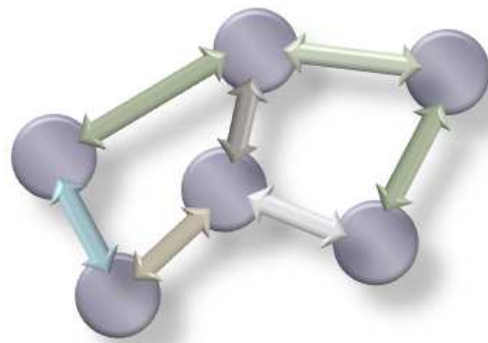


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REPLANET

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Work package 2

Annex II

Empirical Research

Guidelines for Qualitative Surveys

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Guidelines for Qualitative Surveys

I.1 Introduction

This document corresponds to the section **II.3.1.1 Guidelines for Qualitative Surveys** of deliverable **D2.1 PF-P & O-SN alignment model for mass customization scenarios**. The guidelines will be used as support tool for the interviews to be done with the industrial partners of REPLANET project. These interviews constitute the starting point of the **Empirical Research**, gathering information from companies of the consortium to contrast problems identified in the SoA.

The guidelines begin describing a **proposal of work methodology** to be used for doing the interviews and collecting the information received and RTD partners are allocated to industrial partners depending on their proximity and existing relationships. Next, the main body of the guidelines is described. They consist of several issues that must be addressed during the interviews. For each issue, a brief explanation of the main are included as well as a non-closed list of questions that can be used by the interviewers.

The document continues with a sort description of the structure and contents of the summary report that should be done for each company interviewed and it ends with an appendix that shows additional information to be used by the interviewers.

I.2 Qualitative Survey methodology¹

An interview protocol of **open-ended questions** to be answered by **key personnel** at the Pilots:

- Working with company managers, each RTD interviewer (see Table 1) will identify and **target** key personnel (i.e. the plant manager, the accounting manager, relevant product design engineers, relevant manufacturing process engineers, relevant supply management specialists, and one critical 1st-tier supplier) for interview data collection.
- **Interviews** should be conducted, if possible, onsite by **2 or more members of the research team** (see Table 1) and should be **taped** (a) to avoid loss of information or distortion of meaning and (b) to allow for an assessment and verification of content validity after transcription. Due to European privacy regulation, taping an interview however demands explicit agreement of the interview partner.
- During interviews, **supporting archival documents** and **records** (e.g., design specifications, workforce policies, plant layouts, promotional materials, etc.) should be collected for **triangulation** with interview data.
- Taped **interviews** will be subsequently **transcribed**, checked for transcription integrity, and **triangulated** against archival data by each RTD interviewer (see Table 1).

Analysis procedure:

¹ Salvador, F., Forza, C., Rungtusanatham, M. 2002. Modularity, product variety, production volume, and component sourcing: theorizing beyond generic prescriptions. *Journal of Operations Management* 20, pp.549–575. And, Salvador, F., Rungtusanatham, M., Forza, C., Trentin, A. 2004. Build-to-order is not that easy: adding volume flexibility to mass customization. IE Working Paper WP04-16 04/05

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- Once the interviews are concluded, **key themes-dilemmas-enablers-inhibitors**² relevant to the research will be identified for each **open-ended question** of the survey, by each RTD interviewer (see Table 1).
- The result of each interview will be gathered in a report (about 10 pages), by each RTD interviewer (see Table 1), and will be sent to RWTH and IKERLAN. **This task is expected to be completed by 15-12-2009.**
- RWTH will analyze all the case studies reports and will identify main conclusions: **common themes-dilemmas-enablers-inhibitors**. The result of this analysis will be gathered in a report that will be sent to IKERLAN. **This task is expected to be completed by 15-01-2010.**
- IKERLAN will contrast the previous report with the issues raised in the D2.1 SoA and will do a first draft of the Empirical Research edition. **This task is expected to be completed by 30-01-10.**

I.3 Qualitative Surveys partners allocation

Given the proximity and relationships between the members of REMPLANET consortium that will participate in this task and that the interviews will be conducted by the RTD partners, it has agreed the allocation shown in Table 1.

Table 1: Interviewers allocation for Qualitative Surveys execution

Industrial partner	RTD Interviewer
FESTO	RWTH
BIMATEC-SORALUCE	IKERLAN
AEROGISTICS	ULIV
NEWTON	ULIV
VL-IDRODINAMICA	CRIT
GHEPI	CRIT

I.4 Qualitative Survey structure

I.4.1 Company profile

Interviewers should prepare a general description of the company to try to get an overview of the main features of it with respect to their size, business areas, etc. To help accomplish this task, the following kind of information should be collected before or with the interviews.

Note: If the interview partner is part of a larger corporation structured around rather independent business units, the interview should be conducted with regard to the business unit.

- Roles on the firm of the interviewed persons.
- Brief description of its origins and evolution to the present.

² Keskinen A, Aaltonen M, Mitleton-Kelly E. 2003. Organisational Complexity. *Scientific Papers 1/2003, TUTU Publications*, Finland Futures Research Centre, Helsinki.

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- Mission statement, values, and objectives.
- Legal figure: public limited company, limited company, cooperative, etc.
- Is the company part of a corporation, business group?
- What are the major business segments?
- Does it compete in local or global markets?
- Kind of the company by the number of employees: Micro (<10), Small (≥10 & <50), Medium (≥10 & <250) or Big enterprise.
- Financial data as net sales and revenues, operating profit or net incomes of the last year.
- ...

1.4.2 Competitive environment

Some information about special features that surround the company's competitive environment will be gathered. Some questions that can be used for the interviewer are included in the following:

- Which are the delivery lead-time requirements, product demand volatility and uncertainty, typical production volumes, product range, product change rate, as well as customer order size and frequency characteristics of your market?⁹
- How well does the company perform relative its competitors in terms of the following: profitability, product quality, delivery speed, delivery dependability, cost level, price level, productivity, volume flexibility, product mix flexibility?³
- How is your industry affected by the broader macroeconomic cycle?
- How long would it take for competitors to react, and which ones might react most quickly and how?
- What is the potential for new competitors?
- Your competitors' customers also have to be considered - how will they react?
- How loyal are they to your competitors – even if their mass-customization needs are not yet being met?
- Which is the business model: business to business or business to consumer?
- Which is the relationship between company and customer: prime contractor or subcontractor?
- Purchasing model Driver: Brand Driven Market or Product Driven Market?
- ...

³ Sellidin, E. (2005) Supply chain design. Conceptual models and empirical analyses, PROFIL 22, Ph.D. dissertation, Linköping Institute of Technology, Linköping, Sweden.

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I.4.3 Mass customization policy

Interviewers must obtain relevant information about the current competitive position of the company with regard to mass customization and what are the implications for the organization as a result of adopting strategies oriented to satisfy individual needs of customers. Some of the questions that can be useful for doing it are the following:

- Which are the gaps between the product or service benefits desired by customers and the product or service actually provided to the market?
- Are your customers sensitive to receive a customized product?⁴
- Uniqueness of your customers' needs? Segmentation? What are drivers or customization from your customers' point of view?
- Which is the level of tolerance of your customers with regard to hassles, inconveniences, discomfort, long waits, product or service deficiencies, high cost, complicated ordering, lack of fulfilment options, etc.?
- What kind of variety and degree of customization will be appropriated for your customers?⁵
- Which are the product and process customization requirements?
- Are there competitive forces that would enhance or detract from the advantage your company would gain from implementing mass customization?
- How is your product assortment structured with regard to customization: Which percentage of orders is customized to which extend (engineer to order, make to order, assemble to order)?
- Do you also include services (secondary services or after sales services) within your customization portfolio?
- ...

I.4.4 Marketing and Sales

Relevant information on the organization of the marketing and sales areas, main features of the product being offered to market and knowledge of customer needs with special emphasis on mass customization, must be captured by the interviewers. Among others, some questions that can be made to the company are the ones shown below.

- What are the main product families that make up the catalog of the company?
- How is the organization of the sales area to place the product on the market?

⁴ Christopher W.L. Hart. 1995. Mass customization: conceptual underpinnings, opportunities and limits. *International Journal of Service Industry Management*, Vol. 6 No. 2, pp. 36-45.

⁵ Carsten Svensson and Ari Barfod. 2002. Limits and opportunities in mass customization for "build to order" SMEs. *Computers in Industry* 49, pp.77-89

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- Does the marketing department have access to the level of detail regarding customer needs required for mass customization?
- Does the marketing department determine the extent to which mass customization is needed to fulfill customers' requirements?⁶
- Are the people there capable of analysing such information?
- Can customers themselves customize their order by using a configuration tool? How? Configuring orders choosing from a list of options, providing specifications for the desired product, others?
- Can you share more information about your product configuration tool? System? Provider? Years of experience using it?
- ...

I.4.5 New product design and development

Other significant information to collect during interviews is related to the activities of the area of product engineering. Activities on current products, new product development or research for new product-oriented businesses must be highlighted with particular emphasis on the requirements demanded by mass customization. We propose to differentiate the questions by activities and practices of the company for (1) developing a new solution space independent from a concrete customer order and (2) utilizing an existing solution space for a specific customer problem. Questions for the interview can be the following:

(1) Developing a new solution space (new product architecture), independent from a specific customer order

- Which are the breadth and depth of the product structure? - indicates the product complexity (integral vs. modular product architectures, commonality, standardization)⁹
- Which are the principles for generating product variants?¹Is the product designed so it consists of independent modules that can be assembled into different forms easily and inexpensively?⁷
- Does the company have different product platforms for developing new product variants belonging to the same product family in a controlled way? Which approach do you use to design and develop these platform architectures?
- Is the product designed in a way so that it can be customized at the most efficient point in the manufacturing process and supply network?⁷
- How are the development of the product architectures and the configuration system aligned?

⁶ Edward Feitzinger and Hau L. Lee. 1997. Mass Customization at Hewlett-Packard: The Power of Postponement. Harvard Business Review, January-February, pp.116-121

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- ...

(2) Utilizing an existing new solution space for a specific customer order

- Does the design team have access to information concerning individual customer needs?
- Does the design team have the ability to understand these needs?
- Does the company have a speedy and highly flexible process in place for translating customer needs into actual specifications?
- How does the company react on customer requirements which can not be fulfilled by the present solution space / configuration process? Which kinds of checkpoints, if any, are applied to check whether such an order should be accepted or rejected?
- ...

I.4.6 Processes and Operations Management

Information concerned the management of the direct resources and value-added activities that transform inputs (e.g., material, labour, capital, energy and skills) into outputs (goods and services) should be requested. Processes and operations management will be examined from the perspective of the additional complexity generated by the flexibility needed to adapt production capacity to demand and the increase of efficiency demanded by a mass customization approach. Examples of questions to ask by the interviewers are in the following.

- How is the demand profile (stable, seasonal, etc.)? How it affects the planning of resources? How flexible is the organization to adapt quickly to the new circumstances?
- What is the order fulfilment strategy adopted by the company? - make-to-stock (MTS), assemble to-order (ATO), make-to-order (MTO), engineer-to-order (ETO), ...
- Does the company use the same order fulfilment strategy for all products? If not, what are the strategies employed and in what situations will apply each one?
- Information about production lead time vs. delivery lead-time, number of planning points, and position of the bottleneck⁹.
- Does the company choose a manufacturing process to match the product characteristics?
- What kind of planning and control system is employed? Is it designed in a coherent manner according to the market requirements?
- Are manufacturing processes designed so that they consist of independent modules that can be moved or rearranged easily (process postponement, process re-sequencing, process standardization) to support different distribution-network designs?⁷
- How to re-structure the organization and its manufacturing processes?

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I.4.7 Supply Network configuration

Information about how the company moves and stores raw materials, work-in-process inventory, and finished goods from point of origin to point of consumption must be inquired by interviewers. Activities related to plan, source, procurement, transformation, and logistics should be considered including coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers. Supply network reconfiguration to synchronize supply with demand ought to be addressed. All these aspects must be recognized under the perspective of mass customization. Questions that can be made to guide the interview on this section are shown below.

- What is the supply network configuration? - number, location and network missions of suppliers, production facilities, distribution centers, warehouses, cross-docks and customers.
- Are your suppliers integrated in the fulfillment of a custom order by your customers by delivering customized components / parts for this order?
- Are there different supply network configurations depending on the kind of mass customization scenario? (see figure 2)
- Are supply chains designed to handle the specific needs emanating from the product characteristics?
- Does manufacturing and distribution coordinate both the supply and the redesign of materials and situate manufacturing processes in the most efficient locations (time and form postponement strategies)?⁷
- Does the positioning of inventory and the location, number, and structure of manufacturing and distribution facilities enable performing the customization in a cost-effective manner?⁷
- Does the positioning of inventory and the location, number, and structure of manufacturing and distribution facilities have the flexibility and the responsiveness to take individual customers' orders and deliver the finished, customized goods quickly?⁷
- At what stage in the production process are work-in-progress inventories committed to specific products?
- Does the time required to receive specialized parts from a supplier and deliver the final output to the customer necessitate building inventories of standardized products rather than building individually customized products to order?
- Partners in the supply chain are selected for: Cost efficiency, Quality, Delivery speed, Delivery dependability, Volume flexibility, Product mix flexibility, Reputation?

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- How important is cooperation in the supply chain for the company in terms of: Collaborative forecasting, Collaborative inventory planning, Collaborative production planning, Collaborative capacity planning?
- ...

I.4.8 Systems & Technologies

Information management methods, systems and technologies tied to the automation or support of human decision making must be addressed. IT resources for designing, developing and providing products and services with maximum customer satisfaction, corporate productivity, profitability and competitiveness have to be highlighted. Special interest will have those systems and technologies that contribute to provide products that meet individual customer needs with the efficiency required by the company.

- What kind of systems and technologies are used for strategic decisions? – Network optimization, including the number, location, and size of warehousing, distribution centers, and facilities. Product life cycle management. Where-to-make and what-to-make-or-buy.
- What kind of systems and technologies are used for tactical decisions? – Sourcing contracts and other purchasing decisions. Production decisions, including contracting, scheduling, and planning process definition. Inventory decisions, including quantity, location, and quality of inventory. Transportation strategy.
- What kind of systems and technologies are used for operational decisions? – Production and distribution planning. Production scheduling. Demand planning and forecasting. Sourcing planning. Production operations. Order promising. Inbound operations, including transportation from suppliers and receiving inventory. Outbound operations, including all fulfillment activities, warehousing and transportation to customers.
- Are there specific technologies which would allow you to customize your product or service to individual customers?
- How extensive an overhaul is required to incorporate this technology into your existing processes?
- Will it increase or decrease your direct costs and by how much?
- How much investment will be required?
- What are some of the enablers that allow the company to strengthen the process-amenability significantly?
- ...