



Pellucid

A Platform for Organisationally Mobile
Public Employees

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1. Introduction

The word ‘pellucid’ means *‘transparent or translucent; extremely clear in style and meaning’* (Collins English Dictionary). That definition captures the goals of the Pellucid project, a collaborative project funded by the European Commission’s IST programme under the action ‘Systems and Services for the Citizen’ It is concerned with knowledge management for employees of public organisations. More specifically, it aims to develop a flexible, customisable software platform for enabling management and sharing of experience of such employees.

The partner organisations in the Pellucid project are:

- CCLRC (research institute, UK; Project Coordinator);
- Softeco (software developer and systems integrator, Italy);
- Cyfronet (research institute, Poland);
- Sadiel (software developer and systems integrator, Spain);
- Institute of Informatics, Slovak Academy of Sciences (research institute);
- Municipality of Genoa (Italy);
- Mancomunidad de Municipios del Bajo Guadalquivir (association of local councils, Spain);
- General Directorate for Information and Telecommunication Systems of the Regional Ministry of the Presidency in Andalucía, with SADESI (Spanish regional government and associated company).

The last three of these, local government organisations in Italy and Spain, are providing the pilot sites for the project.

This document is the public version of a key deliverable produced by the project, the Environment and Requirements Analysis, submitted in its full form at Month 8 of the project’s life, November 2002. The main goal of a platform such as Pellucid is to be of value for its end-users, which can only be achieved if the user needs and working environments are taken into account in the definition of the system.

The deliverable has been edited into a publicly accessible form to allow other interested organisations from outside the project consortium to understand the needs for knowledge management of the three user partners. It is expected that these needs will be general to many organisations of different types, though of course their processes and internal structures will be very different. The document aims to give sufficient detail to allow an appreciation of the real needs, and their relation to the situation of other organisations. It will be particularly relevant to organisations interested in the Pellucid Dissemination Group (see the project’s website at <http://www.pellucid-eu.org> for more information).

The importance and the relevance of the users’ participation have always been very clear for the Pellucid consortium. In fact, three of the project partners are present in the consortium as user partners, and all of them have been fully involved in the work performed to achieve the outcomes presented in this deliverable.

The document starts with a description of the project scope, setting out the basic problem—organisational mobility—that inspired the project, and explaining the benefits that will result from alleviating the effects of that problem.

For each pilot site, the processes in which the pilot applications will be implemented have been identified, and some desired knowledge management improvements are reported in this document. These requirements were determined by means of the interviews held with the users at various

levels. The information about the desired improvements collected at each pilot site has been used to extract a set of common needs for the Pellucid platform.

The first organisation involved as a user in Pellucid is the Mobility and Transport Department of the Municipality of Genoa in Italy (abbreviated CdG). This organisation deals with several aspects of traffic management in the town including the design of traffic light plants and the decision about their installation. This process involves several tasks including technical evaluation of the traffic light needs, negotiation with several parties (councils, urban police, public transportation companies, ...), design, financial evaluation, administrative approval, installation and final assessment.

The Mancomunidad de Municipios del Bajo Guadalquivir (MMBG), in Spain, is an association of local councils aiming at the support of social and economical development by the provision of services to local entrepreneurs and the execution of several projects funded by public administrations. The management of the complete life cycle of a funded project is considered for the application of the Pellucid technology. This process starts from the initial conception of the project, as a response to a call from an administration providing funds, and follows all steps including design, funding approval, execution and final reporting.

A quite different application is addressed by the third organisation, the General Directorate for Information and Telecommunication Systems of the Regional Ministry of the Presidency in Andalucía, Spain (CPRE-JA). It intends to apply Pellucid to support workers at the Call Centre for Management and Resolution of Fixed Telephony Breakdowns, an area suffering from a very high degree of staff mobility. In this case the main objectives are to speed up the learning curve of new employees as well as to achieve consistent behaviour of all the operators involved. This application is operated by a company called SADESI, which is the active participant in Pellucid. SADESI is a 100% public company created in July 2001, with the strategic objective of leading the management, technical assistance, development, implementation and exploitation of the telecommunication infrastructures, information systems and Information Society advanced services.

These organisations have all allowed their selected business processes to be studied, giving rise to a good understanding of the needs and desires for knowledge management. A natural consequence of this approach is to obtain a comprehensive picture of the user expectations. However, the project will not necessarily address all these expectations at each pilot site, but rather a subset of them, selected for being considered of the greatest benefit and the greatest commonality.

2. Background and scope

2.1 Organisational mobility and knowledge management

Organisational mobility, in which employees move from one department or unit to another, is becoming increasingly common, and brings its own problems and opportunities. When experienced workers leave a job, a large part of their knowledge goes with them, and this is a loss for the organisation, reducing efficiency and effectiveness. The time spent to gain familiarity with a new job is often long and stressful for the worker. This is a loss for the organisation, since it spends money on training, and it can also be frustrating for the worker, thus reducing the effectiveness of his/her activity and increasing the risk of stress-related disorders.

Many organisations devote some effort to the training of new employees, but very little to the adaptation of those who move from one position to another. In particular, there is very little support from computer-based information systems. Many organisations now have Intranets for use by their staff, but these are generally static in nature, difficult to search for the required information (which in any case might not be present), and offering no assistance in performing tasks.

This issue is affecting employees when they have to leave an organisation and to join a new one, as well as when they move from one department to another within the same organisation. In some sense, a department could be seen as a ‘small organisation inside a big organisation’.

The need for a user-friendly tool that helps the employees to perform their daily tasks, thanks to the capitalisation of the knowledge gained by experienced workers in the organisation, is clearly growing due to the current trend of increasing mobility in the labour market.

Pellucid aims at being this useful tool, able to provide suggestions and tips and to ease the access to all the information existing in the organisation in relation to a precise activity. To reach this objective, Pellucid will have to find out and to fulfil the requirements of the addressed ‘organisationally mobile employees’.

In summary, the main goal of Pellucid is to help the organisations improve their effectiveness and efficiency by formalising, recording, storing and preserving the experience and knowledge of the employees in order to avoid the loss of knowledge when they move to another role or department, or leave the organisation. Likewise, the platform will support workers during their integration in a new department, by giving access to specific knowledge and experience accumulated in the past.

Pellucid is highly applicable to employees at middle and upper levels of the organisation—the so-called ‘knowledge workers’. However, the objective addressed by the project is likewise applicable to lower levels from the organisations. There are many examples that can show the usability of Pellucid for lower level organisational scenarios. For example, secretaries usually perform ‘simple tasks’, but they need to bear in mind many complex procedures in their daily work. Another interesting example could be the working environment of a call centre, whose agents are usually ‘low-level’ employees of the organisation, but where the need for knowledge capitalisation is very critical, due to the high mobility degree of the staff.

It is also anticipated to spread the results of Pellucid to private organisations, as the situations addressed by the platform are as common in public organisations as in private companies.

2.2 Aims and benefits of Pellucid

The Pellucid platform aims to assist employees in their daily activities, by:

- Providing them, as part of their normal office computing environment, with interactive knowledge-based assistance that aids them in their tasks, exploiting the accumulated experience of previous workers.

- Developing an ‘organisational memory’ for the accumulated expertise and know-how that is valuable to them.
- Developing knowledge management and access mechanisms to locate and retrieve the information they need for the purpose they want.

Pellucid expects to produce benefits at several levels:

To the organisation:

- Consistency and reliability of performance
- Leveraging the accumulated expertise of its employees
- Making best use of organisational mobility

To the employee:

- Convenience and ease of use
- Taking advantage of the knowledge of colleagues and previous holders of the employee’s job
- Making their tasks more efficient and reducing wasted time in searching for information

To the public:

- More efficient and uniform responses from their public administrations
- More faith in the best practices of the administrations

2.3 The three focuses of experience management

Although the selected applications within the Pellucid project might appear quite different, they have some commonalities that allow the identification of common scenarios. These common scenarios are the starting point for the specification of common user requirements. The common characteristic of the three applications that have been considered is that all of them deal with a ‘procedure’ that has to be accomplished by contacting several internal and external actors, by producing and evaluating documents and respecting a given schedule and timing. These characteristics are also common in a wide range of processes performed in public and private organisations. Following this consideration, in the initial development phases of the Pellucid platform, three scenarios will be selected.

These scenarios summarise the characteristics mentioned above: contact management, document management and critical timing management. The ‘experience’ addressed by the first scenario is the capability to get in touch with the ‘right person at the right time’ when performing activities that involve several actors. The ‘document management’ scenario deals with knowledge about how to prepare documents and how to find and reuse the existing ones. The ‘critical timing management’ scenario deals with the activity planning in order to prevent problems or failures due to possible delays by evaluating how critical activities are, which conditions can influence their accomplishment, which symptoms can warn about possible problems arising and are able to prevent problems.

3. Users and pilot sites

3.1 Roles of the user partners

The three user partners in the Pellucid project have been active since the very early stages in order to provide the input required to achieve a useful tool. This tool has to provide an effective and well-adapted answer to the user requirements. The users comprise three governmental bodies from Italy and Spain who represent a wide range of situations in the Public Administration. They vary from a department of a local administration (Mobility and Transport Department of the Municipality of Genoa), a regional governmental body (Regional Ministry of the Presidency in Andalucía, through the company SADESI), to an association of municipalities (Mancomunidad de Municipios del Bajo Guadalquivir).

The users are responsible for:

- Making the pilot site and the application available for the employees.
- Providing access to their employees for requirements and evaluation.
- Hosting the Pellucid system in operation.

The evaluation of the impact of the system at the different pilot sites should validate the compliance with the user's expectations, the acceptability and the satisfaction. Likewise it should measure the added value of the platform in the performance of organisationally mobile employees.

In fact, the most important objective addressed by Pellucid is the provision of intelligent assistance that will result from knowledge management. The technical aspects, such as scaling, performance, integration, etc. must also be taken into account.

Concerning the implementation of the Pilot Application, all the users have very different starting points that vary from very standardised tasks and a careful storage of documents to a less structured organisation, with almost no systematic storage of documents and no capitalisation of knowledge/experience.

The procedure designed for the achievement of the project's objective related to the development and customisation of the pilot applications of Pellucid can be summarised as follows.

- An internal analysis of the organisational procedures has been performed at each of the pilot sites. This analysis enabled the selection of a representative procedure that will be used for piloting the Pellucid platform.
- The documentation involved in the selected procedure was determined, and the rationalisation and normalisation of document flows resulting from the work processes were studied.
- The 'knowledge management needs' were identified as the results from the interviews with the staff in charge of the work concerning the selected procedures. This has been identified as a key issue for the success of Pellucid, as it will allow the employee to benefit in an effective manner from the experience gathered in the system.
- The information collected at each of the pilot sites was extracted to compose a full set of needs that will allow the customisation of the system for each pilot application.
- To accomplish the validation of the platform, a set of pilot users will be selected in order to experiment with the application under optimal conditions at the selected department.
- The results of the test will be provided for its analysis within the scope of the project. These results will be used as feedback for the optimisation of the Pellucid platform, from the technical as well as from the functional side.

The following paragraphs introduce the three user partners and the Pellucid pilot sites.

3.1.1 Municipality of Genoa

The pilot application of the Municipality of Genoa will address the support for organisational mobility among the several areas of the Mobility and Transport Department of a large city administration. The department manages facilities and technical systems belonging to the urban and near-urban road system. The range of services managed include:

- Planning, installation and maintenance of traffic signs and signalling systems
- Planning and management of parking areas and resources
- Strategic traffic planning, by study, definition and design of traffic circulation plans within the overall road network
- Strategic planning of Public Transport services
- Daily operation and management of technical systems and facilities controlling traffic and mobility within the road network.

The services of general interest for the wider public addressed and the management of such facilities and systems is clearly critical with respect to the quality of the urban environment and the overall 'social cost' of mobility. In order to face the high levels of transport demand in the city and combat the adverse effects of resulting congestion, the technicians, like traffic managers in all major European cities, have to try and make the best possible use of available infrastructures.

On the management of such infrastructures and the effectiveness of planned measures and interventions will ultimately depend the level of transportation services offered to the public.

A major transportation policy goal and a 'market strategy' followed (again, as in most European cities) is based on making public transport services as attractive as possible, in order to increase public transport travel at the expenses of private car traffic. The Municipality of Genoa is jointly responsible for this, together with the municipal public transport company responsible for bus service operation, and are providing, in particular, strategic planning, implementation and assessment of measures and interventions at the level of road infrastructures (both roads and technical systems). These may range from the provision of protected lanes and dedicated bus corridors to bus priority at traffic light controlled junctions.

In order to be able to plan and manage their services effectively, the Municipality of Genoa is following systems engineering practices which also include the use of operational tools, such as network planning and simulation models.

The complexity of the problem and the large number of involved interests requires wide experience to obtain effective results either in general policy design and in actual implementation of such policies. Very often the planned results can be achieved only through a fine tuning of the implemented measures to solve several kind of problems (technical, legal, economical, etc.) which have no simple solution. The expertise of people involved in such decisions is highly valuable and it takes a long time to build it up. The department aims at reducing the waste of expertise and the cost, in financial and efficiency terms, due to the move of workers among roles in different sub-departments or to other departments.

The pilot application will focus on two main goals:

- The formalisation, description, classification and storage of documents and experience of workers in order to create a knowledge base that is common to the whole department.
- The application of the project tools for the continuous update of the knowledge base and for the support of workers that move among different sub-departments or that come from other departments.

The 'general purpose' platform coming from the development phases will be customised with the specific knowledge of the application. Specific knowledge will include among other issues: workflow description, common documents and procedures, lists of key-items and relevant arguments, a description of the organisation.

The application will be installed in the main facility of the department and services will be available on the Intranet.

3.1.2 MMBG

The Mancomunidad de Municipios del Bajo Guadalquivir is an organisation created by eleven local authorities with the main objective of contributing to the social and economic development of an area with 250,000 inhabitants.

The particular problem of MMBG is the wide range of tasks that must be handled by its employees. These tasks include the management of joint services (such as recycling, cultural projects), the provision of innovation and technology services (such as identifying opportunities and weaknesses in the region), the support of business initiatives, etc. This requires a high degree of flexibility among the employees, and expertise is scarce and very valuable. Thus the Pellucid platform is of great interest.

Apart from the headquarters located in Lebrija, the MMBG has one Local Development Agency at each of the municipalities that make up this organisation. Usually the projects accomplished by the MMBG are publicly funded, and involve almost always all the municipalities. This implies that several departments take part in each of the projects and thus, that a very high degree of co-ordination is needed. Harmonisation of knowledge and working procedures is another challenge to be reached in order to develop the projects under optimal conditions.

As already stated, the projects handled by the MMBG are very different (from handicrafts to IT related activities), but there is always the need for knowledge capitalisation and for reuse of previous experiences. This would lead to an increase of the efficiency and would allow a better use of the human and technical resources.

The pilot application that will be validated at the MMBG concerns the management of publicly funded projects among this complex organisation. This will include all the tasks to be performed from the very early stages of the project (definition of the idea, preparation of the proposal and submission to the funding authority) to the justification of the project's costs and activities, and the preservation of all the documents generated during the project execution.

In all cases, a central information repository (the so-called Organisational Memory) together with a set of knowledge management and access mechanisms would notably improve the working environment at the organisation. These improvements would affect both new employees and the experienced staff that can be involved in very different proposals and projects and who can also be considered as 'organisationally mobile employees'.

The MMBG is currently implementing an Intranet that will allow for a common working framework among the 11 municipalities. Pellucid will be accessible to the employees involved in the management of projects and services through this Intranet.

3.1.3 CPRE-JA/SADESI

The Regional Ministry of the Presidency in Andalucía integrates and co-ordinates several Regional Bodies in the eight Administrative Departments which compose the Andalusian Region. Due to their wide scope of application, the several processes performed by this Regional Ministry are large and complex, as they are intended to fulfil the needs of over 7 million inhabitants, and have to establish collaborative working with private and public organisations. This makes the quality and performance requirements very high, and therefore there is a need for some help in order to

minimise the impact of staff mobility as well as other external factors that could make decrease the quality of the provided services.

The pilot application of the Regional Ministry of the Presidency in Andalucía will address the support to the staff mobility among a very 'mobile' environment: the call centre providing support for the complaints about breakdowns in the fixed telephony infrastructure of the Andalusian Government Corporate Network. Although located in the same region as the Mancomunidad de Municipios del Bajo Guadalquivir, their internal and external features allow the enhancement of the scope of the customisation study of Pellucid in public administrations.

The call centre is operated by SADESI, a 100% public company created in July 2001, with the strategic objective of leading the management, technical assistance, development, implementation and exploitation of the telecommunication infrastructures, information systems and Information Society advanced services.

4. Pilot application 1: Municipality of Genoa

4.1 Identification of process for pilot application

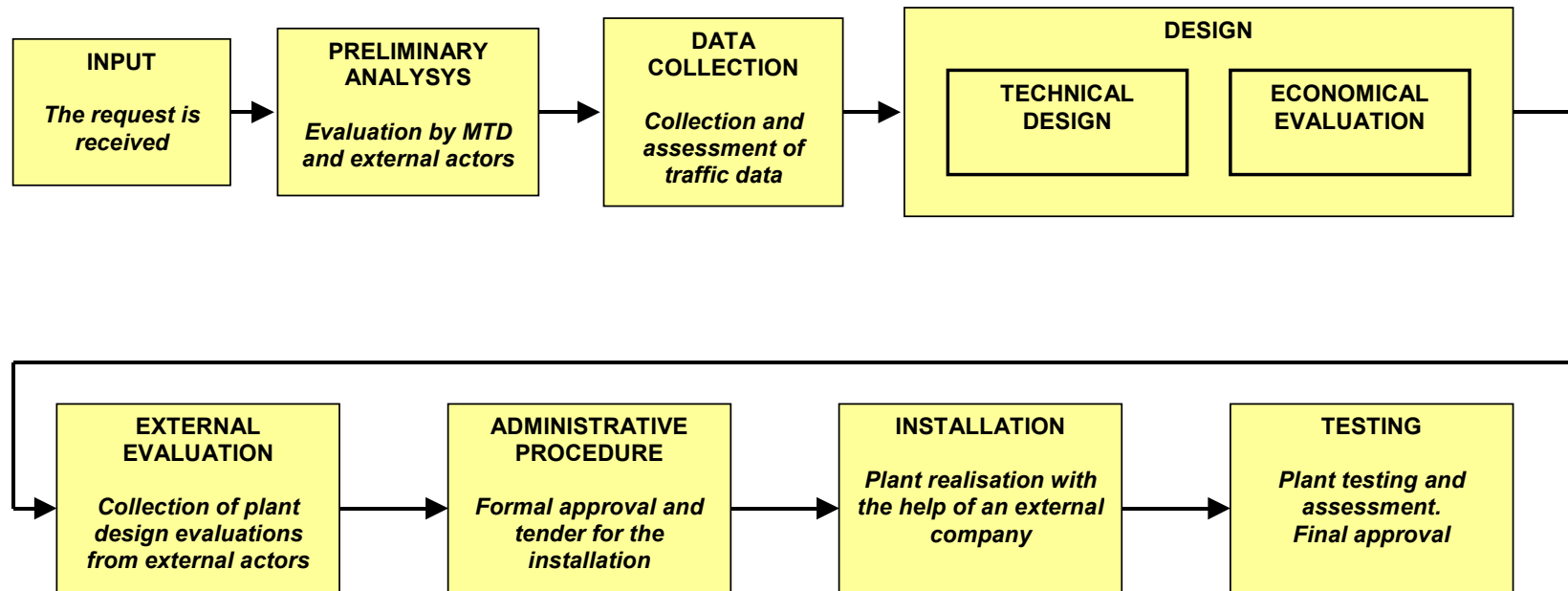
After analysing the internal procedures carried out at the Mobility and Transport Department of the Municipality of Genoa, the one selected to be modelled and implemented for the Pellucid pilot application is the process of installation and maintenance of a traffic light plant.

This process comprises several tasks, and starts with the request of installation of a new traffic light and terminates with the realisation and final testing of the plant. The procedure can also terminate with the rejection of the request at various steps.

The main phase includes the initial **Registration** of the request, which is assigned to a technician in the department. The design activities start with a **Preliminary Analysis** that involved the collection of several informal evaluations of the proposed plant from several actors including Urban Police, Technicians of the Department and Local Councils. The analysis of previous related requests is performed as well. The next phase is the **Data Collection**, during which traffic data are recorded and assessed. This task can require the work of several actors. These data are used for the **Design**, which involve both the technical and the economical evaluation of the plant. This phase involves several internal actors providing among others traffic simulation and updated cartography. Several versions of the plant design can be prepared up to the approval of the final one that is submitted to a formal **External Evaluation**. In this phase an official evaluation is asked to a set of bodies including Urban Police and Local Councils. These evaluations are used for the final assessment and the decision of continuing with the installation. If the result is favourable, an **Administrative Procedure** starts. The goal of this procedure is to obtain the formal approval and to identify the company for the realisation of the plant. The responsibility of the Department includes also the management of the last two tasks: **Installation** supervision and final **Testing**.

This process involves internal actors and external actors. The external actors have to be contacted for informal and formal evaluation of the proposed plant and for obtaining various type of information.

The following diagram illustrates the process graphically.



4.2 Expectations for knowledge management

The following list contains the main expectations of the improvements arising from knowledge management identified after the analysis of the interviews and of the process description at the Municipality of Genoa.

- To contribute to the training and adaptation of the new employees to their new working environment, as well as to the daily activity of experienced workers. This way it will be also useful in organisations/departments with a low mobility degree.
- To support new workers to master the job quicker and with less stress. It should also help experienced people to work more efficiently.
- To provide ‘explanation’ of the status of each project including the phase where the design is the relevant issue and problem.
- To allow a unified approach to the management of all documents produced during the evaluation, design and installation of the plant. To this aim, common standards should be adopted.
- To assist employees by supplying the ‘assessing capability’ coming from the experience. To this aim it could facilitate the approach to the procedures, indicating also the usual way of performing a particular process step.
- To guide employees in the performance of their activities in a didactic way, for instance encouraging them to follow the step-by-step procedure and avoiding the possibility to skip over any phase. A checklist that helps to continue the process following the foreseen steps could be a useful functionality for this purpose.
- To provide a valid support that is not perceived as an additional task. This way people will be able to contribute to the enhancement of the platform’s knowledge of the process by introducing systematically information related to their activity.
- Pellucid should be a platform where the knowledge becomes a common property, therefore it could be useful help to trace the procedure making the working environment more efficient, for instance rationalising the documents related to the traffic light installation process.
- One of the benefits expected from Pellucid is that it enables intelligent search on the plant evaluation and the past design procedure in order to identify:
 - plants similar to the requested one,
 - requests for plants in the same area (both with positive and negative results)
- If there is a link to images of crossing, Pellucid could show pictures of similar crossings in order to have the possibility to compare the two situations.
- To provide a link to the existing applications and the relevant data for the decision making in the process.
- To provide a facility that allows search of previous requests.
- To provide a contact database for the identification of the responsible/contact person for each of the process phases/activities/tasks. As an example, this would help to identify, within the 27 zones in the Municipality, the police in charge of giving the required information.
- To provide a facility for interaction with the agents involved in the process, from the administrative office to the users of the road.

The following table gives, for each task of the ‘Installation of a Traffic Light Plant’, a definition of the task and a short explanation of the reason why this task is easy or not. This does not include external tasks because the person in charge of completing it will not have access to Pellucid.

PHASE	TASK	DEFINITION	EASY OR NOT AND WHY?
Input	Instantiation of a new dossier	Formal verification and registration of the request. A new process instance is created by giving a registration number to the request.	YES – elementary task.
	Forwarding request	Sending to the design sector of the request after registration.	YES, but Pellucid can make it easier
Preliminary analysis	Search for previous requests	DS.T searches for previous requests about the same area and checks for related data.	NO – finding document is not easy and identifying useful data is also difficult
	‘Prepareri’ collection	A sort of preliminary evaluation report is prepared by collecting opinions from the representative of the area district and from the urban police.	NO – finding the most qualified person to ask for opinion is a difficult task
	Evaluation	All the data and the opinions collected are evaluated by the DS.R and a decision whether to continue or not is taken.	NO – request a global vision of the problem and strong estimation capabilities
Data collection	Measures design and planning	Putting together data related to accidents occurred in the area, to the pedestrian habits	NO – this task implies the collection of documents and information about the area knowing where to find them and what to look for is not easy.
	Flow measurement	External task	
	Data analysis	Starting from the data collected during the flow measurements, it is created a traffic flow table.	YES – automated action (downloading a file containing data collected in the previous task and transforming it into a report table).

PHASE	TASK	DEFINITION	EASY OR NOT AND WHY?
	Data assessment	All the data collected are evaluated by the DS.R and a decision whether to continue or not is taken.	NO – request a global vision of the problem and strong estimation capabilities
Design	Topographic relief	External task	
	Simulation	A simulation is performed in order to assess the possible situation with the traffic light and the needed timing.	NO – strong technical capabilities are required
	Structural design	The technical staff designs a planimetry of the plant (how many lights, where to install them...).	NO – technical task that requires experience on similar plants
	Technical design	The technical staff decides the type of plant to implement, the connections with local and central control system and the timing cycle.	NO – technical task that requires experience on similar plants
	Economical evaluation	The economic estimation is made by the design staff taking into account all the information and decision assumed until this phase of the process.	NO – knowledge about current prices of plants, structures and road works needed is necessary.
	Global design evaluation	The resulting design is evaluated by the MTD.D and a decision whether to continue or not is taken.	YES – elementary task
External evaluation	External evaluation	External task	
	Approval	The design with the external opinions is evaluated by the MTD.D and a decision whether to continue or not is taken.	YES – elementary task
Administrative procedure	Administrative check	Administrative procedure starts, in order to establish <ul style="list-style-type: none"> – the funding, – the deliberation, – the procedure of the tender, if needed. 	YES – human task

5. Pilot application 2: Mancomunidad de Municipios del Bajo Guadalquivir

5.1 Identification of process for pilot application

Two processes were initially considered for the MMBG pilot application:

- Management of Projects and Services at the MMBG. This includes a wide scope of activities, devoted to the proposal and execution of different projects that will help to the economical development of the 11 Municipalities composing the MMBG.
- Planning and Management of Training Activities for the promotion of the Employability, in collaboration with the Regional Ministry for Employment and Technological Development.

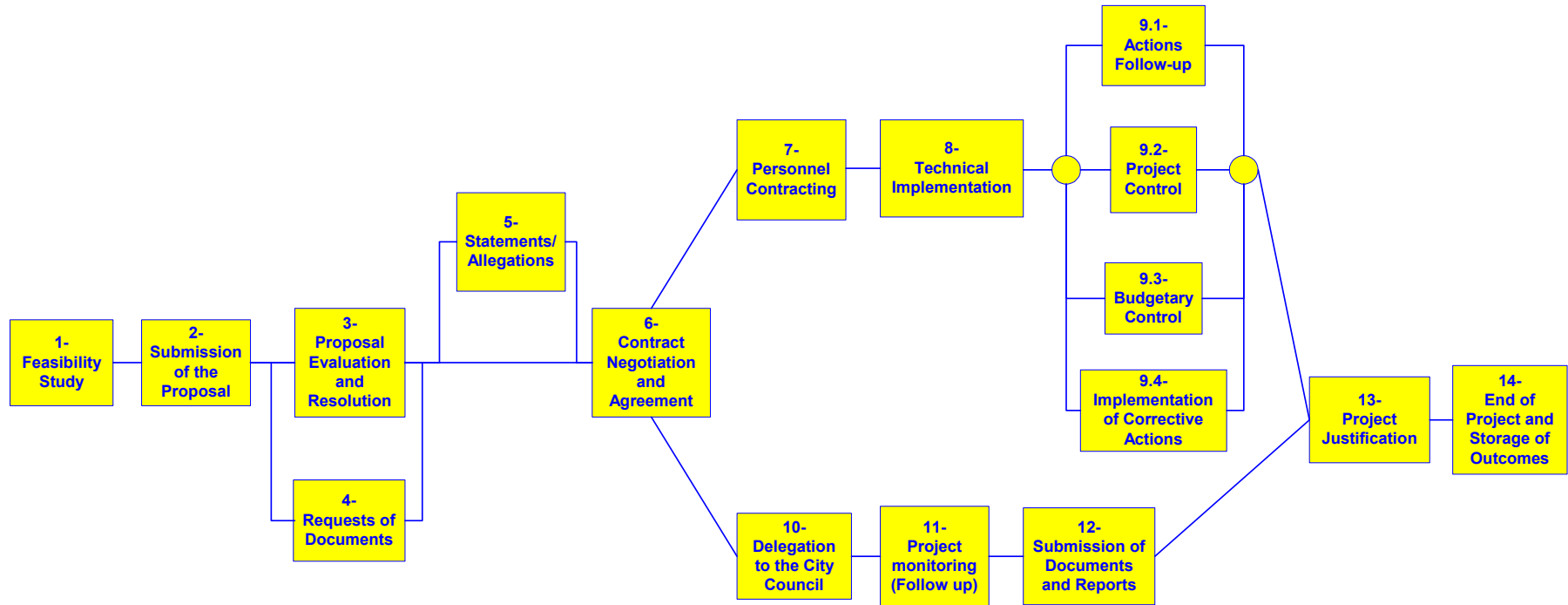
After an analysis of both options, and taking into account the pilot applications defined for the Municipality of Genoa which are devoted to a very concrete process, it seemed more attractive for the enlargement of the project's scope to focus on a more general process. Therefore, the MMBG has selected for its pilot applications the process devoted to the Management of Projects and Services.

The 'Funded Project Management' procedure selected for the Pellucid application starts with the **Feasibility Study** that prepares the original proposal. This study is **submitted** to the funding body that can either **approve it or reject** it. In some cases, **additional documents** can be requested. In case of rejection a **statement** can be prepared to request further evaluation. After the approval, the **contract is negotiated** and the activity launched. Execution includes two paths: *internal* and *external*. The *internal* path starts with **personnel contracting** and **technical instruction**. Afterwards, the following activities, which run in parallel are planned in order to monitor and control the project implementation: **Project Control, Action Follow-Up, Budget Monitoring and Corrective Action Implementation**. The project is implemented by a Local Administration. This procedure follows the *external* path that includes: **Delegation to City Council, Project Monitoring and Reporting**. The two paths join at the project termination when two final tasks are planned: **Final Project Justification** and **Storage of Outcomes**.

The main problems arising during the development of this process at the MMBG are pointed out here below:

- Currently, there is no interrelation among the different areas/departments for the different phases of the process. The information concerning the projects is stored—there is a dossier for each project—but it is not structured to allow its reuse.
- There is no information to support the search of external assessment for the proposals development, since there is not any database that collects the contact data of potential partner companies.
- Concerning the compilation of information for the proposal's preparation, this must be done 'from scratch' each time. This means that, again, there is no possibility for the optimisation of the resources devoted to this task. The same applies for the preliminary research performed previous to the preparation of the proposals.

In this scenario, Pellucid plays a key role for the improvement of the current situation, allowing a homogenisation of procedures and the interrelation of the different actors involved.



5.2 Expectations for knowledge management

The following desired improvements were identified:

- To allow the access to relevant information related to each of the phases of the process. This concerns not only contact database management but also suggestions and recommendations in order to facilitate the work.
- To provide information structured by phases of the process, and by activities.
- To interconnect the different actors involved in the process, and to allow them to share the information about the process phases and status.
- To provide guidance for the steps related to the preliminary research and preparation of the project proposal. It should provide easy access to the information sources (for example: web sites, bibliography grouped by topics) and to previously developed dossiers, in order to take benefit of the work already performed.
- To promote the reuse of the experience related to specific kind of projects, in order to help the Local Development Agents when facing a project in a new domain. It should include tips to help the research phase previous to the proposal preparation, such as where to find the information related to the calls, or what are the key success factors for a concrete type of project.

The following table explains, for each task of the 'Management of Publicly Funded Projects', a definition of the task and a short explanation of the reason why this task is easy or not. This does not include external tasks because the person in charge of completing it will not have access to Pellucid.

PHASE	TASK	DEFINITION	EASY OR NOT AND WHY?
Presentation	Feasibility Study	Elaboration of the documentation in order to produce the application and to obtain the approval	NO – lack of basic information helping to the redaction of the application.
	Submission of Funding Applications	Sending of the application after the approval	YES – elementary task
Resolution	Resolution of the Administration	External task	
	Submission of Statements	When the resolution is negative an elaboration of allegation (explanation and justification) is required.	NO – elaboration of an allegation is quite difficult. Intrinsic with the task
	To send the demanded documentation	Information sending	YES – elementary task
	Agreement on implementation period and amount	Signature of a collaboration contract to begin the execution	YES – human process
Execution	Delegating the implementation to the City Council	Signature of a document to delegate the project execution	YES – human process

PHASE	TASK	DEFINITION	EASY OR NOT AND WHY?
	Follow up the actions of the project by MMBG	It is an external execution task, but the RP takes part in the supervision of the follow-up and the validation of the documents	YES, but Pellucid can make this task easier.
	Sending the required documents to the Department Responsible for the Project	It is an external execution task, but the RP takes part in the validation of the documents useful for the justification	YES, but in order to prepare the justification phase, Pellucid can make this task easier.
	Personnel Contracting	This task consists in: 1. the elaboration of profiles, 2. publish the job opportunity 3. search internal worker	NO – define a profile is not obvious YES – elementary task YES, but Pellucid can make this task of search. easier
	Technical Guidelines	Manual for the planning of the execution and the implementation.	YES, reuse of the initial report for its elaboration and incorporation of this manual in the final report
	Follow up of the actions	Supervision of the tasks	YES, human process
	Control of the Project	Control of the deadlines and phases and produce documentation	YES, but Pellucid can make the task of redaction easier
	Control of the Budget	Control of each economic concept	YES, task based on calculations and not on the experience.
	Perform some modifications on the project planning.	In the case of delay, adjustment of the planning: utilisation and identification of a critical phase.	NO – identification of the critical phase is difficult. In addition, Pellucid can make the task of redaction easier
Justification	Justification	Demonstrate that what has been spent is what has been granted	YES, task based on calculations and not on the experience. But Pellucid can support the redaction task of the justification document.
Registration	Registration	Archive the whole of (paper) documents.	YES – elementary task

6. Pilot application 3: General Directorate for Information and Telecommunication Systems of the Regional Ministry of the Presidency in Andalucía, Spain (CPRE-JA) / SADESI

6.1 Identification of process for pilot application

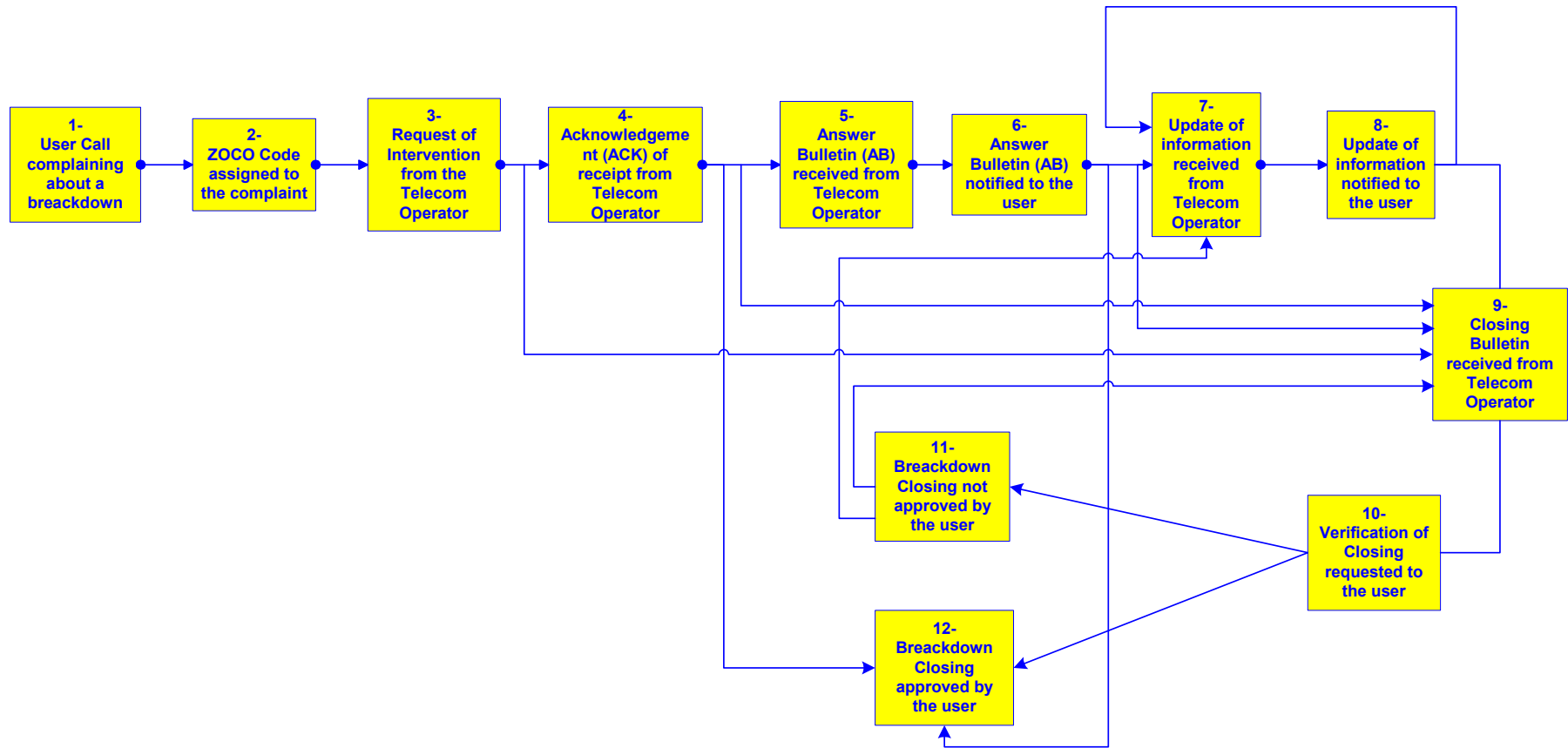
CPRE-JA has selected its pilot application focussing mainly on the mobility issue. It is well known that agents of call centres suffer from a very high mobility degree. The usual stay of the employee at the same workplace is approximately 6 months, as an average. CPRE-JA aims at validating Pellucid in such an 'unstable' environment.

The *Call Centres for Management And Resolution Of Fixed Telephony Breakdowns* of the Corporate Network of the Andalusian Regional Government, and more precisely, the incorporation of a new agent to this call centre, will be the testing environment for Pellucid. This call centre is operated by the company SADESI.

This application focuses on a well-defined process already managed with help of a Workflow Management System. The procedure starts with the income of a **User Call** to the centre. The call is **codified** and the complaint is used to generate a **Request of Intervention** for the telecommunication provider service. The operator can reject the request or send an **Acknowledge Receipt**. After the restoration of the fault, the operator sends an **Answer Bulletin** to the centre explaining the actions it has taken. This bulletin is **notified** to the user that can accept or reject it. In case of acceptance the **Breakdown is Closed**. If it is not accepted a cycle can start, which includes an **updated of information to the operator** and an **updated feedback** to the user. When the problem is finally solved the operator issues a **Closing Bulletin** that is **Verified** and approved by the user.

Among the main problems that Pellucid should solve, the following ones can be highlighted:

- The new call centre agents must acquire an understanding of their new working environment in a very short time. Their training and adaptation to the new workplace takes usually less than one day, and this causes a very important stress load to them.
- There are no training courses for the new agents. The supervisor usually spends 4–5 hours explaining them the most important details, but in order to improve efficiency, this time should be dramatically reduced.
- There is already an application that supports the managing and resolution of the breakdowns, the Vantive System, but not all the functions are provided by this system. Therefore, there is a lack of support for the complete life-cycle of the process.
- If the integration of the new agents in the call centre environment fails, this will lead to an overall decrease of the quality of the services, with the consequent bad image towards the users of the call centre, and the increase of the number of complaints.



6.2 Expectations for knowledge management

The following are the desired improvements:

- To provide complementary help in order to allow the employee an easier performance of their activities. To this aim, the platform should be integrated in the working environment, and should be used in the daily activities of the agents in order to get effective tracking and storage of the knowledge managed in the processes.
- To support the effective transfer of experience among new employees and experienced workers.
- To include, and pay special attention to those activities that are infrequent in the process, due to the fact that they use to be complex and relatively unknown in the organisation, and their resolution is therefore more time consuming.
- To provide validation rules for the correct development of each of the process phases.
- Pellucid should not complicate the existing process. This is, it should provide a complementary tool, allowing the employee to improve its efficiency at the workplace, but it should not mean an extra work, since this would lead to a rejection of the platform.
- To provide a complementary database for knowledge management, and implement the functionalities needed for the exploitation of this database. This will allow an effective reuse of the experience 'stored'.
- There is already a software tool used to handle the incidents. The Vantive system helps with the collection and storage of the information related to a breakdown. It allows distributing the work concerning the management and resolution of the breakdowns. However the existing Vantive System does not allow implementing modifications. Pellucid is expected to add flexibility and to support the modification of process structure and information.
- To provide guidance for the completion of the different templates (Vantive screens).
- To provide agents with 'tips' for saving time and avoiding the main problems encountered during the resolution of the different tasks. These tips are, in fact, the way of reusing the 'non formal' experience. This is the experience gained by colleagues that have previously dealt with the same situations.

The following table explains, for each task of the 'Management and Resolution of Fixed Telephony Breakdowns', a definition of the task and a short explanation of the reason why this task is easy or not. This does not include external tasks because the person in charge of completing it will not have access to Pellucid.

Transition	Task	Definition	Easy or not and Why?
T1	User call complaining about a breakdown	Fill in the first screen of Vantive. There are three important elements: the sub-type of the incident, the priority of the incident and the observations.	NO. In a very short time, the agent must identify and characterise the incident
	ZOCO Code assigned to the calling user	ZOCO Code is the reference number for the resolution of an incident. It is a register number. The agent notifies this code to the user.	YES - automatically assigned by Vantive. YES – elementary task
	Intervention requested to telecom. operator	The agent sends an e-mail to the operator.	YES - Vantive generates the e-mail. The agent just reformulates a few sentences.
T2	E-mail received from the tel. operator	The operator sends an e-mail to the agent. The agent identifies the e-mail as an Acknowledgement.	NO - the received e-mail is not clearly written up. The agent must establish if this e-mail is not a Closing Bulletin.
T3	New e-mail received from the tel. operator	The operator sends an email to the agent. The agent identifies the e-mail as an Answer Bulletin (AB).	NO - the received e-mail is not clearly written up. The agent must establish if this e-mail is not a Closing Bulletin.
	Answer Bulletin (AB) notified to user	The agent sends an e-mail to the user.	YES - Vantive generates the e-mail. The agent just reformulates few sentences.
T4	Other e-mail received from the tel. operator	The operator sends an email to the agent. The agent identifies the e-mail as an Update Information Bulletin (UIB).	NO - the received e-mail is not clearly written up. The agent must establish if this e-mail is not a Closing Bulletin.
	Update Information Bulletin (UIB) notified to user	The agent sends an email to the user.	YES - Vantive generates the e-mail. The agent just reformulates a few sentences.
T5	Other e-mail received from the tel. operator	The operator sends an email to the agent. The agent identifies the e-mail as Closing Bulletin (CB).	NO - the received e-mail is not clearly written up. The agent must establish if this e-mail is a Closing Bulletin or an Update Information Bulletin.

Transition	Task	Definition	Easy or not and Why?
	Verification of Closing requested to user	The agent must obtain information as soon as possible, for that he can opt among several alternatives: 1) the agent call the user 2) the agent indirectly call the user, for instance the office. 3) the agent sends an e-mail to the user.	1, 2) NO - to locate the contact person is difficult once in a while. 3) YES - Vantive generates the e-mail. The agent just reformulates few sentences.
T6	Breakdown Closing not approved by the user	The agent must send an e-mail of refusal to the operator.	YES – transition without ambiguity
	Breakdown Closing approved by the user	The agent sends a confirmation e-mail to close the file.	YES – simple transition
T7	Update Information Bulletin (UIB) notified to operator	The agent sends an email to the operator.	YES - Vantive generates the e-mail. The agent just reformulates few sentences.
T8	Timing break Decision	The agent must decide whether the request of timing break is valid or not.	NO – Pellucid can help this task providing knowledge of decision.
T9	Cancellation of Timing break	The agent resumes the time counter.	YES – transition without ambiguity
T10	Transmit a claim	The agent hounds the operator that does not respond.	NO – Pellucid can help this task providing knowledge about the time awaited for the delivery of the claim.

7. User needs and knowledge management

7.1 Introduction

7.1.1 Objectives

Having studied the three pilot applications, the next step—covered in this section—is to analyse the general user needs. The Pellucid project is developing a customisable platform, so there has to be some generic functionality for knowledge management underlying all the particular applications. Some of the expectations identified at the pilot sites might be very particular to those sites, or better addressed through other means than Pellucid. The important thing is to group and abstract the knowledge management needs into a generic set that can be taken as the requirements for the Pellucid system.

This section continues with a short presentation of the main actors that have to be considered to characterise the different levels of experience in the organisation. Subsequently, the following points will be considered:

- **General requirements**
Based on the interviews, some general needs concerning the Pellucid system have been abstracted, about its relation to the users and the working environment.
- **The experience to be managed**
The three main focuses for the Pellucid knowledge management—at least in the first phase of the project—will be contact management, document management and critical timing management. The nature of the experience in each case is defined, in terms of what distinguishes an experienced from a novice employee. It is this experience that the Pellucid system must help to manage.
- **Technical requirements**
Likewise, it is very important to collect the technical requirements. These requirements stress different aspects of the integration of Pellucid within the existing organisational environments.

7.1.2 Main Pellucid actors

The actors define the principal types of users. Each actor plays an important role for the effective exploitation of the system (use of the system, enrichment of the organisational memory, etc.).

The main actor is the **new employee** of the organisation. Within this category and due to the relevance of their role in the system, several types of actors need to be taken into account:

1. **The novice:** a new employee that has just been graduated and starts his career,
2. **The external contracted:** a new employee that has already some experience on the same tasks but that comes from another organisation, thus, working environment,
3. **The internal contracted:** a new employee that comes from the same organisation, so he knows the methods and the usage, but has been involved in other tasks.

The second actor is an **experienced employee** of the same organisation. These actors will play a main role in the enrichment of the organisational memory and thus their contribution to the platform will allow sharing of the 'organisational experience'.

7.2 General requirements

Considering the different interviews, general requirements have been established concerning:

- knowledge reuse,
- help to facilitate the use of Pellucid,
- the user interface, and
- training.

The reuse of experience is performed according to a very concrete reuse goal. One of the main objectives of the Pellucid tool is to support the new employee in the performance of daily tasks, and more generally, to help the employees and facilitate their performance of the different tasks to be accomplished by means of the sharing of knowledge among the organisation.

Concerning the three pilot applications, some general requirements and knowledge management improvements expected by the users are underlined here below:

- Pellucid should be regarded as a complementary tool, allowing the employee to improve their efficiency at the workplace. To make the user acceptance easier, Pellucid should not entail a further activity, nor complicate the normal process. Only in this way people will be able to contribute to the progress of the platform's knowledge.
- Pellucid should contribute to the training and adaptation of the new employee to their new working environment, as well as to the activity of the experienced workers. Pellucid should support the effective transfer of experience among new employees and experienced workers.
- Pellucid should be integrated in the working environment, and should be used in the activities of the actors in order to get effective tracking and storage of the knowledge managed in the processes.
- Pellucid should allow the employee an easier performance of his/her activities. In addition, Pellucid should include and pay special attention to those activities that are infrequent in the process, due to the fact that they use to be complex and relatively unknown in the organisation.
- The Pellucid platform could give some hints to performing activities, most of all in those particular cases, when the usual rules are not enough to assess the situation. The platform should facilitate the approach to the procedure rules, and show the usual way of doing a particular process step. This would also be the case of a critical phase, for instance when an activity/task is not well defined/described, there are no correct data for its resolution.

The following requirement focuses on how to facilitate users' interactions with the Pellucid tool. To achieve this goal the user will be able to:

- Access to help services containing enough information to explain the objectives, functionalities and properties of the Pellucid tool.

The interface requirements cover the ergonomic aspects and the tool perception by the users. Generally, we can collect the following type of requirements:

- The interface must be understandable.
- The navigation must be as intuitive as possible.

The Pellucid tool requires some training according to the end-user's current situation. These training sessions will be planned for every new task available through the platform, in order to make the users able to get the maximum benefit of the tool.

7.3 The nature of experience to be managed

In the context of the three pilot applications we will detail the experience related to three main themes that have been established for the Pellucid knowledge management:

- Contact management,
- Document management, and
- Critical timing management.

Scenarios are used to capture end-users' needs in their own context. These scenarios enable to focus on the specific aspects of knowledge management involved in these three themes, to capture the whole picture and a concrete set of interaction sequences, and to view the system as a component of a knowledge management solution for a company.

7.3.1 Contact management

The 'contact management' scenario deals with the contacts required for performing some activities (e.g. asking for a consultancy, sending a design result, sending request for information...). This is a very common task, which affects all the applications. The 'experience', distinguishing between expert people from newcomers, can be defined as the capability to get in touch with the 'right person at the right time'. Pellucid should capitalise the knowledge obtained through observing the behaviour of several employees involved in the same task for a certain period. It should also enable to reuse this knowledge and to suggest an optimised contact list adapted to the present process status and task (i.e. to suggest the right 'contact' to get in touch in the present context).

In different phases of their work and in order to accomplish their different tasks, employees often have to contact other persons. These persons may belong to the same company or to other structures. Therefore, these employees gather an enormous quantity of data about these contacts and about how they may affect the activity to be carried out. For example, who should be called to solve some kind of problem, who to get in touch with to have a certain type of information, what communication means are most advisable (e-mail, telephone, fax) etc.

In this scenario, this is the experience that distinguishes an experienced worker from a newcomer. This experience contributes to create a knowledge base that allows an effective and efficient use of the contact list, with a real benefit from the task carried out.

Hence 'experience' could be defined as *the capability of classifying and organising the contact list according to different criteria, depending on the activity to carry out and the present conditions of the work.*

The contact management depends not only on the activity of the process the employee is working on, but also on the conditions of this activity. For example, a certain problem to be solved, within a particular process, could be more demanding than considering another process, so it might be necessary to contact the most competent person or to request more opinions.

Therefore, the optimal contact will depend on the activity to be carried out, or on the particular problem to be solved, the urgency of the task, and so on. All these factors do not only depend on the workflow itself but also on the particular situation the employee has to face and on the workflow that is going on.

Once the meaning of 'experience' in this scenario is known, Pellucid should capture and capitalise it in order to return it to the user, and reuse it to create new improved knowledge.

7.3.2 Document management

The 'document management' scenario deals with the preparation of technical documents including reports, forms, drawings and many others. The 'experience' includes in this case knowledge about

how to prepare these documents, which template to adopt, which elements to focus on first, which part can be omitted, how to find help, where to find reusable material and many others issues. It also includes smart search of useful documents. This problem applies to all procedures even if the types of document to prepare are different. The support expected by Pellucid is in the provision of instructions, hints and suggestions on the 'smart' way to prepare these documents and on the way to find further help, achieved by analysing and capitalising the behaviour of employees which performed the same tasks in the past.

During their work, employees have to deal with an amount of documents that they produce or use to carry out their tasks. So it could happen that, in a particular phase of the process, the worker has to produce a particular document by filling in some forms or writing down a letter or compiling a list of requirements and so on. An experienced worker knows what document is relevant to a particular activity and what is a smart way to produce it.

Other activities could require the use of documents already existing, such as document produced in past works or documents coming from external structures (budgets agreements etc). In this case the experience means: knowing where to look for these documents and what are the relevant parts.

Once more, 'experience' can be defined considering what distinguishes an experienced worker from a novice. In this scenario, 'experience' is *the ability to know what the documents relevant to the present task are and where to find them, and what the documents to be produced are and how to compile them depending on the present conditions of the work.*

Of course, documents, to be produced or used, depend on the task to be carried out within the process. However this is not enough. Documents, and in particular their filling in, are strongly dependent on the conditions of the present activity. For example, if there is a delay in the process or if the process is more urgent than others are it could be necessary to produce one or more documents to urge the accomplishment of some related tasks or activities.

Obviously there is a relation between the document and the contact management and between the document and the critical timing management. Indeed, knowing how to manage a document often means also knowing the receiver or who is in charge to produce it and to know the timing criticality level of the activities.

7.3.3 Critical timing management

The 'critical timing management' scenario deals with the activity planning to prevent problems or failures due to possible delays. Present project management tools can help in keeping track of this, but are not able to assign and manage task criticality.

Experienced people are able to

- evaluate how critical each activity is,
- which conditions can influence its accomplishment,
- which symptoms can warn about possible problems arising, ...

... and are even able to prevent problems.

Pellucid is expected to suggest newcomers which tasks to monitor, which of them are more critical, which are the elements for the evaluation of task behaviour, which task are performing in agreement with the historical data, which are not and the most effective corrective actions to perform. These suggestions should come from the reuse of the knowledge accumulated and discovered by the observation of the employees and their actions in the past.

The daily working routine of an organisation implies the existence of simultaneous processes based on the same workflow, each composed of several task. Obviously, among these processes and tasks, some of them are more urgent or critical than others. So employees have to face and manage the

criticality of these processes in order to avoid problems and failures. This means that they should be able to evaluate the criticality level of each process, to recognise the symptoms of arising problems, to manage exceptions and to prevent problems. More experienced workers know whether a task is being performed according to historical data or not, and the reason for a possible mismatch.

In this scenario, 'experience' can be defined as *the capability to assign priorities and criticalities to pending processes, to foresee and prevent problems and to manage arising exceptions.*

7.4 Technical requirements

Three technical requirements can be underlined so far:

- **Activation of Pellucid under the user initiative:** for this requirement, we may add an option that allows the user to choose whether he wants the Pellucid tool in automatic activation mode or not.
- **Suitable integration:** use of Pellucid without delay or disturbing other running processes.
- **Take into account the context of work** at the moment of the activation of Pellucid tool. In fact, when a user is working and needs some information that is available from Pellucid, the user will require a quick and suitable answer with no need to indicate the workflow, the activity nor the task on which he is working.
- **Integration with the existing Workflow Management (or Tracking) System (WfMS, WfTS)**

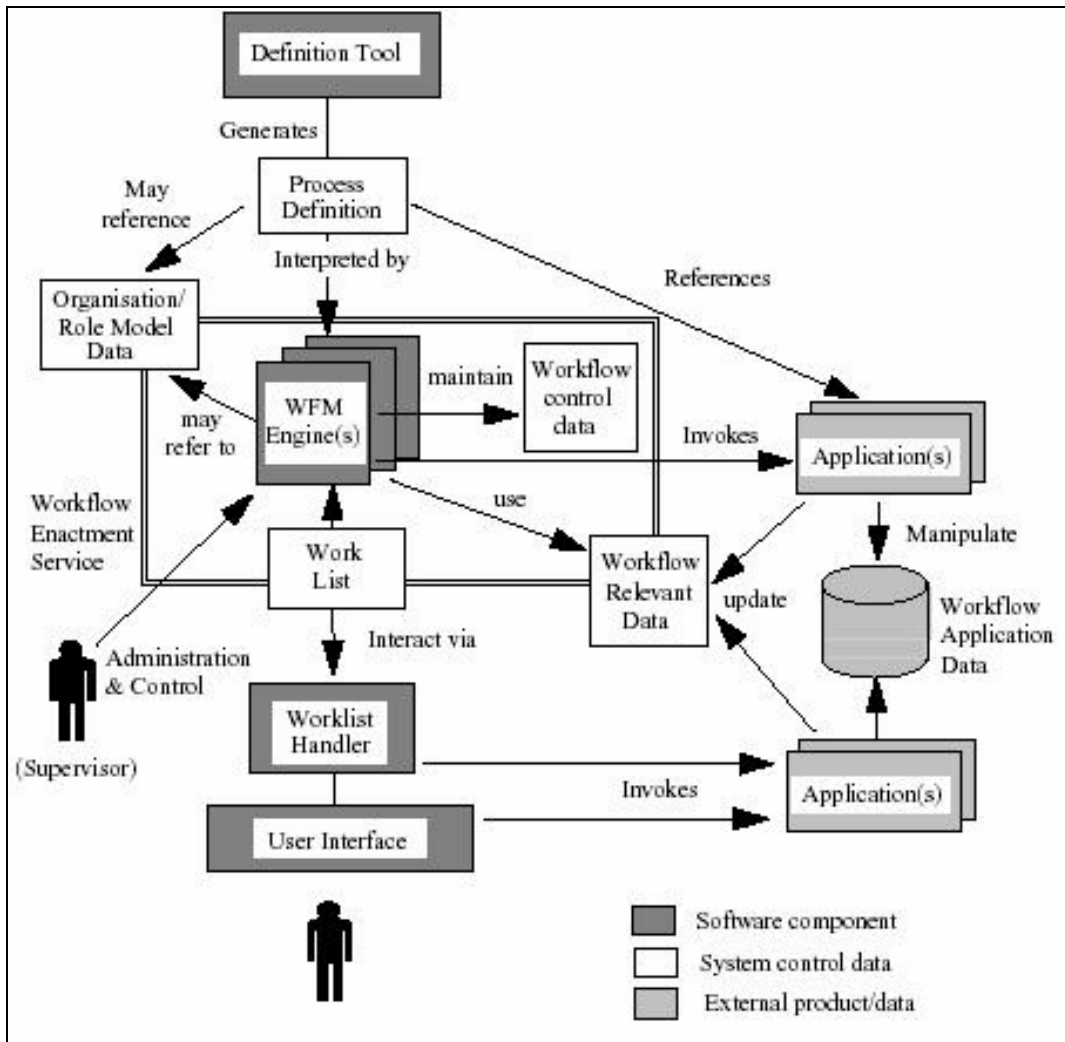
For many Pellucid functionalities, a tracking system should be build up that allows for the identification of the current task being performed by the Pellucid user when interacting with the system, and to store this information into the platform for a later use.

The Pellucid platform, in its general approach, supposes the existence of an underlying workflow management system (WfMS), from which part of the knowledge of the users will be captured. Referring to this issue, the situation of all three pilot applications is quite different:

- CdG is considering the use of an open source WfMS (possibly OpenFlow).
- CPRE-JA uses a proprietary software with an embedded WfMS (Vantive).
- MMBG has at present no WfMS for the development of its activities.

In the case of existing WfMS, Pellucid needs to adapt to the possible changes of the WfMS, in order to prevent the possibility of losing any previous work if the WfMS adapts to new situations or new processes performances.

Therefore, the implementation of the Pellucid platform must be independent from the WfMS that can exist in each working environment. Due to the very different initial situation of each pilot application and to the fact that no homogeneous evolution is foreseen, the solution should be necessarily based on the use of internationally recognised standards. In this sense, the Workflow Management Coalition (WFMC) proposes the following scheme to describe a generic workflow management product.



Generic WF Product Structure. *'The Workflow Reference Model'*.
 Copyright 1993, 1994, 1995, Workflow Management Coalition.

For Pellucid, the interest focuses mainly on the access to the System Control data:

- Process definition.
- Organisation / Role Model Data.
- Work list.
- Workflow control data.
- Workflow relevant data.

In the case of CdG's and of CPRE-JA's pilot applications, the access to this information is feasible for Pellucid, with the only condition that the WfMS in use conforms to the WAPI standard established by the WFMC.

MMBG's case is different, due to the current absence of a WfMS. The implementation of the Pellucid platform in this environment requires the additional availability of a system in charge of gathering the previously indicated information, even in a manual or semiautomatic form. This system could be even an easy 'MS Access application', and must conform to the WfMC's WAPI standard.