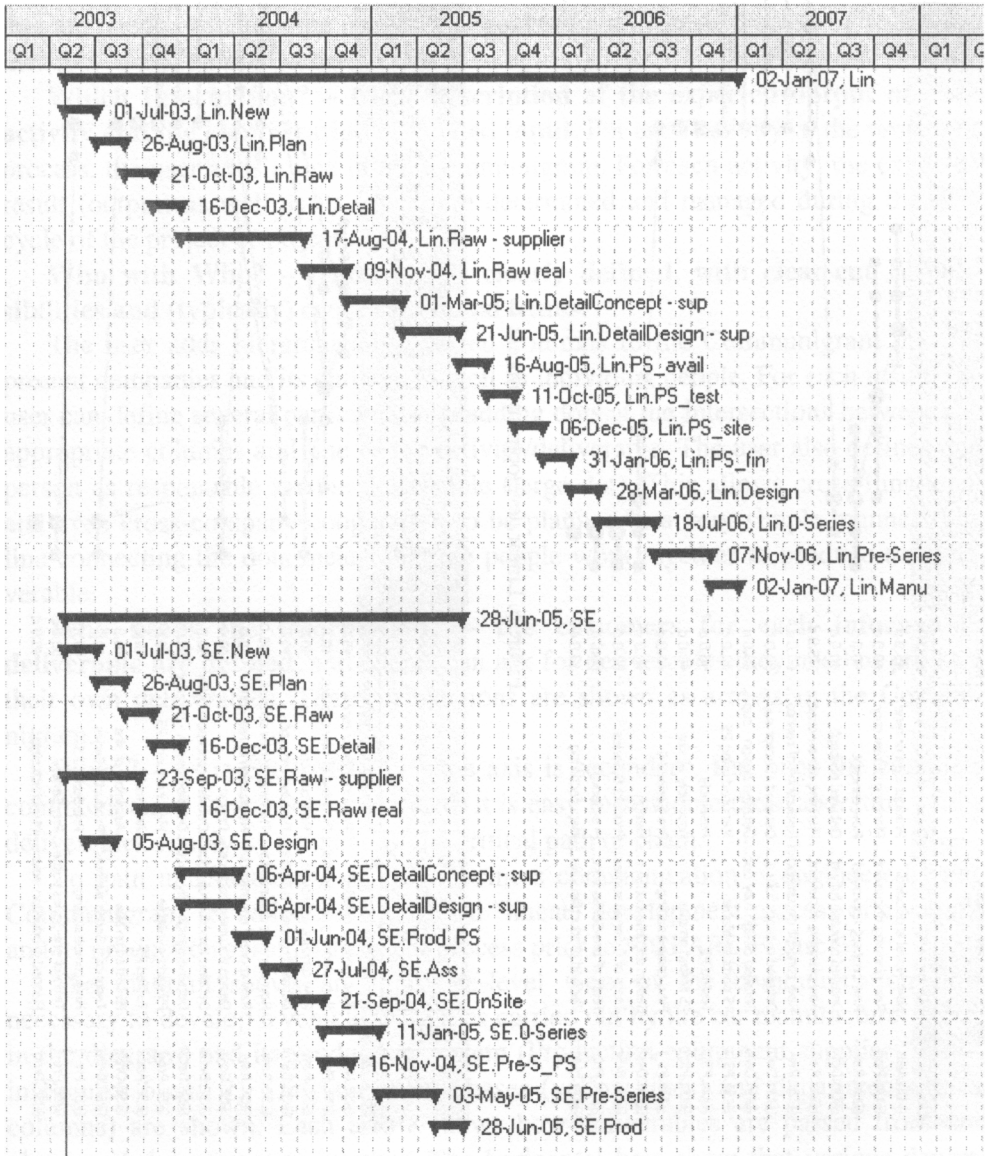
Figure 8. The time axis of the linear and the SE-Approach

Expand and collapse

Through its unique expanding and collapsing facility, the Communigram helps gain an overview of the entire project or process. Communigram can expand and collapse an unlimited number of levels of departments, sub-departments, etc. Furthermore, certain lines can be hidden in order to gain a better overview of what is happening in the organization. Any given work section, i.e. a group of tasks within the project, can be collapsed to hide the underlying tasks.

Figure 8 shows the SE-project more in detail (two phases are expanded). The rich collaboration taking place between the various departments is clearly visible.
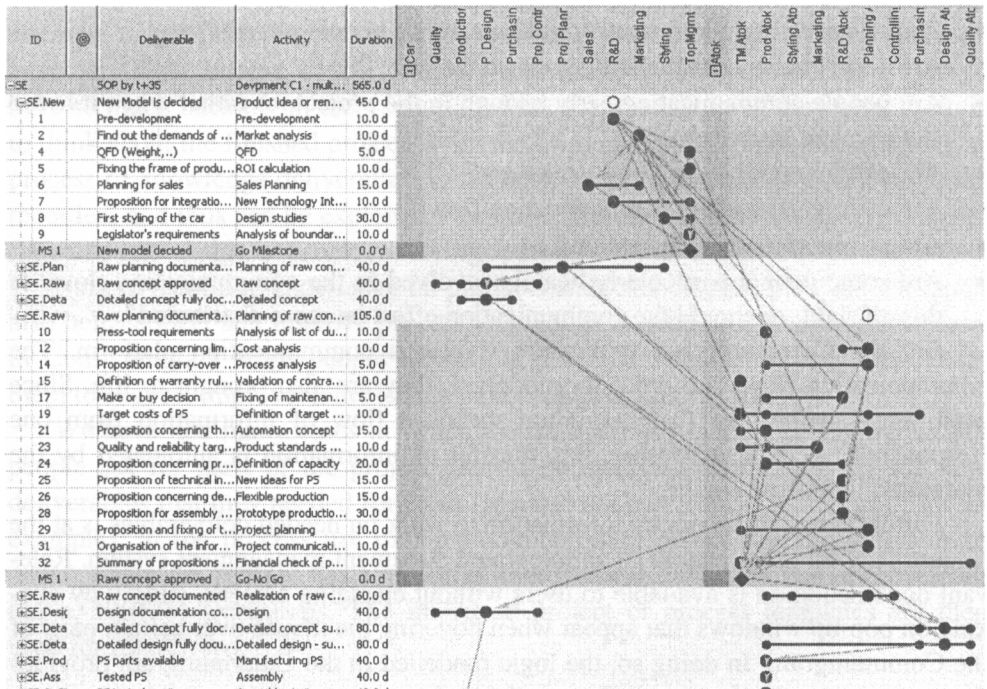
Figure 9. Communigram with processes 1, 2 and 3 (with revealed detail)

In the Communigram, a large circle indicates the responsibility of a work section. When the corresponding process is collapsed, this large circle turns into a large dot, and the communication arrows are routed through this dot (Figure 9).

Figure 10. Responsibility of process 2 "Pre-development" is shown as a circle, and collapses to a large dot

Therefore, when a responsibility is defined for a work section, this work section can be collapsed to provide a better overview of the communication flow in the company. The same example as before is as shown below in Figure 10 when the people responsible for work sections are defined.

Communication Functions

First of all, the Communigram application allows planners to define project work in a whole new way. As the Figures 6 through 10 show, using Communigram is like wearing a new pair of glasses [Brown, Schmied, 2005]: you can simply *see* if the project plan makes sense:

- Are all necessary communication flows among people planned?
- Are departments communicating, or do we have "walls" among them?
- Are people communicating early enough in the project, or rather when it is too late to make improvements?
- Are all communication flows necessary?
- Are there dead-ends in communication flows?
- Are people missing information?
- Are some people particularly heavily involved in the communication flow? Is this all right, or should the communication effort be more distributed?

But the Communigram application is also a communication platform. The communication flows are not only modelled, they are also brought to life. Since each arrow within the Communigram means a flow of information from one (responsible) person to another, this transfer of information is automated by the integrated workflow engine.

Furthermore, all necessary information to work on needed deliverables is at the fingertips of all users, thanks to an integrated document management system. Relevant documentation is available to users without changing screens, simply by clicking on pop-up windows that appear when hovering the mouse over certain parts of the Communigram. In doing so, the logic modelled in the Communigram provides the structure for the documentation available: instead of searching for information, people find information where they are looking for it, i.e. next to the deliverable they are working on.

The same is true for all status information, comments or questions which may arise around the work on a deliverable: all information is tracked and is available in a pop-up window associated with the deliverable. Since all that is said and done around a deliverable can be easily found in the Communigram in a "self-service" paradigm, this saves hundreds of "broadcast" e-mails that these days simply take too much time to read.

Traffic Lights

During the execution of the project, it is important to have up-to-date information on the current progress of activities. Communigram takes a new approach

with respect to the traditional "percentage of completeness" measure. Instead, users are asked to set traffic lights with respect to their progress. Coupled with methodological measures, this constitutes a very effective early-warning system with which arising difficulties can be anticipated.

Knowledge Management

We actually prefer the term "Experience Management" to describe how the knowledge elaborated during the projects and processes is systematically recorded during the project. The important point here is that this recording takes place *without any additional effort* on behalf of the personnel. We have found all attempts to get project teams to reflect on "best practices" and "lessons learned" have very little success. People typically are already working on another project or have so much backlog on their everyday work that the last thing they want to do is to think about the finished project. With the Communigram system, the elaboration process of knowledge deliverables in response to expressed needs is automatically recorded, and thus can be exploited when new projects are started that may require the same knowledge or problem-solving approach.

Next to recording knowledge on products and technologies, the Communigram also helps collect and improve process knowledge. Indeed, the person-centric view in Communigram helps people identify themselves with the process and incites them to suggest improvements for the next project or process run.

We have had many cases in which the transparency in the Communigram got people ask for parts of the project plan to be modified, particularly to add new deliverables that they needed for input (see also the case study "Machinery" for an example). In the process use of the Communigram, people use the diagrams to detect where the process has a potential improvement in Continuous Improvement (a.k.a. Kaizen) workshops. The improved project or process templates are then used for future runs.

5. Case Studies

5.1. Innovative Component for Automotive

In a 3-year development project of a highly innovative automotive component employing up to 350 people, the Communigram methodology and toolset was used to improve the management of the project in many ways. The scope ranged from the redefinition of the project objective following the methodology to a reengineered project plan and a partial restructuring of the project unit.

The original project plan of this project contained the phases foreseen in the company's product development process. As Figure 11 shows, little was done to ensure integration among the various departments and functional groups.

ID	Deliverable	Activity
AM Mk-III_en	SOP by t+48	Development of AM 3rd generation
AM Mk-III_en.1	Go/NoGo Decision	Preliminary phase
AM Mk-III_en.2	Prototype specs	Prototype Design
AM Mk-III_en.3	Finished prototype	Prototyping
AM Mk-III_en.4	Test results	Testing
AM Mk-III_en.5	Improved prototype	Re-Design
AM Mk-III_en.6	Production system ready	Production preparation
AM Mk-III_en.7	Production geared up	Production rollout
AM Mk-III_en.8	Marketing materials, ...	Marketing gear-up

Figure 11. Original plan of the project: little integration of system functions

ID	Deliverable	Activity
AM Mk-III_en-CE	SOP by t+48	Development of AM 3rd generation
AM Mk-III_en-CE.1	Go/NoGo Decision	Preliminary phase
AM Mk-III_en-CE.2	Prototype specs	Prototype Design
AM Mk-III_en-CE.3	Finished prototype	Prototyping
AM Mk-III_en-CE.4	Test results	Testing
AM Mk-III_en-CE.5	Improved prototype	Re-Design
AM Mk-III_en-CE.6	Production system ready	Production preparation
AM Mk-III_en-CE.7	Production geared up	Production rollout
AM Mk-III_en-CE.8	Marketing materials, ...	Marketing gear-up

Figure 12. Re-engineered project plan with high integration of system functions

The first step was to make sure that the main system functions "Top Management", "Marketing" and "Production" were far more solicited during the project.

Afterwards in a second step, additional system functions such as "Intellectual Property" (IP), "Quality", "Product Design" and "Project Support Office" were integrated into the project plan.

With this new project master plan, many activities foreseen in the later phases of the project (particularly those concerning Production and Marketing) were integrated in earlier phases. While this put of course an additional load on the concerned people, this allowed many difficulties to be anticipated and helped re-orient the product towards market requirements while at the same time omitting unnecessary functions and thus reducing costs.

Because the project is unique in its kind, an exact appreciation of the impact of the Communigram on project lead time and performance cannot be made. However, the project manager is sure that at least 10% project lead time had been saved. What is much more important is that the project 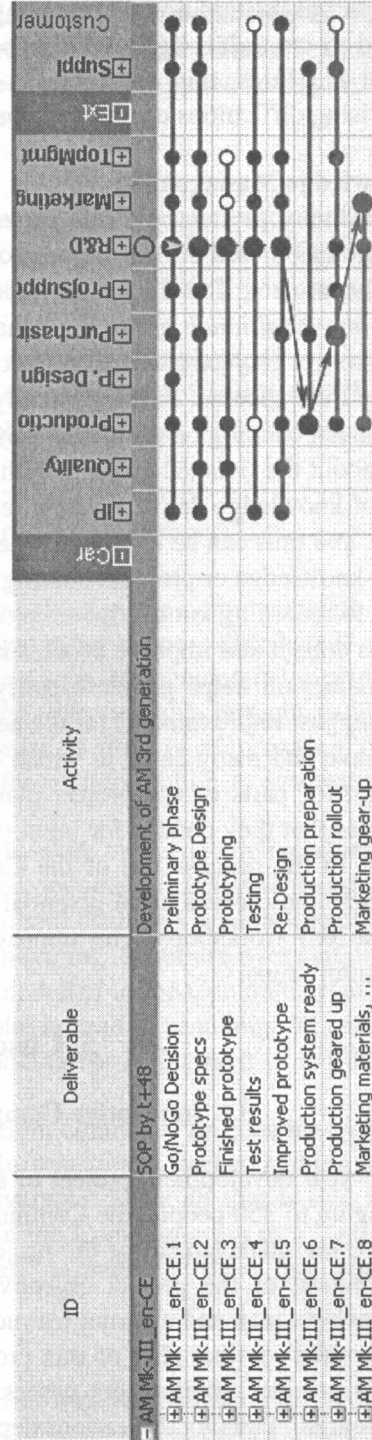was finished in time for the major customers "application" projects, i.e. integration of the component within their new vehicle models. Due to the characteristics of the product and its acceptable cost for upper-class vehicles, the product was an instant success. The company now profits from a near-monopolistic situation and high profits, as it could set the standards for this new technology.

5.2. New Machine for Exhibition

In this company specialized in high-performance machinery for industry, innovation is a must due to strong competition. In the past, each new machine type presented at an exhibition had not finished its development cycle. Very often, last changes to the exposed machines were made at the exhibition itself! The developers always warned the salesmen of the company not to sell the machine to customers just yet because the vital tests runs to debug the machines had not been yet made. But of course after every exhibition, the first machines had been sold with agreed delivery dates. This led to severe quality problems, high costs due to necessary interventions on site at dissatisfied customers, and to frustrated R&D staff.

The Communigram methodology and toolset was used to structure the entire project according to the "pull" principle of client-supplier relationships. Each participant of the project needed to look into their part of the Communigram to say whether they had all input they required to produce the deliverables they were assigned to. This is very easy to do, as each person simply has to look down their own column to see where they have dots. In doing so, many participants found that necessary input was not planned for (Figure 13).

Using this view of "who gets which information" during the execution of the project, it was discovered that 20% of all needed deliverables had not all been
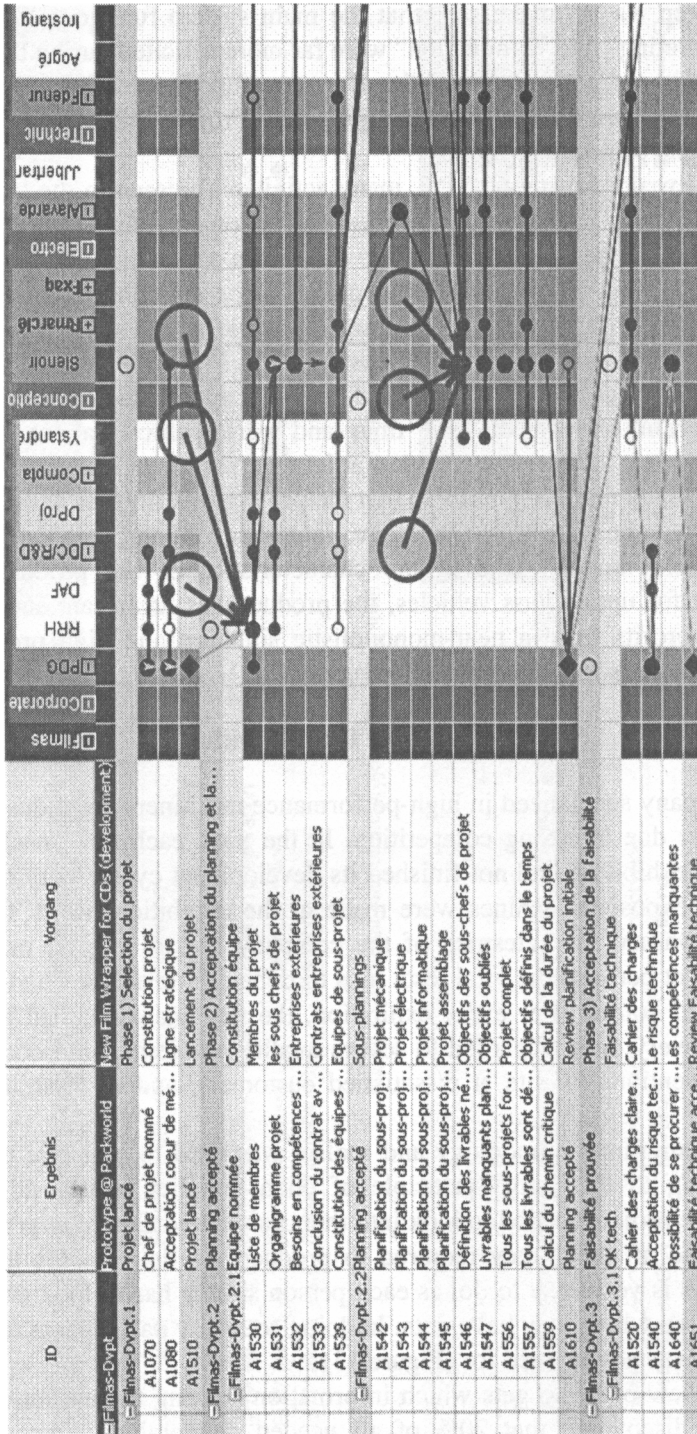
ID	Ergebnis	Vorgang
□Filmas-Dvpt	Prototype @ Packworld	New Film Wrapper for CDs (development)
□Filmas-Dvpt.1	Projet lancé	Phase 1) Sélection du projet
A1070	Chef de projet nommé	Constitution projet
A1080	Acceptation coeur de mé...	Ligne stratégique
A1510	Projet lancé	Lancement du projet
□Filmas-Dvpt.2	Planning accepté	Phase 2) Acceptation du planning et la...
□Filmas-Dvpt.2.1	Equipe nommée	Constitution équipe
A1530	Liste de membres	Membres du projet
A1531	Organigramme projet	les sous chefs de projet
A1532	Besoins en compétences ...	Entreprises extérieures
A1533	Conclusion du contrat av...	Contrats entreprises extérieures
A1539	Constitution des équipes ...	Equipes de sous-projet
□Filmas-Dvpt.2.2	Planning accepté	Sous-plannings
A1542	Planification du sous-proj...	Projet mécanique
A1543	Planification du sous-proj...	Projet électrique
A1544	Planification du sous-proj...	Projet informatique
A1545	Planification du sous-proj...	Projet assemblage
A1546	Définition des livrables né...	Objectifs des sous-chefs de projet
A1547	Livrables manquants plan...	Objectifs oubliés
A1556	Tous les sous-projets for...	Projet complet
A1557	Tous les livrables sont dé...	Objectifs définis dans le temps
A1559	Calcul du chemin critique	Calcul de la durée du projet
A1610	Faisabilité prouvée	Phase 3) Acceptation de la faisabilité
□Filmas-Dvpt.3	Planning accepté	Review planification initiale
□Filmas-Dvpt.3.1	OK tech	Faisabilité technique
A1520	Cahier des charges claire...	Cahier des charges
A1540	Acceptation du risque tec...	Le risque technique
A1640	Possibilité de se procurer ...	Les compétences manquantes
A1651	Faisabilité technique acce...	Review Faisabilité technique

Actor columns (top, rotated): Filmas, Corporate, PDG, RRH, DAF, DCrR&D, DProj, Compta, Ystandrè, Conceptio, Stenoir, Renarclè, Frxaq, Electro, Alavardè, Jjbefrrar, Technic, Fdenur, Aogrè, Irostang

Figure 13. Users detect missing deliverables in the Communigram

planned for, planned for, but too late, or planned for, but with ambiguous definitions of what deliverable needed to be produced.

Together with other methodological measures including the use of the "critical chain" approach [Goldratt, 1997], it became evident that it was impossible to finish the project in time for the targeted exhibition. This pushed senior management into making some tough decisions. Some difficult solutions are found and the decision is made to stop another project to provide additional resources. Once the necessary boundary conditions were set, the project moved ahead very quickly because all details concerning information needs and their transmittal were organized in the Communigram. Furthermore, much time was saved through less e-mails and quicker access to information. All this allowed the prototype to be developed including all necessary tests in time for the exhibition – for the first time ever in the history of the company.

5.3. Moving an Entire Insurance Company

A completely new office building is built for an insurance company. The company has to transfer itself there within a very short time span to avoid lapse time when people cannot be reached, thus leading to customer dissatisfaction. The company fears to have limited front desk reactivity for several days and chaos for several weeks in the back office.

The Communigram methodology and toolset were applied to apply the principles of thinking in deliverables and client-suppliers relationships to this complex task involving many people and companies. This allows the company to set up a very detailed plan of who needs to do what during this critical time.

As a result of the use of the Communigram, the company moves exactly the right day without any delay, and is ready for business within 48 hours (which of course are scheduled to be on the weekend). 72 hours later, even the back office is back to normal.

6. Conclusions and perspectives

In this paper, we have presented a methodology based on organizing and controlling communication that reduces lead time and leads to more successful projects and processes. We have also shown how this methodology is supported with a toolset that directly translates this methodology into appropriate IT tools. In several case studies, we have shown how both the methodology and toolset have been applied to produce a considerable advantage in industrial settings. Not only have project lead times been reduced in many cases, the outcomes of many projects in terms of quality and costs have also been improved.

The toolset we have developed works very well in company environments because it *only* translates the methodology with no additional overhead. This provides

a tool that is simple to use and requires very little training. Current customers particularly appreciate that training can be entirely "learning by doing": with very little theoretical training, people learn to use the toolset simply by learning the use the methodology by applying it to their currently running projects and processes. The main advantage of Communigram over seemingly similar solutions is that it is based on a new, proven methodology that improves both project planning and execution. Instead than implementing an IT system with lot of functions and then trying to find a methodology to make it work, companies that use the Communigram solution start with the methodology and then use the toolset to deploy it. Unlike many IT solutions in which technology is the main characteristic, the Communigram toolset is "methodware".

New technologies emerging in the marketplace provide very interesting perspectives for future uses of the Communigram. One example for this is SOA. Given its flexibility, Communigram could be used as a highly flexible interface to make use of services, particularly within the environment of an ERP. For instance, in many projects, certain parts and materials need to be sourced. A purchase order could be generated from outside (i.e. from within Communigram) using an appropriate service. As long as parts are scheduled to be delivered on time, this information is conveyed to the appropriate deliverables within the Communigram system. Other interesting integration scenarios include accessing calendars of people to suggest dates to work on deliverables, distributing reminders and feedback requests via e-mail, or providing mobile access to the most vital functionality.

A challenge of a very different kind arises from the very advantages of the system. As every web application, the Communigram system is affected by what is known as the "offline problem", i.e. users cannot use the system while they are on the move without a sufficiently fast internet connection. This problem is currently being addressed by storing data in a local cache that is later synchronized with the server.

Future evolutions of the product will also include new methodological aspects. Through the rich experience gained today in the field, the Communigram methodology is quickly being extended and enriched. Furthermore, certain complementary methodologies of project and process management are being integrated into the overall approach. All this is successively being translated into functional requirements that will be integrated into later evolutions of the toolset.

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