club rp

an advanced project for developing a rapid manufacturing network in the plastics sector

O Club RP foi um projeto inovador e revolucionário que consistiu no desenvolvimento de uma rede de fabrico rápido no setor de moldes para plásticos.

A tecnologia de prototipagem rápida e de Rapid Tooling apontavam para um alvo específico no setor industrial moderno: os coprodutores de produtos plásticos.

Este setor era composto por PMEs cujo objetivo se baseava na especialização de criação e interpretação de ideias e transformá-las em verdadeiros protótipos e produtos.

O projeto Club RP tinha também por objetivo reunir grandes e pequenas empresas numa rede global, com vista à criação de uma nova identidade europeia no âmbito do setor de moldes para plásticos, através da introdução das Tecnologias de Prototipagem Rápida e Rapid Tooling. Além disso, é importante referir que este projeto visava ainda a implementação de um conceito de produção de peças plásticas personalizadas às necessidades diferentes clientes

O Club RP envolveu parceiros nacionais, espanhóis, alemães e italianos.

RP&T NET®
RAPID PROTOTYPING & TOOLING NETWORK

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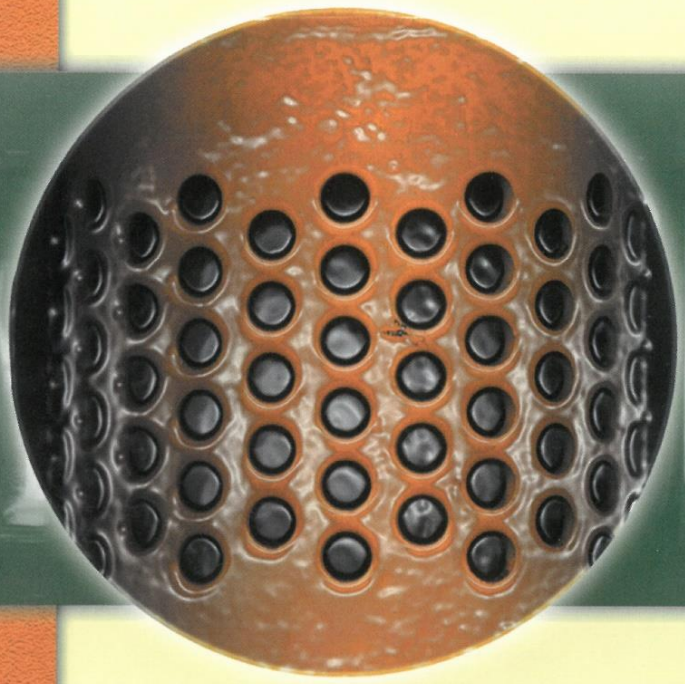

CLUB RP The development of a common "atmosphere"

Rapid Prototyping and Tooling technology as a specific target of a modern industrial sector: the **"plastic products co-makers"**.

The *plastic products co-makers* sector is composed by SMEs whose aim is to specialise in the interpretation of designers' ideas and transforming them in real prototypes and products.

Pursuing this objective, the CLUB RP project is aimed to gather big and small companies in a common "atmosphere": a new European *identity* for plastic products and moulds, moving the attitude of the social groups from today's long series production of standardised plastic products, towards more "made-to-measure" ones.

In the past two years the CLUB RP has started its activity in the areas of:

Marinha Grande, Catalonia, Baden-Württemberg, Treviso.

This project is financially supported by the European Commission in the Innovation line of the 4th Framework Programme

Innovation

THE SKILLS OF THE PARTIES AT THE CORE OF THE CLUB RP PROJECT

Companies and SMEs

are the first parties in the CLUB RP project: in fact the basic skill and source of relationships capable of generating business in a TCE and RPT environment, belong to the designers of the final product, the designers of the mould and the transformers and injection makers of various supply chains.

They all see the RPT technology as the specific task of the modern industrial sector of the plastic products co-makers and aim to specialise in interpreting designers' ideas and transforming them in real products and prototypes.

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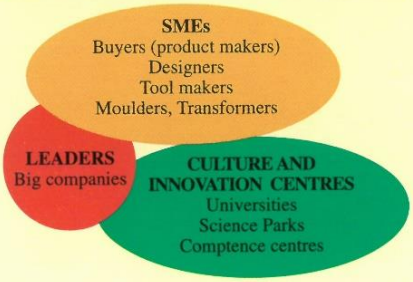
Steinbeis TZ *Kunststofftechnologie*
Tecnologia & Design

are the second parties and they have a high rate of "inclusion" in the specific framework of industrial mould production. Moreover they are deeply concerned with innovative "rapid prototyping" and "rapid tooling" services for the mould supply chains.

Cluster Competitiviness
Enea Irene *Italian Relay Centre*
Poster
Steinbeis TC *International Technological Co-operation*
Transvalor
Treviso Tecnologia

are the third parties and are technology transfer centres focused on innovation in different sectors. In particular they are interested in the results of the Club RP project as a general device for rapid innovation in SMEs and industrial districts.

Parties of the transfer



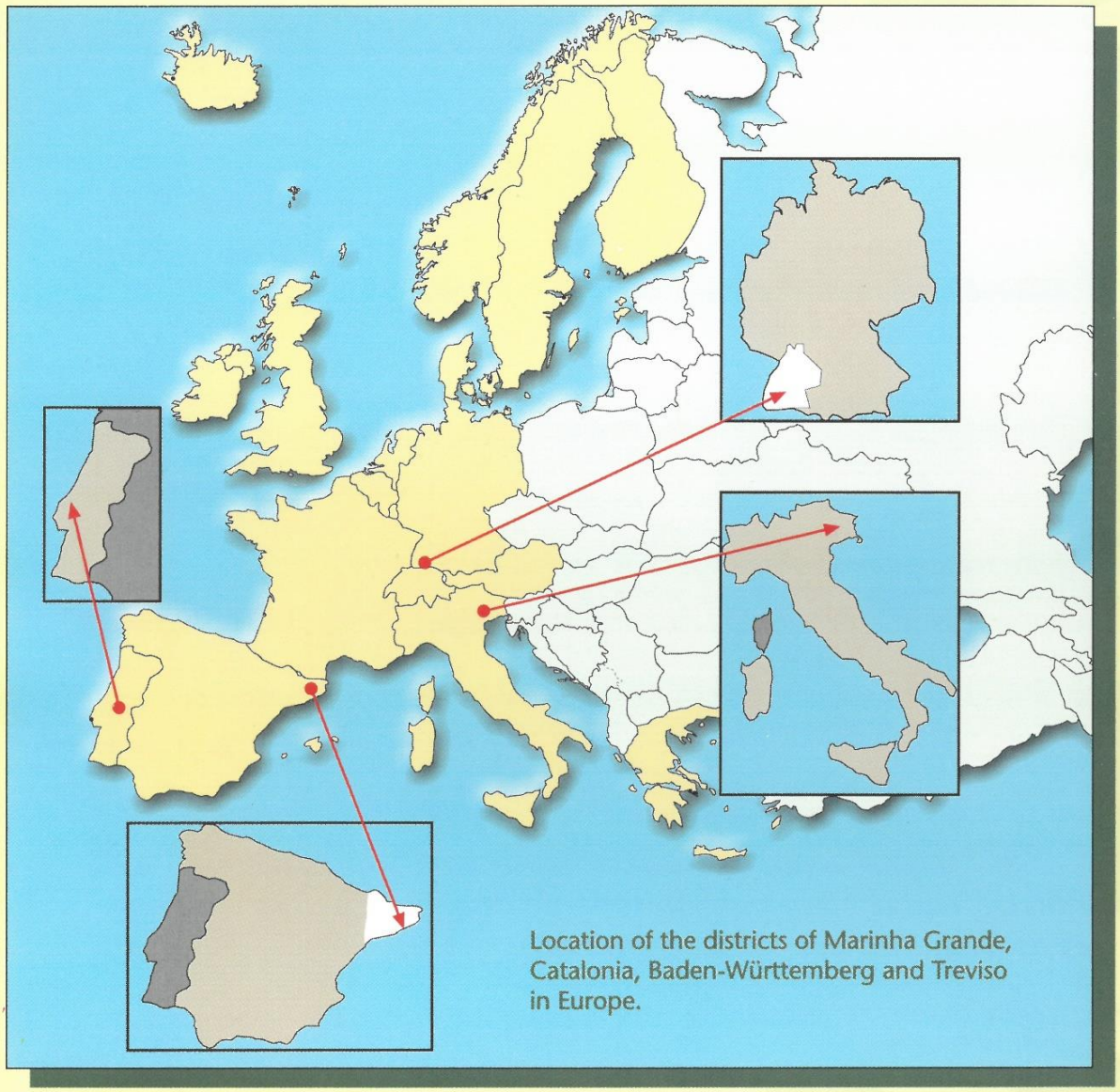
Each of these parties is looking at the kernel of the process (mould and plastic prototyping and production) in a peculiar way. An important step of Club RP has been the involvement of all these parties at a transnational level, aiming to lead them into a "common European atmosphere" (technology framework of new rules and best practices for plastics manufacturing).

A COMMON EUROPEAN TECHNOLOGY FRAMEWORK MEANS:

- The ability to rapidly develop pre-series for made-to-measure products (TCE)
- The attitude to share territory resources and become members in wider projects (Co-design and Co-engineering)
- The capability to innovate products and processes through shared virtual design and engineering with the support of a facilitating transnational resources platform (Network)

CLUB RP

CLUB RP 1st year: the creation of a geographical network



Location of the districts of Marinha Grande, Catalonia, Baden-Württemberg and Treviso in Europe.

CLUB RP 2nd year: the creation of RP&Tnet

RP&Tnet is the final virtual network for RPT (Rapid Prototyping and Tooling) among leading European companies:

- Consumer Products Makers
- Materials and Machines Suppliers
- Technology Service Providers
- Research and Innovation Transfer Centres

as a means towards an effective TCE (Time Compression Engineering)

EXCHANGING EXPERIENCES AND UNDERSTANDING EACH OTHER: THE THREE STEPS OF THE CLUB RP PROJECT

Design of a Transfer Scheme

An effective way for transferring TCE and co-design methodologies to the SMEs

"Learning by doing" and benchmarking

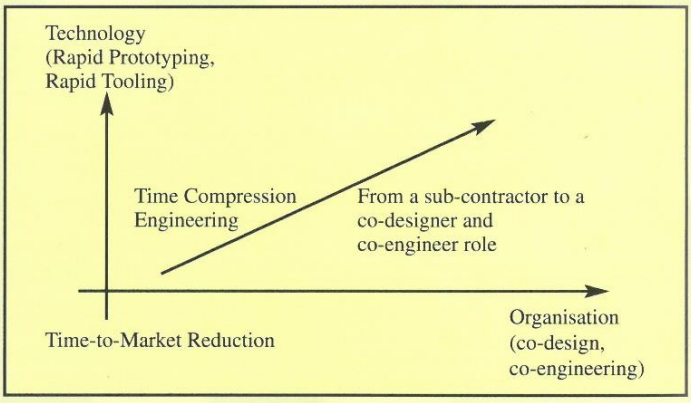
The validation of the transfer scheme through experiments along the supply chains

Towards a European network of virtual co-design and co-engineering capability

The realisation and promotion of a transnational networked platform

Design of a Transfer Scheme

Distinctive features in the industrial organisation of single areas have been analysed to identify the relevant parameters of the model designed to transfer TCE methodologies to the SMEs of the four districts by using local platforms. The promotion of the companies' attitude to co-design and innovation roles was one of the most important factors included in the design of the scheme. In fact the scheme should reinforce the general competitiveness of the European companies, both as big innovators and rapid manufacturers, through co-operation among themselves and with technology research institutions and universities.



"Learning by doing" and benchmarking

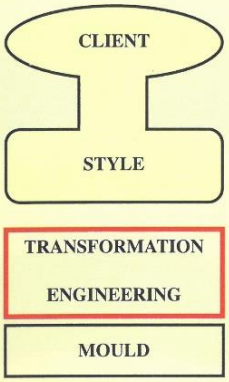
By monitoring different production trials with the final plastic product makers, the mould producers and the transformers (and at the same time transferring RPT technologies), it has been easier to directly identify in the field the best methods that should become a standard for the CLUB RP and the RP&Tnet participants.
Secondly, these trials have identified the pros and cons of the transfer scheme and have enabled the production of a modified validated version.

Towards a European network of virtual co-design and co-engineering capability

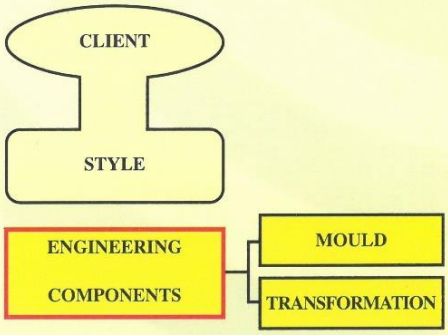
Minor differences characterising the industrial organisation in the various case studies of step two have been resolved. This was mainly carried out by institutional transfer centres, universities and science parks participating in the project. In addition, this promoted a "common European atmosphere" and made possible the realisation of a transnational companies network. The network has been realised starting from a co-engineering experiment, shared among the partners.

THE GENERAL LAY-OUT OF THE INVESTIGATED TCE PATHS

CLUB RP PROJECT



CLUB RP interviewed in each country different experts from companies and professors from universities in order to devise a general flow chart for mould design and production. Every expert or entrepreneur had a different flow chart and had difficulty in understanding other descriptions.



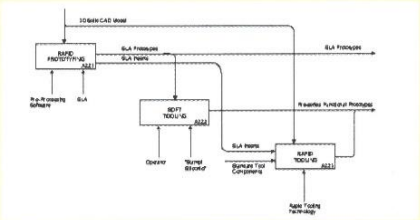
A first target of the CLUB RP has been therefore to lay-out a standardisation of a general path. In this path the design and production of a mould can be divided into different stages:

- *feasibility analysis*
- *development of component/prototype*
- *mould or die design for pre-series*
- *steel mould for long run series*

Depending on lead-in time for the client, on the shape and cost of the product and on the organisation of the sub-contractors, the co-makers (mould producers and transformers) have different options in order to perform their tasks along all the stages of the process.

They can shape the component by using soft tooling (e.g.: a silicon mould) and create inserts in a cabinet mould by using all kinds of rapid tooling (high speed machinery, laser sintering, stereolithography, etc.).

The output is the first series of 50-100 pieces, which simulate important features of the final product and the production problems.



Total time compression depends both on organisational and technological factors as explained in the following table:

1) *A flexible use of different technologies and a sophisticated management of all the cycles requested by the client*

The most advanced co-makers are those, who can carry on a wider and wider control of the available techniques, directly inside the company or inside co-design and co-engineering platforms.

2) *The ability of integrating different stages of the process and reducing time along the sequence of cycles*

This is more easily developed by the co-makers who invest in project managers or leaders, whose main task is "shadowing" the client's needs and design performances.

3) *A networking strategy with technology and material suppliers, collecting critical information about innovation, quality tests, new materials, etc.*

This is a very critical asset for co-makers, who are willing to improve the quality of their services and enter, as co-designers and co-engineers, the client's value chain.

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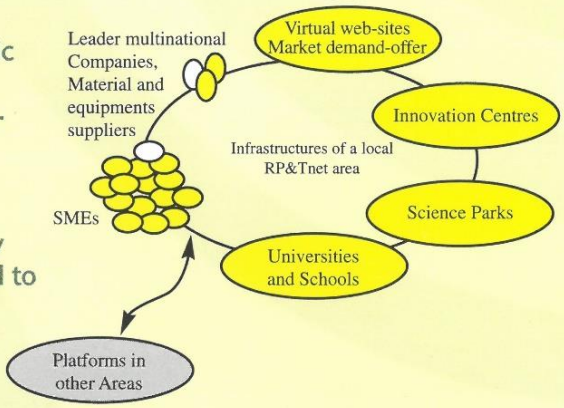
THE RP&TNET

CLUB RP has promoted a series of actions among the mould makers groups, whose final target is to create a new European identity for plastic products and moulds, moving the attitude of the product makers from today's catalogue production, towards the rapid supplying of "made-to-measure" products.

Consequently, CLUB RP now has a set of best practices, competing technologies and infrastructures, which can be used in different ways by companies belonging to the same geographical area (local systems) and to different ones (virtual community).



The most evident CLUB RP infrastructure is a European network of recognised international partners, each one specialising in plastic materials analysis and simulation, mould design and production and able to offer an effective Rapid Prototyping, Tooling and Setting Service to components and products manufacturers. Even though these partners remain located in different countries, they belong to the RP&Tnet virtual community, which follows a common pattern of engineering and production and is connected by validated RPT methodologies, all characterised by the RP&Tnet trade-mark.

A medium term objective of the RP&Tnet is to introduce into the community the skill of advanced designing and prototyping, taking it away from a Tayloristic organisation, towards a virtual design capability all along the stages of the production.

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