



**I3E**  
*South East Europe TCP*

## Best Practice Report

# *Automated System for Footwear Production*

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## Best Practice Report

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Everybody please state revision index and short description of what has been done + partners involved and date.

<b>Final approval</b>	<b>Name</b>	<b>Partner</b>
<b>Reviewer</b>	Domenico Ricchiuti	IEA

## 1. Best Practice Title

Automated System for Footwear Production

## 2. Location of Best Practice

*Country, region, town*

Italy, Lombardia, Vigevano

## 3. Best Practice Executive Summary

*Describe briefly (max 10 lines) the GP context (partnership, funding, objectives, approach followed, results)*

This GP describes how a whole industrial sector (footwear sector) can be totally re-designed and improved with the support of technology and innovative ideas that redefine both productive processes and products. It, besides, shows that these initiatives are realizable with a strong cooperation between research, public investments and entrepreneurial initiative.

The practice describes the creation of a pilot plant where new innovative and high technological equipments, tools, systems and processes, have been tested with the aim of raising the innovation level of the whole footwear sector.

## 4. Best Practice Classification

### Best Practice Theme

- Research Transformed to Innovative Product*
- Research Transformed to Innovative Service*
- Research Transformed to Innovative Methodology*
- Research Transformed to Innovative Production Process*
- Financial Mechanism for Transformation of Research to Innovation*
- Support Mechanism for Transformation of Research to Innovation*
- Other (describe)*

### Best Practice Research / Application Areas

- Industrial / Manufacturing Systems*
  - Industrial Informatics and Communications*
  - Intelligent Devices*
  - Distributed Control Systems*
  - Flexible Manufacturing Systems*
- Embedded Systems*
  - Industrial Embedded Systems*
  - Nomadic Environments*
  - Private Spaces*
  - Public Infrastructures*

## 5. Description of Best Practice

### 5.1 Best Practice Context

*Overall background of the Best Practice. Location, socio-economic, technical & policy background of the BP (max 10 lines)*

In Italy the footwear industry has an important role for the national economy, considering that it is composed by more than 6000 companies and 80000 employees. It's strengths have always been the creative talent, the competitive capacity, the innovation, the flexibility and the "made in Italy" image, that made Italy the first producer in the European Union and the eighth in the world.

This success is related to the typical structure of the sector, organized in a production chain context, made by a sub - supply system of raw materials, tanneries, components, accessories, stylists and production machinery producers.

In 1990s Italian footwear industry, which held the primacy in commercializing of production machinery (50% in the world), suffered the strong competition of other countries competitors (above all Germany, Korea and Taiwan) although they had machines more suitable to lower quality production. The increase of lower quality productions and the growing of imports were both unequivocal signals of weakening.

#### 5.1.1 Policy Elements

*What are the policy initiatives that have influenced the contextual environment of BP: innovation promotion policies, research funding policies, certification etc. as well as relevant tools (max 10 lines)*

In such scenario the "MIUR" (Ministry of University and Scientific and Technologic Research), promoted, in 1997, in the scope of the National Research Program about "Innovative Production Systems", a project finalized to the development of an high performance automated, integrated production system.

The National Research Program is an answer to the Country's needing of provide itself with an effective tool for the planning of the R&D efforts. This needing was born from the awareness that, as in every other economically and technologically advanced context, the initiatives individually developed by the scientific system are to be combined with the overall needs of the Country, that refer to science, technology and innovation.

The Program is an opportunity for a systemic afterthought of the scientific and technological policies of the Country.

The final aim of the Program is , in other words, that of taking part in building, in a middle-long period, a different positioning of Italy in the international context.

#### 5.1.2 Socio-economic & Other factors

*Other contextual factors such as customer / target market addressed, international validity, customer density, economic conditions, customer values, research area addressed (max 10 lines)*

The main factor that has brought to the creation of the initiative was the need of supporting the Italian footwear sector, that was suffering the strong competition of other countries production.

The strong competition came mainly from the sports and special shoes, where the presence of the Italian enterprises was minimal. Among the most reactive companies, those of South Korea were relocating on medium-high quality products and there was the possibility that these companies could absorb the Italian companies export capacity.

### 5.2 Objectives

*Aim of the project, specific objectives & strategies to achieve these objectives (max 10 lines)*

The project aimed to deeply re-design and renovate the production system, giving it a higher level of

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innovation. The specific objectives were that of increasing the productivity, the product quality and the flexibility of the processes.

The matter was that the other countries manufacturing was characterized by a mass production while the Italian manufacturing by high quality, mainly in terms of customization. The objective was that of creating a “**mass customization**”.

In other words to produce industrially customized shoes with a quality comparable to handicraft productions.

## 6. Process

*Describe the project including key concepts and the overall approach followed. Indicate project end users, target market, main project phases, problems encountered and solutions, problem resolution (max 10 lines)*

In the ambit of the Program a so-called “integrated plant” was developed, which uses a productive process where the working phases (from footwear design to assembly) are totally automated.

The project end users are all the subjects involved in the footwear industry that can, thanks to this innovative plant, provide themselves with new technologies, methodologies, processes and confront with a new industrial paradigm.

### 6.1 Project Design

*Project design based on targeted market complete understanding, project structure, policies and procedures, management and implementation actions (max 10 lines)*

A pilot plant was realized in the town of Vigevano (Pavia). This plant is able to design and fabricate customized footwear for alternative uses, with a huge productivity, using a few number of skilled workers. Everything occurs with the support of very efficacious planning and control tools: each skilled worker, in fact, is helped in the working phases by audiovisual equipments and a computerized network.

A sophisticated system was developed, which is constituted by machines which draw the digital image of the foot, fit the model's design to this image, cut and assemble all the manufacture's parts. The project has also brought to the development of new innovative products and processes: a leather cutting table, an automated system for the semifinished parts transport, a system for displating the mounting phase and new robots useful for injection operations.

### 6.2 Project Management

*Activities relevant to project coordination and management, project documentation and reporting, quality control, validation and verification (max 10 lines)*

Each single collaboration of the laboratory with external companies or each project developed has been adequately documented.

### 6.3 Project Implementation

*Main elements associated with the project implementation. Realization of new idea, or new technological realization or improvement / novelty to known technology and means to achieve this. Innovation associated with the project realization in terms of new products, services, methodologies. Marketing, advertising and customer service. (max 10 lines)*

Concretizing the research results.

In a territory which has a great footwear tradition (and that has a certain resistance to change) a higher level of process and product innovation has been achieved.

The process innovation is related to a higher automation and to the possibility of creating customized shoes, while the product innovation consists first in the creation of a new concept of shoe and then in the development of various production equipments, such as leather cutting table, an automated system for the semifinished parts transport, a system for displaying the mounting phase and new robots useful for injection operations.

## 6.4 Project Evaluation

*Project feedback mechanisms and evaluation mechanisms. (max 10 lines)*

The best feedback mechanism has been the continuous interest that many companies have put in the project, demonstrated by the great number of collaboration that have followed to date.

## 7. Description of Research team/Institution

*Short description of R&D team and institution (max. 10 lines)*

The original R&D team was formed by a conjunction of public research centers, universities and private companies.

Public research centers:

- Sintesi Consortium;
- Industrial Technologies and Automation Institute of CNR (ITIA);
- ENEA (New Technologies, Energy and Environment Body);

Universities:

- University of Florence;

Subsequently (in the last decade) the project has been carried on by ITIA with the collaboration of private companies.

## 8. Applied Financial Mechanism

*Describe financial mechanisms applied in transformation of research into innovation within BP, as well as means of connecting scientific research team and financiers (max. 1000 char.)*

The "MIUR", Ministry of University and Scientific and Technologic Research (in 1997 called MURST), funded the whole initial project, in the scope of the National Research Program about "Innovative Production Systems" (PNR-SPI – tema 6), a program finalized to the development of an high performance automated, integrated production system in the footwear field, which could be an efficacious countermeasure to the compelling competition of the other countries productions.

In the last 10 years funding have been obtained, for a significant part, by the participation to European, national and regional projects (above all EuroShoe project).

## 9. Impact and benefits

*Describe achieved benefits of R&D team and/or enterprise implemented innovation, as well as impacts on institutional and policy levels. (max. 1000 char.)*

The main benefit is the filling of the gap existing between the concrete needs of the entrepreneurial world and the research needs.

About 100 companies of the sector have benefitted of the innovative services, methodologies and technologies provided by the laboratory.

At a policy level the initiative helps a whole industrial sector to be more competitive and to face the more and more difficult challenges that new world economy impose.

## 10. Sustainability

*Provide information on sustainability of innovation after financial aid within implemented financial mechanisms, and some multiplier effects as replication and extension of the action performed in BP. Expected use of Best Practice and lifecycle considerations. (max. 1000 char.)*

For a Ministry initiative this innovative plant is used as a scientific laboratory for further technologic developments: it's high productive flexibility and technical-economical features, make the new factory the fulcrum of "Euroshoe", a program funded by European Union for a overall investment of 17.000.000 Euros. At this program participate 36 partners from 11 Countries.

Euroshoe is only one (even if the most important) of the projects to which the laboratory participate (others are CEC-Made-Shoe, highvalueshoe, Fit4you, NetChallenge, Robofoot, IdeaFoot etc.)

## 11. Repeatability and transferability

*Lessons learned from the project implementation team. Repeatability and transferability of the project. (max. 1000 char.)*

The main lesson learned, that can be repeated and transferred to other contexts, is that the best way to face the competition of other countries production (characterized by lower production costs and by a mass production) is the concept of "mass customization".

This target can be achieved with a deep redefinition of the whole industrial sector, that must leverage on automation and innovation, but with a big care to quality and to the customer requirements.

## 12. Evaluation

*Describe reasons and evaluation criteria why the described example is a best practice. (max. 1000 char.)*

This example shows how, in a critical moment for economy and industry, the State intervention with innovative and concrete initiatives, involving research centers and private companies can help a whole industrial sector to oppose the Asiatic competition and to create an innovative industrial paradigm. On the other hand, all this would have been ineffective, in a long period, without good capacities of research centers and private companies to carry on the project, once finished the public intervention.

The innovative idea of a pilot factory is an excellent example of how research should move to increase the small companies interest in developing their technologies and improve their processes.

## 13. Contact of research team/institution

*Name, address, tel., fax, e-mail, URL*

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## 14. Contact of financial mechanism facilitator

*Name, address, tel., fax, e-mail, URL*

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