DEVELOPMENT OF AN INNOVATIVE AND HARMONISED EUROPEAN CURRICULUM IN PURCHASING AND SUPPLY MANAGEMENT

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Abstract

The paper deals with the need, motivation and requirements for the development of an innovative and harmonised curriculum in the Purchasing & Supply Management (PSM) discipline against the background of trends and current developments in the industry. Furthermore, the methodology, which was developed and is successfully applied in the context of the EU Erasmus+ project “Purchasing Education and Research for European Competence Transfer” (PERFECT) to develop the curriculum is in focus. Moreover, the concrete results of this research, i.e. the discovered competences, which need to be taught to students of PSM, are presented in the paper.

Keywords: Curriculum Development, Purchasing & Supply Management, competences, EU project.

1 INTRODUCTION

The purchasing and supply management (PSM) function in any organisation is a key contributor to a firm's performance [1]. A significant portion of the total turnover of a modern industrial firm in Europe is directly transferred to suppliers [2]. This trend is detectable in all sectors, with average purchasing costs of approximately 60% of the overall costs [3]. Moreover, the bulk of supplies is now no longer of domestic origin, but of European and international nature. As this network economy with a low depth of production and high reliance on international suppliers is a recent phenomenon that has emerged in the last two decades, firms are still struggling to find effective and efficient ways to cope with these circumstances [4] [5].

The definition of PSM in this paper was agreed upon during the work for the project PERFECT, which will be described in detail in later chapters. It is based on van Weele's understanding that PSM “ [...] is the discipline that is concerned with the management of external sources – goods, services, capabilities, and knowledge – that are necessary for running, maintaining and managing the primary and secondary support processes of a firm at the most favourable conditions” [2]. In addition, a broader scope focusing on the full upstream network is included. [5]

Therefore, the PSM definition for the PERFECT project is specified as follows: Purchasing and Supply Management comprises the management of external inputs – materials, services, capabilities and knowledge – that are required for building, running and maintaining the focal firm's processes, while simultaneously managing the external and internal stakeholder network with an extended upstream supply network understanding [5]. It is visualised in Figure 1.

![Figure 1. Purchasing & Supply Management scope [5]. Adapted from [6].](image-url)
In PSM, two main processes can be distinguished: On the one hand, there are the strategic source-to-contract and on the other hand the purchase-to-pay activities. Nevertheless, these processes are not independent from each other but connected as shown in Figure 2.

![Purchasing Wheel](image)

**Figure 2. Purchasing Wheel [7].**

The importance and current developments of the different procurement tasks and needed connected competences are currently subject to significant changes in the business environment and their impact on companies and PSM in particular.

The relevance of the strategic role of purchasers increases more and more in a highly linked and quickly changing business environment in which new trends arise constantly [8] [9]. A lot of up-to-date studies deal with the trends in PSM such as the increasing importance of the field, digitalisation, strategic focus and networking role in the value chain, automation of operational processes, new demands on people's skills etc. [8]. These developments highlight the need for employees possessing the necessary skills and competences in the field of PSM [10] [11].

Firms struggle to cope with the complexity and the new responsibilities caused by the current developments in PSM. Their already existing staff as well as fresh university graduates do not possess the necessary harmonized skill profiles and competence sets, as there is no harmonized higher education program.

The relevance of PSM has not yet been fully reflected in education. Unlike the current status in other disciplines, a harmonised higher education (HE) curriculum is non-existent in PSM [5]. Modern aspects like the digitalisation of procurement processes are missing in existing programs and students are not sufficiently prepared for upcoming PSM related roles. Resulting from this gap analysis between the PSM education landscape and modern requirements it becomes evident that there is a need for an innovative and harmonised curriculum.

## 2 PROJECT PERFECT: PURCHASING EDUCATION AND RESEARCH FOR EUROPEAN COMPETENCE TRANSFER

The project PERFECT was set up in 2015 and is funded by the European Union under the Erasmus+ program “Strategic Partnerships for Higher Education” for the term from 2015 to 2018 to become the first worldwide region to develop an empirically validated harmonized pan-European PSM higher
The aim is to establish an international study program at universities for higher education in PSM.

In order to achieve this main outcome and the milestones listed in the methodology section, a consortium consisting of five project partners and an advisory board is formed, which brings together the following leading universities:

- TU Dortmund University (Germany)
- Hochschule Mainz (Germany)
- University of Twente (Netherlands)
- Staffordshire University (England)
- Lappeenranta University of Technology (Finland)

The consortium brings together European academia, practical exposure, associations such as IPSERA (International Purchasing and Supply Education and Research Association) and IFPSM (International Federation of Purchasing and Supply Management) as well as industry partners, all with a very strong background and an international network in PSM.

The development of a pan-European curriculum for PSM education which is based on a combination of identified best practices and industry requirements will ensure that individual students are provided with the necessary knowledge and that they learn to join a purchasing department of any size of organisation ready to engage in different aspects of purchasing. It provides opportunities for students to gain experience in other European countries through student exchange programs and also through more informal discussions and activities which will help them to further develop their professional skills as well as their personalities. For the participating academic organisations, this provides an opportunity to strengthen their pan-European ties and ensure that their purchasing curricula reflect the requirements of an increasingly pan-European industry. Pan-European organisations often adopt collaborative buying activities and an understanding of the European dimension of these activities will ensure that their staff is prepared. SMEs, which may not have a pan-European presence, but which will nonetheless buy from suppliers in many different countries and will therefore also benefit from this knowledge. Additional target groups and collaborations include the purchasing related associations.

The most desired impact of the project is an increase in the number of highly qualified students who are suitable for entering the workplace in PSM related jobs.

3 RESEARCH METHODOLOGY

An empirical profile analysis is essential in order to deduce the competence requirements and to accomplish a fit between graduates and industry needs.

The project consists of six big work packages within Intellectual Outputs (IO). The structure of these six project milestones is shown in Figure 3:
The substantial steps are the needs assessment of competences and their validation followed by a final model of explicit and tacit competences leading to an empirically validated curriculum. Literature research (part of IO1) and qualitative benchmarking case studies (IO2) were conducted and are about to be validated in a widespread survey (IO3) to ensure a substantiated database.

For the development of a PSM Skills Model (IO1), academic literature, job advertisements, the PSM education landscape, practitioner models and studies on trends and future skills were analysed in order to derive a preliminary competence model and a gap analysis.

The approach for the case studies (IO2) was to conduct interviews with PSM practitioners to identify competences, which are required to cope with current requirements and future trends. In total, the project team had 46 interviewees from 16 companies, belonging to various industries in the European Union, differing in size and business model. A semi-structured interview guide was used and the interviews were recorded, transcribed, coded and evaluated. The goal was to answer the following research questions (RQ):

- RQ1 – Which current competences/knowledge are necessary for PSM practitioners?
- RQ2 – Which future competences/knowledge will be necessary for PSM practitioners?
- RQ3 – What is the gap between RQs 1 and 2?
- RQ4 – How do these competencies/knowledge vary by role?
- RQ5 – Which of these competences/knowledge are Tacit/Explicit?

The results of IO1 and IO3 are incorporated in the design of the questionnaire for IO3. A list of this database can be found as Table 2 in the project results section.

IO3 consists of a wide-spread survey for validation of IO1 and IO2 and tries to filter out which skills and competences make PSM professionals successful. The link between organisational effectiveness and performance is empirically explored. A gap analysis based on previous findings leads to further improvement of the competence model which serves as the basis for the curriculum.

IO4 is the project’s core – the development of the curriculum itself. It starts with developing the rationale describing the motivation, need and demand for a new curriculum. Furthermore, explicit knowledge and tacit skills which need to be taught are combined in modules. For each module, a module descriptor will be produced. Further steps are program specification support documents showing details for each specific area, which can offer advice and tips to participating institutions and other institutions which are interested in establishing the curriculum. At least one sample teaching and learning activity will take place to teach students from the different European institutions of the consortium the contents of a selection of the suggested modules.

IO5 is an online self-assessment tool with which participants can assess their own skills. It will mainly be based on the survey structure and its results. In combination, a competence development scheme is planned to provide feedback and advice for those who completed the self-assessment. The tool can help to assess, for example, the knowledge level of new students. The technical implementation and platform design will be realised by and purchased from an external service provider.

Activities related to IO6 – the development of a Massive Open Online Course (MOOC) for an introduction to PSM – are the preparation of the didactic concept and learning content as well as the technical development of the course and the implementation of material on a platform. The course gives the possibility of web-based learning for students and practitioners.

4 PROJECT RESULTS

For the “PSM Skills Model” (IO1) academic literature, job advertisements and descriptions (mainly Dutch and Austrian), the PSM education landscape status quo, practitioner and association models

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2 The project results are published on the project website (http://project-perfect.eu) to make all results publically available. So far, white papers for IO1 and IO2 can be found online. In addition, scientific papers are developed from the research results of the project.

3 More than 50 sources were systematically analysed.

4 Study and learning programs in Germany, Netherlands, England, Finland and a selection of further courses were systematically analysed and compared.

5 Selection of European PSM associations: NEVI, BME, BMÖ, AERCE, CIPS, LOGY
and studies on trends and future skills were analysed in order to derive a preliminary competence model and a gap analysis. Important outputs of IO1 are the preliminary PSM skills model as well as the education landscape analysis. [5]

The analysis shows that relevance of PSM has not yet been fully reflected in academic education. A couple of universities offer single PSM courses, but the imbalance between consecutive and executive programs points out the mismatch between offer and demand of PSM education. The European PSM education landscape is characterised by a number of short, post-graduate or tailored professional courses. PSM is mostly only part of generic study programs such as Business or Supply Chain Management. [5] This makes it necessary for companies to hire university graduates with other specializations and often spend years bringing them up to a skill level which graduates in other disciplines already possess.

Regarding the content of the PSM courses, which was analysed in a structured, standardised manner, it was found out that education focuses on the Process Organisation of PSM, but does not consider Structural Organisation and Human Resources and Leadership even less [5]. In the future, greater focussing on identified skills which include many soft/tacit/non-technical ones than covered in existing courses is needed.

Furthermore, the relevant aspects like digitalisation of procurement processes, strategic purchasing, technology scouting, innovation sourcing, compliance and sustainability, change and human resource management are not sufficiently covered in existing programs. [5]

The preliminary PSM Skills Model [12] with the top 10 skills identified as listed in table 1 is based on input from the literature review, job advertisements, practitioner skills models and studies on trends and future skills.

<table>
<thead>
<tr>
<th>Table 1. IO1 top 10 skills identified. [5]</th>
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<tbody>
<tr>
<td>Negotiation skills</td>
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<tr>
<td>Analytical skills</td>
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<tr>
<td>Problem solving</td>
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<tr>
<td>Risk management</td>
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<td>Decision making</td>
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</tbody>
</table>

In the next step, the preliminary PSM Skills Model was validated and complemented by deducting case study interviews.

The results derived from the interviews are multi-faceted. In total, 65 current and 56 future competences and knowledge areas have been identified after coding all interviews. The gist of the analysis of current competences is that the competence clusters on top of the list are Negotiation, Communication and Relationship, Strategy and Analytics and PSM basics. Nevertheless, it becomes clear that a PSM curriculum or training needs to reflect all skill areas and teach them using different methods and formats. [13]

Operational and basic PSM knowledge and competences should be related to communication or relationship-oriented thinking. In addition it must be made clear that PSM serves as an essential link between internal customers and requirements towards the external supply network. Tacit as well as explicit competences are important and a mixed learning approach is needed. Tacit competencies need to be factored into education/training to a higher extent than it is done now. [13]

Skill requirements will change, underlining the altered relevance the PSM function might have in the future. When asking about future competences, some additional areas in comparison to those involved in current analyses come up. A majority is technology focused (eProcurement technology, Big Data Analytics, Computer literacy, Analytical skills). Digitisation/Automation will particularly impact PSM operational tasks: Sub-functions requiring a low degree of judgement, especially in the Purchase-to-Pay process, are going to disappear. In addition, Sustainability is an issue especially when thinking about the future. Knowledge and skills in the field of Sustainability are needed to prepare students and employees adequately for this future development. [13]
Table 2. All PSM related skills identified (basis for IO3 survey). Based on IO1 and IO2 results. [5] [13]

<table>
<thead>
<tr>
<th>Planning and Strategy</th>
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<tbody>
<tr>
<td><strong>Demand Planning</strong></td>
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<tr>
<td>Forecasting of the demand</td>
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<tr>
<td>Enterprise Resource Planning / Material Requirements Planning / Advanced Planning and Scheduling</td>
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<tr>
<td>Customer orientation</td>
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<td>Stakeholder Relationship Management</td>
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<tr>
<td><strong>Pooling Planning</strong></td>
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<tr>
<td>Pooling Planning and Organising</td>
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<tr>
<td><strong>Market Analysis and Planning</strong></td>
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<td>Supply Market Analysis</td>
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<tr>
<td>Supply Chain Analysis and Planning</td>
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<tr>
<td>Commodity and Domain Specific Knowledge</td>
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<tr>
<td><strong>Innovation Analysis and Planning</strong></td>
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<tr>
<td>Technology Planning</td>
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<tr>
<td>Innovation Sourcing</td>
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<tr>
<td>Innovation implementation in the own organisation</td>
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<tr>
<td><strong>Sourcing Strategy Planning</strong></td>
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<tr>
<td>Category Strategy Development</td>
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<tr>
<td>Make or Buy Decisions</td>
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<tr>
<td><strong>Purchasing Involvement with other Functions</strong></td>
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<tr>
<td>Organisational Structure and Mandates</td>
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<tr>
<td>Purchasing knowledge</td>
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<tr>
<td>Process Management</td>
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<tr>
<td>Technical knowledge of products and production systems</td>
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<tr>
<td><strong>Strategic Integration with the Board</strong></td>
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<tr>
<td>Add value to the organisation</td>
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<td>Strategic Management</td>
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<tr>
<td>Corporate Governance</td>
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<tr>
<td>Position of Purchasing in Organisation</td>
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<tr>
<td><strong>Purchasing Involvement with other Functions</strong></td>
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<tr>
<td>Working together with the department Production/Operations</td>
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<tr>
<td>Working together with the department Quality Management</td>
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<tr>
<td>Working together with the department Marketing Management</td>
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<tr>
<td>Working together with the departments Logistics and Storage</td>
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<tr>
<td>Working together with the department Research &amp; Development</td>
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<tr>
<td>Working together with the department Human Resources Management</td>
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<td>Working together with the Legal department</td>
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<td><strong>Process Organisation</strong></td>
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<tr>
<td>Supplier Selection and Evaluation</td>
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<tr>
<td>Developing specifications for supplies</td>
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<tr>
<td>Solicit Offers (RfQ / RfP / RfI)</td>
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<tr>
<td>Global Sourcing / Supplier Acquisition</td>
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<td>Making cost analyses</td>
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<tr>
<td>Evaluate Offers &amp; Supplier Selection</td>
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<tr>
<td>Corporate Social Responsibility</td>
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<tr>
<td>Sustainability</td>
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<tr>
<td>Optimisation of Purchasing Processes</td>
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<tr>
<td>Negotiation</td>
</tr>
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<td>Negotiation</td>
</tr>
</tbody>
</table>
### Contract Development and Management
- Contract Development
- Contract Management
- Claims Management
- Supplier Relationship Management

### Supplier Management
- Supply Risk management
- Supplier Evaluation
- Supplier Development

### Early Supplier Involvement
- Early Supplier Involvement
- Strategic Business Partner

### Human Resources and Leadership

#### Job Descriptions and Competences
- Purchasing Roles and Job Profiles

#### Personnel Selection and Integration
- Personnel Selection Process
- Employee Integration and Development Plan

#### Performance Appraisal and Career Development
- Employee Performance Measurement
- Leadership / managing personnel
- Training personnel
- Managing change processes

#### Soft Skills Development
- Project Management Skills
- Team Ability Skills
- Salesmanship Skills
- Communication Skills
- Cross-cultural Awareness
- Personality Characteristics Development

### Controlling

#### Controlling Target System
- Set key performance indicators (KPIs)

#### Purchasing Controlling Process and Structure
- Performance Measurement and Follow-up

### Methods and Tools Support
- Statistical Analyses
- Big Data Analyses
- Portfolio Analysis Support
- Cost Reduction Techniques

### Supportive IT
- Procurement IT Systems / e-procurement applications
- Automation

PSM has the opportunity to increase its importance by focusing on newly upcoming tasks. However, a broader scope of skills for PSM professionals is required to cope with e.g.:

- Focus on strategic approaches, processes and decision making
- Lead and benefit from changes brought about by automation
- Reshape and adapt PSM structures
- Value collaboration and networking
Drive innovation with suppliers

Changes require pro-active development when planning training and education for PSM personnel. New requirements caused by digitisation need to be evaluated urgently; Informal training methods such as case studies, dealing with dilemma situations, project assignments which can increase the awareness of sustainability issues; training on interpersonal communication which strengthens the role of PSM being a networker and interface between internal and external customers, suppliers and other key stakeholders; mentoring and buddy which has students and personnel share tacit knowledge effectively.

Basic factors for the success of the project the team agreed on to ensure the novelty of the curriculum are the requirements that the curriculum:

- Meets the varied needs of different industrial sectors and organisations.
- Ensures that the PSM graduates are as prepared as possible for a variety of PSM roles.
- Can be flexibly used by a variety of Higher Education Institutions across Europe and form the basis of their own internal validation or accreditation requirements.
- Can be used by organisations as the basis of their own internal training programmes.
- Recognises the future requirements of the PSM field.
- Contributes to the enhanced perception of the PSM profession.
- Is based on contemporary approaches to and principles of teaching and learning and harnesses technological developments.
- Puts the student at the heart of the curriculum.

Besides regarding the content, learning methods, especially in the context of digitalisation of education, play an important role [14]. Examples are the outputs MOOC and the self-assessment tool including individual recommendations for participants.

The curriculum will be structured in an innovative way. The modules combine the teaching of tacit and explicit knowledge. Larger modules will be used, instead of short modules only dealing with limited content, in order to integrate different topics and their interdependencies. Modern innovative and digital approaches, an industry classroom for close cooperation with practice, lots of project work, problem-based learning and case studies will be implemented. [15] [16] [17]

The project-related research also captures future requirements and therefore the PERFECT curriculum is sustainable for a number of years to ensure its participants and alumni can meet the challenges of an increasingly complex business environment. In addition, the gap analysis between the skills required and the current education provision to reinforce the uniqueness of the PERFECT curriculum by demonstrating additional areas that this curriculum will cover which other courses do not.

5 OUTLOOK

The development of a harmonised and empirically validated European curriculum for the PSM discipline offers a significant opportunity to improve the described circumstances by closing the gap between new industry requirements caused by changes like digitalisation and existing study programs.

The benefits of the new curriculum development, which is the main goal of the project PERFECT, for Business, Academia and Society are:

- Companies will be able to hire employees who are prepared to deal with the current and future requirements of PSM.
- Students are provided with the necessary knowledge and learn to join a purchasing department of any size of organization and industrial setting.
- Academic organizations strengthen their European ties and ensure that their purchasing curricula reflect the requirements of an increasingly pan-European industry.
- Society benefits from a generation’s pan-European understanding as well as an enhanced competitiveness of the European economy.
Student mobility in the scope of the Erasmus+ exchange program is facilitated. The pan-European approach gives rise to the possibility for students to be able to pursue their curricula Europe-wide, thereby giving them the chance to gain international experience, which is ideal for future careers in procurement. It as well strengthens the partnerships between HE institutions. All project results are publically available. Therefore, also other institutions that are now involved in the project can make use of the outputs and take over the curriculum or only certain modules or elements for their own utilization.

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PERFECT PROJECT WEBSITE

http://project-perfect.eu

REFERENCES


