

# SEVENTH FRAMEWORK PROGRAMME

NMP-2007-3.1-2

New added-value user-centered products and product services



**SERVICE** Oriented Intelligent Value Adding nEtnetwork for

Clothing-SMEs embarking in Mass-Customisation



## D6.5 Pilots evaluation report

### Identifier

|                             |  |
|-----------------------------|--|
| <b>Project Reference No</b> | FP7-214455   |
| <b>Deliverable</b>          | D6.5 Pilots evaluation report  |
| <b>Work Package</b>         | WP6: Integrated and Interoperable e-Manufacturing Pilots   |
| <b>Nature</b>               | Report   |
| <b>Dissemination Level</b>  | Public   |
| <b>Date</b>                 | 31/08/2011   |
| <b>Status</b>               | Final  |
| <b>Editor(s)</b>            | Elfriede Kirchdoerfer, HOH<br>Martin Rupp, HOH   |
| <b>Document description</b> | Evaluation report of the Servive Pilot installations at UNICATUM (Evaluator HOH), Team Colours (Evaluator LCF) and Matteo Dosso (Evaluator CustoMax) and the automatic knitting site IFTH/NTU (self-evaluation). |

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## LIST OF TERMS AND ABBREVIATIONS

| Abbreviation | Definition                    |
|--------------|-------------------------------|
| MF           | Micro Factory                 |
| SNI          | Supply Network Infrastructure |
| SPL          | SERVIVE Transactions Platform |
| SPO          | SERVIVE Style Community       |
| SBP          | SERVIVE Business Platform     |

## EXECUTIVE SUMMARY

At the nearly end of the project the Micro Factory (MF) Pilots must be evaluated to compare the initial aims with the realised solutions. Within the Servive project a lot of soft- and hardware developments have been made. One of the key topics was the planning / design, set-up and commissioning of the Micro Factories.

Due to some "turbulences" during the project not all achieved solutions have been planned initially by setting up the project. But there were 3 more or less commercial micro factories realised at the final stage.

Nevertheless, significantly positive solutions have been achieved and are highly expected to stay active and be of economically success also in the future. The efforts invested into the UNICATUM pilot and the method of designing and running a Micro Factory can be used in the future although this enterprise went bankrupt. With the development of the Micro factory profiler in future MF's offering free capacity could be connected successfully into the MF-Network.

The work done by IFTH and NTU demonstrate to produce commercially customised fully-fashioned knitwear - even if was not possible to run the automatic knitting site in a pilot MF. The results indicate that it is practical to produce customised luxury knitwear from start to finish in less than 2 days, with an indicative price band of €300-€500. It is possible to reach this with one whole-garment machine, for efficient staffing and machine utilisation an SME micro-factory with a minimum of 2 machines is recommended. This would facilitate an annual throughput capacity of 2,000+ garments. An investment of around €0.5 million could generate an annual turnover of a similar amount, and a satisfactory profit.

Within this document you can find a description of the starting points for the different MFs and a tabular list of the main developments as well as an assessment of them. For each pilot, the Servive backbone services have been set in relation to an assessment divided into the three main questions of implementation, usefulness and profit estimation. Finally a comparison of the performance against the original specification was made.

# 1 INTRODUCTION – MAIN IDEA

Task 6.4 “Testing and evaluation of pilots” from the description of work:

Following the installation of pilots and the linking of their infrastructures to the SERVIVE backbone services, a group of Consortium experts will conduct a systematic testing based on pre-defined protocols and benchmarking yardsticks, to compare performance against original specifications (Task 1.5).

This is the main idea of the performed evaluations and the documentation by this deliverable.

## 2 STARTING POINT AND DEVELOPMENTS

### 2.1 Starting Point(s)

- Unicatum
  - pilot demonstrator for the micro factory of woven and knitted garments in Kaiserslautern, next to UNICATUM shop in city centre. This micro factory will be based and will operate on guidelines / concepts of Hohenstein Institute
  - installing co-design and style advisory in own retail store to and generate input from UNICATUM customers using above SERVIVE services
  - product range manufactured of woven and knitted garments
  - commercialisation of micro factory concept within Europe by multiplying in three steps:
    - a) within Germany
    - b) within countries of SERVIVE partners with support from national EURATEX representatives for recommendations/door opener
    - c) within all other EC countries
  - commercialisation will base on licensing model to manufacturers and franchising of UNICATUM retail outlets

#### Main focus in the SERVIVE project:

- Optimisation of the whole MtM selling, pattern design and production process within a micro factory network

- Matteo Dosso

- MD pilot
  - Establish links to the SERVIVE web services (Style Advisor)
  - Creation of interface services with order management as well as with clients and suppliers (see WP5)
- MD Demonstrator: The existing IT infrastructure of MD will be linked to the SERVIVE networking services Testing and Evaluation of SERVIVE web services

#### Main focus in the SERVIVE project:

- Optimising service for B2B-customers and their sales process with consumer.
- To make the sales process quicker, safer, more efficient and with more shopping fun for all parties involved.
- To gain more B2B customers for individual clothing. And to do more turnover with existing customers.

- Team Colours

- In TCL they see themselves in the future as Custom-made Sports and Leisure wear manufacturers, using the latest machinery, software and fabrics, as well as garment embellishment facilities to enable them to offer their Customers exactly what they require in regard to garment design, size and colour(s).
- The choice of garment and specifications would be made by the customers online through a website. Work on a "design your own" site is among their main objectives in the project (see WP4).
- They visualise a website which will be easy to use and give the customer a wide choice of designs, with personal sizing and choice of fabrics colours.
- They would also hope to be able to work with retail partners by extension of their online facilities to them (e.g. via the SERVIVE platform)

Main focus in the SERVIVE project:

- To expand the Team Colours online services and the visibility of their brand and product line and supply networks in European and Commonwealth countries to both B2B and B2C customers.
- To develop the scope and quality of their womens' Netball and football offers, especially in terms of co-design and customisation of bespoke imagery and logos.
- To optimise the Team Colours working environment and speed up production and internal logistics through digital restructuring of processes and patterns and addition of high-tech printing processes.
- To encourage womens participation in sports and health and a sustainable attitude to the consumption of clothing through improved appearance, fit and business conduct/ performance factors such as online customer relationships.

- IFTH/NTU:

- IFTH and NTU took over the task to finalise the work concerning the automatic knitting site, started by UNICATUM.

Main focus in the SERVIVE project:

- Development and evaluation of the procedures for a business model to produce commercially customised fully-fashioned knitwear
- Demonstration of the commercial potential for on-demand, localised manufacturing of up-market fashion products using new technology

## 2.2 Developments and significant results

Clearly significant results of Work Package 6 are highlighted in the list below:

- UNICATUM Pilot:

| Assessment   | Totally realised | Partially realised | Not realised | More than expected | Satisfied | Less than expected |
|--|------------------|--------------------|--------------|--------------------|-----------|--------------------|
| 1. Design and planning of factory layout related to the principles of flexible production of lot size one  | X                |                    |              | n.a.               | n.a.      | n.a.               |
| 2. Design and planning of plan, machinery layout, installation requirements and qualification of personnel   | X                |                    |              | n.a.               | n.a.      | n.a..              |
| 3. Development of a first draft of workflow from shop to production  | X                |                    |              | n.a.               | n.a.      | n.a.               |
| 4. Installation of flexible micro factory infrastructure: room, IT network, machines for part 1 dresses and 2 knitwear (Spring 2009)   |                  | X                  |              | n.a.               | n.a.      | n.a.               |
| 5. Search and hiring process for production manager (Spring 2009)  | X                |                    |              | n.a.               | n.a.      | n.a.               |
| 6. Qualification program for selection of staff, program defined and performed in cooperation with local ARGE-authority to re-integrate long-term unemployed female workers. (June – October 2009) | X                |                    |              | n.a.               | n.a.      | n.a.               |
| 7. Prototypical production for test group non-commercial (September – October 2009)  | X                |                    |              | n.a.               | n.a.      | n.a.               |
| 8. Opening of new store generated commercial orders of private customers (from November 2009 on)   | X                |                    |              | n.a.               | n.a.      | n.a.               |

| Assessment   | Totally realised | Partially realised | Not realised | More than expected | Satisfied | Less than expected |
|--|------------------|--------------------|--------------|--------------------|-----------|--------------------|
| 9. Fine-tuning of pattern system with Hohenstein for use both with and without body scanning | X                |                    |              | n.a.               | n.a.      | n.a.               |
| 10. Layout and production planning for knitwear system has been prepared.                    |                  | X                  |              | n.a.               | n.a.      | n.a.               |

- IFTH/NTU simulated Demonstrator:

| Assessment   | Totally realised | Partially realised | Not realised | More than expected | Satisfied | Less than expected |
|--|------------------|--------------------|--------------|--------------------|-----------|--------------------|
| 1. Installing a of the automatic knitting site to simulate the MF  | X                |                    |              |                    | X.        |                    |
| 2. Design and production of a sample of variant knitted customised garments                                | X                |                    |              |                    | X         |                    |
| 3. Evaluation of the feasibility to produce a customised knitted garment within a acceptable space of time | X                |                    |              |                    | X         |                    |
| 4. Development of a business plan for future implementation  | X                |                    |              |                    | X         |                    |
| 5. Evaluation of the simulated business cases to demonstrate profitability of an automatic knitting MF     | X                |                    |              |                    | X         |                    |

- Matteo Dosso pilot:

| Assessment  | Totally realised | Partially realised | Not realised | More than expected | Satisfied | Less than expected   |
|---|------------------|--------------------|--------------|--------------------|-----------|--|
| 1. Successful introduction in the SERVIVE project on 01.03.2009 and follow up with the developments of the first 6 months already done by the consortium    | X                |                    |              |                    | X         |  |
| 2. Provided significant input regarding structures and processes for made to measure projects   | X                |                    |              |                    | X         |  |
| 3. In close cooperation with Hohenstein, the input was studied and examined in view of the design of processes and system structures for the micro factory. | X                |                    |              |                    | X         |  |
| 4. Three seasons catalogues (in March 2009, August 2009, and January 2010) were incorporated in the under development SPL platform.                         | X                |                    |              | X                  |           |  |
| 5. 3D presentation of mtm styles in an online order process   |                  | X                  |              |                    |           | X<br>(Due to the bankruptcy of UNICA-TUM and the change of responsibility) |
| 6. SNI – Automatic connection between seasonal data and front end of order system   | X                |                    |              |                    | X         |  |

- Team Colours pilot:

| Assessment   | Totally realised | Partially realised | Not realised | More than expected | Satisfied | Less than expected |
|--|------------------|--------------------|--------------|--------------------|-----------|--------------------|
| 1. In-depth study for the adaptation of the existing infrastructure and production organisation to the needs of expanding to new types of customisable sportswear                                    |                  | √                  |              |                    | √         |                    |
| 2. Identification of product line data requirements in on and offline sales  |                  | √                  |              |                    | √         |                    |
| 3. Re-organisation of workflow in close cooperation and joint research with LCF. Expansion of sales and production and implementation of smoothing of workflow initiatives through digital dataflow. |                  | √                  |              | √                  |           |                    |
| 4. Installation of digital inkjet printing and sublimation printing for T-shirt and small fabric items   | √                |                    |              | √                  |           |                    |
| 5. Installation of CAD/CAM pattern drafting and lay-plan and marker plotter and transfer of paper patterns to digital format, organisation of data.  | √                |                    |              | √                  |           |                    |
| 6. Introduction of new range of customisable polo shirts and hoodies.  | √                |                    |              | √                  |           |                    |
| 7. Addition of co-design features in the selection of the offered custom made products, through the pilot's website and the evolution of the new design tools.                                       | √                |                    |              | √                  |           |                    |
| 8. Improvements in communication of the appearance, fit, sports benefits and sustainable fabrication of the product line through Servive SPO   |                  | √                  |              |                    | √         |                    |

| Assessment   | Totally realised | Partially realised | Not realised | More than expected | Satisfied | Less than expected |
|--|------------------|--------------------|--------------|--------------------|-----------|--------------------|
| 9. Addition of social media aspects to the online sales environment. Brand values and entertainment, CRM uses. |                  | √                  |              |                    | √         |                    |
| 10. Evaluation of profit through above adjustments   |                  | √                  |              | √                  |           |                    |

### 3 LINK TO SERVIVE BACKBONE SERVICES

- Matteo Dosso Pilot:

| Assessment                               | Implemented |    | Useful |    | Profit |    |
|--|-------------|----|--------|----|--------|----|
|  | Yes         | No | Yes    | No | Yes    | No |
| SERVIVE Portal (SPO)                     | X           |    | X      |    | X      |    |
| SERVIVE Transaction Platform (SPL)       |             |    |        |    |        |    |
| Virtual Try-On Services (VTO)            |             | X  |        |    |        |    |
| Virtual Try-On Web Application           |             | X  |        |    |        |    |
| Personalization Server (PServer)         |             |    |        |    |        |    |
| Recommendation Engine                    |             |    |        |    |        |    |
| Micro-Factory Network Coordinator (MFNC) |             | X  |        |    |        |    |
| Intelligent Pattern Configurator (IPC)   |             | X  |        |    |        |    |
| Style Communities                        |             | X  |        |    |        |    |
| Co-design Services                       |             |    |        |    |        |    |
| Virtual Try-on                           |             |    |        |    |        |    |
| Style Advice Services                    |             | X  |        |    |        |    |

- Team Colours Pilot:

| Assessment                               | Implemented |    | Useful |    | Profit |     |
|--|-------------|----|--------|----|--------|-----|
|  | Yes         | No | Yes    | No | Yes    | No  |
| SERVIVE Portal (SPO)                     | ✓           |    | ✓      |    |        | N/A |
| SERVIVE Transaction Platform (SPL)       |             | ✓  | ?      |    |        |     |
| Virtual Try-On Services (VTO)            | ✓           |    | ?      |    |        | N/A |
| Personalization Server (PServer)         | ✓           |    | ?      |    |        | N/A |
| Recommendation Engine                    | ✓           |    | ✓      |    |        | N/A |
| Micro-Factory Network Coordinator (MFNC) |             | ✓  |        | ✓  |        | N/A |
| Intelligent Pattern Configurator (IPC)   |             | ✓  |        | ✓  |        | N/A |
| Style Communities                        | ✓           |    | ✓      |    | ✓      |     |
| Co-design Services                       | ✓           |    | ✓      |    | ✓      |     |
| Lounge application                       | ✓           |    | ✓      |    | ✓      |     |
| Style Advice Services                    | ✓           |    | ?      |    |        | N/A |

## 4 COMPARISON OF PERFORMANCE AGAINST ORIGINAL SPECIFICATION

- Unicatum Pilot:

Additional to the original planning and specification of the project, the complete mtm-process from pattern generation to production for a shift dress was specified and realised within the work packages.

Due to the insolvency of Unicatum during the project, the final aims set by the original specification could not be reached. However, the project partners NTU and IFTH undertake essential parts of the planned work whereby good results could be achieved.

- Matteo Dosso Pilot:

Main targets for better service in sales process of mtm articles are achieved. With Servive developments, better, faster and cleverer support for mtm customers is possible.

Difference between original plan and final result is due to professional way of learning in this project. With the knowledge of the whole team, the targets were adjusted in the running project, for best result to get.

- Team Colours Pilot:

Team Colours involvement in the SERVIVE interface was limited to the SPO (Style Community) aspects of the project. Their products can (in future) be incorporated into the transactional platform SPL of the portal, if a suitable e-business tagging system is implemented; however, it was not deemed necessary to test this, and a viable trade arrangement would need to be negotiated. For the mostpart the Team Colours products were displayed as 2D photography and colour variations. The 3D virtual try-on service (VTO) was attempted with three garment types (polo shirt, netball dress and hoodie) using the MIRAlab and Digital Humans partnership plug-in as a proof of concept; and could be seen to be fast and useful. However, the service was not yet capable of functioning reliably for consumers as this would require some considerable expense of processing DXF pattern data and texture maps of many products, outside the scope of the project. Team Colours have incorporated the concept of co-design into their own brand website with a 2D configurator with successful results, estimating a 40% increase in enquiries leading to sales. They are sceptical as to whether a 3D configurator could cost-efficiently improve on this.

The P Server, recommendation engine and Style Advice services effectively give a similar result of yielding preferences and variations that might appeal to the buyer. This application is considered valuable and meaningful and could ideally be extended for use on mobile applications, as sports people are more likely to be 'on the move' rather than sitting at console. Recommendations regarding size fit and colour are most applicable; however the full service has not been sufficiently consumer tested to reliability to use publicly. Sportswear recommendations and 'rules' differ significantly from fashion requirements and aspects such as the fit and length of garments may also be governed by sports regulations and safety issues that would need to be applied.

Team Colours did not implement a Micro-Factory Network Coordinator (MFNC), however they did considerably restructure, overhaul and relocate their work processes in the light of the project review and research in close collaboration with LCF and upgraded their ordering systems to tally with their ERM system.

This has led to an appreciable improvement in their Supply Network infrastructure. Promising alliances may have been managed with Unicum through SERVIVE if it had not been for their unfortunate demise.

The intelligent pattern configurator (IPC) was conceived as an item suitable for trouser fit optimisation in Made-to-Measure suits and did not apply to the Team Colours women's sports product line.

Efficiency and agility was improved with digital ordering and processing of patterns and imagery using a Vectigraph CAD /CAM Pattern Design System and plotter system that is capable of integrating smoothly with the data used by the SERVIVE streams described above. Being ahead of the game has given the company a competitive advantage

The company has most profited from the experimentation with Social Networking. For group decision-making, news and sharing ideas and configurations the website can be seen to function well, especially through the lounge application for communications and visualisations.

## 5 CONCLUSIONS

The new concept of Micro Factories and the Servive services developed during the project showed by there implementation and introduction, that there is a huge potential for mtm services and offers in B2B and B2C businesses. The pilots set up by Servive partners were used to test and evaluate the planning, implementation and commissioning of this concept. The results of the evaluation of the Pilots are very promising for a successful use of them in the future.

As an example for the estimation of the project results, please find a statement of Team Colours below:

“The most effective and successful implementations of the SERVIVE project for Team Colours have been the practical installations of new plant and processes. The company has greatly benefitted from the opportunity to understand and learn both at first hand and through the consortium members of the cost benefits and strategic advantages of digitised supply chain communications in Europe and co-design and mass-customisation issues at the heart of their niche product offers. They have gratefully taken advantage of the opportunity to align themselves with 21st century agile manufacturing practices and improve their product offers and own brand website, alongside the development of the SERVIVE site. Over the period of the project they have seen their profits improve significantly, as a result of these endeavours, in spite of the credit crunch and depressed market. The online 2D and 3D visualisations and social media connectivity, such as the 'lounge' application within in the SPO have been valuable exercises in realising the value of C2C communications for a sports confederacy. Team Colours believe that this form of communication within the sporting community can be advantageous and give them a competitive advantage worth pursuing further to mobile formats, such as phones and tablets. However, Team Colours feel that their brand message may be somewhat diluted by the incongruity of the Made-to-Measure business wear offers on the current SERVIVE portal site and that their customer would not easily recognise the portal site as suitable to their requirements. Notwithstanding, they are keen to pursue further development of a mobile application that could leverage the excellent work done within the project and enhance their market positioning and differentiation as a bespoke supplier of women's sporting goods.”