



## D7.1.1 User Interviews Feedback Report

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This document provides a summary of user interviews conducted, in order to identify users' needs, which could be addressed by ADVENTURE and users' expectations with respect to a resulting ADVENTURE system. Besides highlighting the major findings of the user interviews, the document also describes the basic approach applied for conducting the interviews and analysing the outcomes..



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## Executive Summary

This ADVENTURE deliverable, D7.1.1, presents the basic approach applied within the project to conduct user interviews. The user interviews are a basic building block to get a better understanding of users' needs and allow for the refinement of the use cases initially envisioned in the Description of Work (DOW), the Project Vision Consensus Document (deliverable 2.1), and the Target Market Descriptor (deliverable 2.2). The interviews conducted with the three user partners in the project, ABB, Azevedos, and Control2K (member of TANet), are summarized and the key findings are highlighted. These findings will for example be mainly used to identify requirements relevant within the ADVENTURE, stemming from users' needs, e.g., providing input for deliverable 2.3 in the context of WP2.

Major findings can be summarised as follows:

- An ADVENTURE system should not substitute existing systems but should rather act as a complementary system;
- An ADVENTURE system should improve users' monitoring capabilities of the supply chain, e.g., by enabling online, near real-time monitoring, opposed to the currently used offline monitoring;
- An ADVENTURE system should enhance users' forecasting capabilities, which should allow for a better and more timely prediction of potential problems within the supply chain;
- An ADVENTURE system should provide an easy and efficient mechanism for data exchange for various information types from all the partners in a supply chain.

## 1 Introduction

ADVENTURE – ADaptive Virtual ENTerprisemanufactURING Environment – is a project funded in the Seventh Framework Programme by the European Commission. ADVENTURE creates a framework that enhances the collaboration between suppliers, manufacturers and customers for industrial products and services. Within this deliverable the approach used for conducting user interviews and the corresponding results of these interviews are presented, as a valuable input to understand the goals and expectations of the use case partners with respect to the project's results.

### 1.1 ADVENTURE Project Aims

The framework proposed by ADVENTURE provides mechanisms and tools that facilitate the creation and operation of manufacturing processes in a modular way. ADVENTURE combines the power of individual factories to achieve complex manufacturing processes, providing tools for partner-finding, process creation, process optimization, information exchange, as well as real-time monitoring, combined with the tracking of goods and linking them to cloud services.

There have already been several research projects that address the combination of different independent manufacturers to so-called virtual factories. Most of these research projects focus primarily on the business-side in general and on aspects like partner-finding and factory-building processes in special. However, no proven tools or technologies exist in the market that provide for the creation of virtual factories applying end-to-end integrated Information and Communication Technology (ICT). ADVENTURE is aiming to provide such tools and processes that will help to facilitate information exchange between factories and to move beyond the boundaries of the individual enterprises involved. The collaborative manufacturing process will be optimised by enabling the integration of factory selection, forecasting, monitoring, and collaboration during runtime.

ADVENTURE builds on concepts and methods of Service-oriented Computing and benefits from the advancements in this field. The monitoring and governance of the collaborative processes will be supported by technologies from the Internet of Things such as wireless sensors. Existing tools and services that can be integrated will be considered during the development of the platform for ADVENTURE.

The increased degree of flexibility provided through ADVENTURE is especially beneficial for SMEs as it helps them to react quickly to changes and to participate in larger, cross-organizational manufacturing processes. Furthermore, ADVENTURE will help manufacturers in assessing the environmental friendliness of actual manufacturing processes and resulting products and services. Other objectives of ADVENTURE include research in areas such as service-based manufacturing processes, adaptive process management, process compliance and end-to-end-integration of ICT solutions.

### 1.2 Deliverable Purpose, Scope and Context

In order to better understand the use case partners' needs and to further refine, respectively validate against the background of these needs the initially derived use

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cases in the Description of Work and the scenarios depicted in the deliverables 2.1 (“Project Vision Consensus Document”) and 2.2. (“Target Market Sector Descriptor”) interviews have been conducted with ADVENTURE’s use case partners. All three use case partners, namely ABB, Azevedos, and Control2K have been involved in this process to gather a bright understanding of users’ challenges and cover the different application sectors, these three partners are positioned in. In this deliverable, after the setup for the interviews has been described, an individual summary for each interview is presented. Afterwards the major findings from these interviews are highlighted.

The results from the interviews are in particular used to derive corresponding requirements, for example within the context of WP2 and there, e.g., in deliverable 2.3.

### 1.3 Document Status

This document is listed in the DOW as ‘public’ primarily because its content is not only interesting and relevant for the project partners, but can provide a beneficial input for researchers and other persons active in the field of virtual factories to grasp an idea of what is relevant in this domain from a user’s point of view.

### 1.4 Target Audience

This deliverable is to be used by all participating project members to achieve a project-wide understanding of user’s needs and expectations towards the ADVENTURE framework that aims to enhance collaboration within the factories of the future and to foster the establishment of efficient virtual factories. Specifically, this deliverable will provide valuable input for the requirements specification in ADVENTURE’s WP2 and there for example for deliverable 2.3. Nevertheless, as mentioned, the deliverable might provide valuable insights for researchers and other persons working in the field of virtual factories not within the project, as well.

### 1.5 Abbreviations and General Terms

A definition of general, common terms and roles related to the realization of ADVENTURE as well as a list of abbreviations is available in the supplementary document “Supplement: Abbreviations and General Terms” which is provided in addition to this deliverable.

Further information can be found at: <http://www.fp7-adventure.eu>

### 1.6 Document Structure

This deliverable is broken down into the following sections:

**Section 1** provides an introduction for this deliverable, outlining the scope, audience and the structure of the deliverable.

**Section 0** elaborates on the user interviews conducted by firstly describing the setup and secondly providing a summary of the conducted interviews.

**Section 0** provides an analysis of the conducted interviews, with a focus on highlighting the major insights relevant to the ADVENTURE project, which could be gathered from the interviews.

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**Section 0** provides a wrap-up of this deliverable in form of a conclusion.

**Annex A** provides the initial questionnaire used for conducting the user interviews and the transcript of the first user interview conducted with the ADVENTURE use case partner Control2K.

**Annex B** provides the revised, final questionnaire used for conducting the remaining user interviews and the transcript of those user interviews conducted with the ADVENTURE use case partners ABB and Azevedos.

## 2 User Interviews

In order to prepare the user interviews, a first version of a questionnaire was prepared. The first user interview was conducted based on this questionnaire. The University of Vienna thereby interviewed the use case partner Control 2K. The answers of the partner can be found in Annex A. After this initial, first interview, the questionnaire was revised and improved. The subsequent user interviews took place utilizing the revised version of the questionnaire. INESC thereby interviewed Azevedos, the University of Vaasa interviewed ABB. The respective answers of these two partners can be found in Annex B.

In the following, a brief summary of each user interview is presented and respective key elements are outlined.

### 2.1 User Interview ABB

#### 2.1.1 User Interview Summary

ABB Oy Distribution Automation – commonly known as "FI-DA" – provides solutions in the area of power and automation technologies to utility and industry customers. FI-DA is part of the medium voltage power product unit of ABB, developing and manufacturing world class protection and control solutions to ensure reliable power transmission and distribution. In cooperation with its supplier network, FI-DA's products are built to withstand most demanding environments, including marine and offshore, industrial facilities and paper and petrochemical plants, as well as utilities in urban and rural locations.

FI-DA factory at Vaasa, Finland follows an MTO (Make to Order) production process and sometimes an MTS (Make to Stock) one, in which case all the products are standard with no scope of customization. Main products of FI-DA are IEDs (Intelligent Electronic Devices), which comprise of electronic hardware in the form of PCBA's (Printed Circuit Board Assemblies), mechanics and software.

On an average, the FI-DA factory delivers 1400 IEDS per week based on the customer orders. A confirmed order from a customer is booked in the ERP system where the order delivery process is managed. The booking of a sales order triggers the planned orders automatically which are further converted to production orders manually. A production work queue system helps in balancing the available capacity and materials – essentially manually. The MRP process of the ERP system routinely triggers purchase orders to suppliers depending on stocks, consumption, receipts, pending orders etc.

There are different product families within FI-DA, which in turn comprise of various product series. Different product series from each product family are usually introduced every 2 to 3 years on average. Along with the product delivery, the factory also provides after sales service to its customers.

The FI-DA factory takes 2 weeks to deliver an order after it is confirmed; express delivery takes 2-5 days on average and OTD (On Time Delivery) rate is about 91%, based on the latest data from the year 2011. The product delivery is heavily dependent on FI-DA's global supplier network, which supplies components and modules that are

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finally assembled and tested into products that are packed and shipped from the factory.

Because the factory mainly employs a supplier-based production system, it demands for monitoring the complete supply networks in real-time with respect to buffer levels, capacity and capability of each of its suppliers. It also requires having information related to order forecasting and the ability to react quickly to late changes in orders.

From the ADVENTURE framework, firstly, FI-DA expects a solution for aggregated real-time monitoring of the suppliers buffer levels and deliveries. Visualizations of such buffer levels and the visibility of consignment status would help FI-DA in properly managing its inventory as required to maintain an OTD with its customers. At present, FI-DA maintains the supplier buffer levels by implementing the tool 'SharePoint', which is Excel-based and thus cannot provide online, but only offline information. FI-DA expects to implement ADVENTURE to maintain buffer levels online.

Secondly, it is expected that ADVENTURE will support FI-DA in improving its execution process by extracting and providing customer order forecasts as early as possible. These order forecasts could be used for an early pre-planning of the required production scheduling, both in FI-DA and its suppliers sites. This facility will support FI-DA to publish necessary components and modules to the corresponding supplier networks.

Finally, FI-DA would implement ADVENTURE along with its legacy systems to maintain the process for CTP (Capable-to-Promise) and ATP (Available-to-promise), where the notifications from the corresponding suppliers indicate the availability of components or modules with respect to their production capacities.

### 2.1.2 Key Elements

- FI-DA will implement ADVENTURE in association with its legacy systems to improve the overall order-delivery process.
- FI-DA expects that ADVENTURE will provide real-time buffer status both in its internal and supplier sites (including the buffer on transit).
- ADVENTURE is expected to provide additional benefits for FI-DA without replacing its existing solutions (ERP, SharePoint, ASCC, CCP, etc).
- FI-DA expects from ADVENTURE to have the ability to quickly adapt and optimize processes by receiving forecasts of customer's processes.
- ADVENTURE is expected to provide FI-DA with timely event notifications through alert systems (e.g., in case of delivery delays, cancelled or changed orders, material unavailability, etc.).
- FI-DA is also planning to apply ADVENTURE in order to manage rush orders and to have the ability to react quickly to late changes in orders by using the CTP / ATP process.

## 2.2 User Interview Azevedos

### 2.2.1 User Interview Summary

Azevedos designs, produces and sells industrial equipment and machines for the cork production and transformation industry. The company also provides consultancy and after-sales support services.

Accordingly, key activities involve the client requirement analysis, product concept and development, production and assembling of electrical/mechanical parts, integrated tests and verification, fine-tuning and after-sales assistance.

Products are directly sold to customers, rather than through a network of distributors. International and domestic sales roughly constitute the same share of the company's turnover.

Each machine is made up of several modules and employs several technologies, including mechanical parts, control software, electrical power circuits, industrial controllers (PC's and PLC's) and sensors (e.g., laser beams, load cells).

Azevedos' commercial offers comprise a standard portfolio containing more than 50 active models, which is complemented by one-of-a-kind engineer-to-order products. The latter represent about 50% of the company's turnover. Two types of such products can be distinguished: First, customization of portfolio products – e.g., specific changes on software or feeding systems – and second, products designed “from scratch” (also referred to as “fully customized machines”).

Azevedos primarily sees the ADVENTURE framework as a solution for the management of its engineer-to-order products. Thus, engineer-to-order products will constitute the focus of all efforts in conjunction with the ADVENTURE project.

In engineer-to-order products, there will be a new project for each customer order. The fulfillment of each customer order will involve a specific arrangement of design, manufacturing and business (commercial) activities. According to the ADVENTURE terminology, a new potential customer order is equivalent to a business opportunity, and each customer order should be managed as a new ADVENTURE Virtual Factory.

A distinctive feature of Azevedos' virtual factories lies in the fact that they involve product design, process engineering and manufacturing tasks. All these tasks should be managed comprehensively by the ADVENTURE virtual factory management system. Furthermore, in such engineer-to-order virtual factories, several documents are created at execution time, namely product plans and schemas (product design), process plans (process design) and quality records (physical manufacturing).

Therefore, the virtual factory management system is expected to encompass both, workflow management (i.e., task management) and document management (i.e., creation, exchange and archiving of design plans and quality records).

As of now, the company uses legacy management systems (i.e., ERP and MES solutions) for the management of internal orders. Azevedos expects to use ADVENTURE primarily to manage external orders. Thus, in Azevedos' understanding, ADVENTURE complements, rather than substitutes these systems.

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Using ADVENTURE, the company is interested in finding and evaluating (potential) new partners. So far, Azevedos focuses on long-established relations with external suppliers, which are periodically reviewed based on aspects such as product quality and terms of business.

In addition, Azevedos hopes to facilitate a fast and controllable exchange of information with third parties through ADVENTURE. As of now, the exchange of information is facilitated through various channels – including e-mail, fax, telephone and website – and in different formats.

Azevedos further hopes to employ ADVENTURE for collaborative process simulations, monitoring and forecasting. Today, outsourcing decisions are made manually by an industrial manager for each particular customer order, depending on the internally and externally available production capacities and technological capabilities. This type of information is communicated via different channels and not necessarily in real-time.

It is important to note that Azevedos sees itself on the demand-side, not the supply-side within ADVENTURE. That is, the company understands ADVENTURE as a means for finding and collaborating with outsourcing partners, but is not aiming to offer its own services as part of ADVENTURE production processes to third parties (“AZEVEDOS INDUSTRIA sells the entire solution”).

## 2.2.2 Key Elements

- Azevedos plans to apply ADVENTURE in conjunction with a specific part of its product portfolio, namely engineer-to-order products, where the manufacturing process involves outsourcing of activities to third parties.
- Accordingly, Azevedos sees ADVENTURE as a complementary to its existing ICT systems, i.e., ERP and MES solutions, rather than a substitute.
- Azevedos expects to facilitate the discovery of new partners and fast and controllable exchange of information (e.g., specification documents) with third partners through ADVENTURE.
- Azevedos also plans to employ ADVENTURE for simulation, monitoring, and forecasting of collaborative processes.
- Azevedos sees itself as a requester of services in ADVENTURE and not as a supplier.

## 2.3 User Interview Control 2K

### 2.3.1 User Interview Summary

Control2K is a software/hardware integrator. It allows companies to upgrade manufacturing machines with sensors in order to collect and process data so that it can be used for monitoring and process improvement strategies. Industreweb is the company's solution to support these functionalities.

The primary aims of the Industreweb software suite are listed below:

- Track WHEN machines produce waste, track WHY machines produce waste.

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- Have unified information available in order to make an informed decision HOW to reduce waste (lean management).

Whilst Control 2K is not directly involved with production, it is involved with implementation projects. Hardware is the only subcontracted stage in the main product delivery. The value added by Control 2K is the aggregation, transformation and presentation of data.

The main finished goods produced consist of both hardware and software. The hardware is generic and is not really customised, although it may be assembled with other generic hardware. The software is very much customized based on the customer's needs. These can be either existing software components, or alternatively components developed to meet concrete customer requirements. Hardware generally remains standard, and when this is not what the clients require, they may supply the hardware directly.

Control 2K's target markets are Small, Medium and Large Enterprises in the manufacturing sector. In terms of competitive advantage the price point of its products and services are very reasonable, particularly in relation to its larger competitors. In addition the flexibility of its products and how they can be configured and customised means that it has a very wide market potential. Control 2K focuses its business activities primarily on regional markets.

Control 2K usually subcontracts the production and installation of hardware used in its products, because it is not part of the company's core capabilities or its business objectives. Control 2K is able to openly select its suppliers and therefore has a large number of potential suppliers, especially when the hardware components and products and services are less specialised. It is possible at every point to select and bring in new suppliers. The management of suppliers is handled by the financial director Denise Bowen whose role includes the review, compliance and insurance of suppliers in accordance with Control 2K's quality management system. Suppliers are selected on a per project basis from a pool of 2-3 trusted suppliers.

In terms of its ICT strategy Control 2K uses standard business software using Microsoft Exchange for email communications with customers and suppliers, and Microsoft Office documents for its sales, planning and quality system. In relation to its customer project management, Control 2K uses Microsoft Project but for smaller projects or work packages FDD (Feature Driven Development) is implemented using standard tools such as Microsoft Excel.

For its customers Control 2K implements standard interface methods to interact with higher level systems such as MES. These include ftp, web service, and flat file formats, such as CSV or, XML. Where it is required, the Industreweb solution is customised or extended to incorporate a new connection standard. To connect to lower level devices, such as sensor networks (e.g. Zigbee), standard protocols are utilised and internally customized where required.

Control 2K's interest in ADVENTURE is to develop connectors to allow it to share data gathered by Industreweb with the cloud. ADVENTURE is expected to complement and extend Industreweb rather than to replace or replicate its functionality. In addition, by

connecting to the ADVENTURE platform, Control 2K would like to add to Industreweb the ability to connect to Smart Objects, as this functionality is presently not supported.

By implementing the above features Control 2K hopes to improve its interactions with its customer and supplier base. Through the cloud based connectivity the data exchange will be more efficient and less reliant on propriety client based software. It is expected that the high degree of automation will help speed up order delivery whilst flagging up issues that may occur in a timelier manner. The Smart Object support will help Control 2K to improve its supply chain management with more accurate data.

### 2.3.2 Key Elements

- Control 2K will apply ADVENTURE in conjunction with its Industreweb software suite as part of its manufacturing customer and supplier partner relations.
- Control 2K sees ADVENTURE complementing and extending Industreweb rather than replacing or replicating its functionality.
- Control 2K expects ADVENTURE to improve its business interactions with its customers and the hardware suppliers required within the context of an implementation project.
- Control 2K expects that ADVENTURE will highlight issues with the Implementation and execution of its Industreweb software through the use of cloud technologies.

### 3 Results of the User Interviews

According to the interviews, all of the regarded industry partners – ABB, Azevedos and Control 2K – have a wide range of standardized software, such as Microsoft Office, as well as proprietary and legacy software in use today.

ADVENTURE is generally seen as a complement to these existing systems, rather than a substitute. Thus, ADVENTURE is expected to provide additional or extended capabilities, which cannot be delivered with the existing ICT infrastructure.

First, this concerns the monitoring of supply chains, e.g., with respect to delivery times or buffers. ADVENTURE is expected to provide online or real-time monitoring capabilities and thus to provide a more timely and accurate reporting than the existing systems, which operate in an offline manner, i.e., based on historic and thus less reliable data. In addition, ADVENTURE is expected to facilitate the automatic aggregation of data, thus providing all relevant information concerning the supply chain in one common place. Based on its monitoring capabilities, ADVENTURE should also facilitate the timely notification about business-relevant events.

Second, the industry partners anticipate benefits from ADVENTURE's forecasting capabilities. Specifically, this concerns the ability to predict potential problems in the upstream supply chain, such as insufficient buffer levels or production capacities, in advance, and thus facilitate proactive – rather than simply reactive – responses to these problems, such as process adaptations or optimizations.

Third, major improvements are expected with respect to the exchange of data. In this respect, ADVENTURE is seen as an instrument for structured and efficient exchange of various types of information across corporate boundaries, through a unified channel. Thus, the expectation is that ADVENTURE will improve the interaction with business partners across the supply chain.



## 4 Conclusion

The aim of this deliverable was to highlight practical deficits and needs in the ICT support of (collaborative) production processes and to outline potential benefits which can be expected from ADVENTURE in real business applications.

For this purpose, a set of interviews has been conducted with the respective users of ADVENTURE, namely, the industry partners ABB, Azevedos and Control 2K. The deliverable at hand provides a comprehensive summary of these interviews and highlights common concerns and expectations among the industry partners.

Most notably, all industry partners see ADVENTURE as a complementary solution, rather than as a substitute of their existing – partially standardized and partially proprietary – ICT systems. Thus, ADVENTURE is expected to deliver improved or extended capabilities, compared to the status quo.

First, this includes advanced monitoring features, which permit an aggregated, real-time view of the supply chain status. Second, this concerns improved forecasting capabilities, which permit *proactive* responses to events or problems in the supply chain. Third, this includes a more efficient exchange of information across corporate boundaries.

## Annex A

### Interview with case company – Control2K

Interview Partner: Gash Bhullar

Interviewer: Juergen Mangler (UVI)

#### *Company presentation*

**a) Business objectives (vision, mission, ...)**

Control2K is a software/hardware integrator. It allows the companies to upgrade machines with sensors; the sensor data is fetched, processed and made available in unified form. Control2K does not supply the hardware but supplies the planning and realization of the software integration, while for the hardware it relies on suppliers. Goal of Control2K solution:

- Track *when* machines produce waste, track *why* machines produce waste.
- Have unified information available in order to make an informed decision *how* to reduce waste (lean management).

**b) Products and services offered (identify the different product families)**

IndustreWeb: collects data from arbitrary inputs and puts it into an SQL database.

- .NET, Microsoft Sharepoint Server
- Presentation through Browser

**c) Target markets**

Small, medium and large Enterprises from the producing industry.

**d) Position in the value chain(s)**

- Is directly contacted by companies (first in value chain) *or*
- Is recommended by hardware partners of companies (but is then again first in the value chain).

**e) Company's competitive advantages**

- Reasonable costs
- Fully flexible and customizable integrated hardware and software solution to look at production data.

**Product structure****a) For main product families identify the average number of levels in bill-of-material (BOM)**

Not relevant. Bills have two kinds of items: hardware parts from suppliers depending on project volume, consulting bill also depending on project volume.

**b) Number of components in BOM of end items**

You can get one, but it is not relevant in this context (Control2K produces services).

**c) Number of production phases in the main product**

No production. Each project has several phases:

1. Meeting (Participants: Engineers from Customer, Production Managers, Control2K Staff)
  - How many Machines and points of data?
  - How to present the data (central/de-central, visual)?  
→ Number of components, screens.
2. Pilot Project: One Machine is equipped with the hardware to estimate complexity.
  - Too large projects results in endless negotiations and vague specifications. A pilot project ensures commitment and buying of the customer.
3. Initial Quotation: Minimum, maximum, optional cost.
  - Reconciliation with customer leads to contract (ideal cost for customer are typically minimal + some optional).
4. Hardware is delivered by subcontractors and either
  - Installed by the subcontractors.
  - Installed by technicians of the customer (common).
5. Industrial grade PCs are installed at customers facility
6. Remote installation, connection and customization of the software to fit customers' needs.
7. (Optional) Backup of collected data to off site location.

**d) Number of subcontracted stages in the main product**

One, namely hardware.

- e) Does your partner have any influence on your Product Design (if so, how regular do you receive requests for changing Routings and BOM lists? Or work on a stand-alone process?

When partners use specific protocols (e.g., Zigbee), the main product has to be adapted to ensure hardware compliance.

- f) What is the value added by the company related to the total product value?

Aggregation, transformation and presentation of data.

### ***Manufacturing strategy***

- a) Is the company focusing on regional markets (domestic) or for global markets (EU-wide, Global)

Regional markets.

- b) Are the main finished goods (based on the turnover) tailored or mostly generic

- Hardware: mostly generic
- Software: customized.

- c) How is the planning done in the company? Is the company using material requirements planning, how about net MRP? How do you consider/deal with “external” production capacity? How is production scheduling done? How often is it changed? How long is the frozen period?

See Product Structure c). No planning is required, as the company works on per project basis and does not produce. Company can rely on several hardware partners with an average hardware availability period of ~10 days.

- d) Do you consider ATP (Available to Promise) or CTP (Capable to Promise)?

CTP, project-based work. Adaptation to setting in company.

- e) How is calculated/stored the total load of the factory?

Not relevant.

- f) How is process planning done?

See Product Structure c). Microsoft Project. ISO-9000-ish process (customized to best serve company and customers).

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**g) What are the reasons for subcontracting (if 2.1.2 d)?**

Company does not want to produce/install hardware.

***Customization and order fulfilment strategy*****a) Are there customized features in the products; in what kind?**

Mass customization. Every aspect of the software is adapted to the requirements of the customer.

**b) How the specific customer requirements are collected if not a make-to-stock product?**

See Product Structure c) 2). Pilot Projects are an adequate means to predict complexity and thus costs:

- Typically one Machine is selected. If many different machines are present (common), the machine should be among the more complex. The machine is typically selected in conjunction with the customers production managers.
- Hardware is installed for this one Machine and the data is collected and transformed by the software.
- Results are extrapolated to the rest of the Machines.

**c) Are the customized features just components that exist in inventory or a supplier is delivering?**

No. Hardware is fairly standard.

**d) Are the features that the customer wants to change exactly the same than BOM second level components?**

No. The customer typically wants to change data related aspects. The installed hardware is somehow predetermined by the available machines.

**e) Do the customers require engineering during the sales order fulfilment process?**

Yes. The engineering is done by the customer itself (custom) or the hardware suppliers.

**f) How does the lead-time vary from order confirmation to final delivery?**

Hard to say, depends on the project (e.g. number of machines). Typically the hardware is delivered in ~10 days. Then the installation of the hardware and customization of the software takes place. Average: 1 month.

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**g) How does the lead-time vary from the initial offer request to the final delivery?**

See above.

**h) What are the main sources of variability?**

Number of machines and datapoints, and the complexity of the data to be presented.

**i) How long it takes to send a quotation, from the initial offer request (and how critical is for their business)?**

Very critical. The Initial offer is based on requirements engineering and the pilot project. Can take up to one month (as delivery and installation of hardware for one machine is involved).

**j) What is the share of standard products in turnover?**

5-10% for the hardware. Although it is possible that the customer orders and installs the hardware totally by itself, as big production companies have more leverage on hardware manufacturers and can get better prices.

**k) Are the inventories located close to the customer?**

No inventories. Data is stored at server at the customers location. Off site backup is possible.

**l) If the customer can state: What is their main production typology: MTS, MTO, ATO or ETO?**

—

**m) How the data of customised product are shared with suppliers?**

Documentation (PDF).

***Sourcing strategy***

**a) Is the initial strategy one key supplier one backup instead of open competition in every purchase order?**

For every project a specific supplier is selected from a pool of 2-3 trusted suppliers. It is at every point possible to select and bring in new suppliers (see below).

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**b) Has the company annual agreements with the suppliers / partners?**

See above. No. They are selected on a per project basis.

**c) If annual agreement how are they managed?**

—

**d) Is there a role for supplier management (job position – what)?**

Denise Bowen. Financial director. Supplier Compliance Insurance.

**e) Number of potential suppliers in the market (many or few)?**

Many suppliers. Typically a pool of 2-3 suppliers are considered for projects.

**f) Where are suppliers / partners located? Is distance an issue?**

Local suppliers. No, but company prefers local partners (easier to rectify issues that may occur). Suppliers go to the customer to solve their own problems (warranty).

**g) Has the company suppliers selection and evaluation practices?**

Yes. Whenever a new supplier is needed, suppliers are evaluated with a standard evaluation method (internal). A new supplier is selected according to this evaluation. After each project suppliers are again evaluated.

***Distribution and customer interface*****a) Define the sales channels of the company**

Recommendation by former customers, fliers, repeated Business, conferences. Sometimes: recommendation by hardware suppliers (that sometimes are asked by customers).

**b) How close the end-customers the distributors locate?**

—

**c) What is the delivery time to the end-customer after sales order?**

See above.

**d) How does the company forecast demand? How visible are distributors / customers policies and final customers demand and market trends?**

Not at all. No standardized product and no stocks.

***Buffering mechanism***

This section is not relevant as there is no standardized product and no stocks. Software is customized on a per project basis.

***ICT-solutions***

What ICT solutions are used in the company?

**a) Name and version of ERP-application? Modules?**

None.

**b) Name and version of CRM- application?**

None. Internal handling in custom and/or standard office software (e.g. eMail, Excel).

**c) Name and version of PDM- application?**

None.

**d) Name and version of MES- application?**

OPC (open source) to connect to higher level MES systems. Company relies on standard and internally customized protocols to connect to lower levels (e.g. Zigbee).

**e) Name and version of CAD-application?**

None.

**f) Name and version of Project management solution?**

Microsoft Project.

**g) Name and version of email server solution?**

Microsoft Exchange (hosted).

**h) Name and version of FCS or APS application?**

None.



**i) EDI or other interoperability solutions? What kinds of data formats are used? Other communication protocols?**

Not necessary, as there is no high volume exchange of order/billing data.

**j) Other planning ICT tools?**

FDD (Feature Driven Development methodology). Mostly internal (custom developed) software.

***Key business partners and networks***

**a) Identify the company key business partners (identify the type of partners and give some examples of the main partners in each type).**

- Hardware Suppliers: e.g., Hitex.
- Customers: Work on a per project basis, so no main partners.

**b) Identify key networks which your company is participating.**

Relations to suppliers and former customers. Frequently open days and conferences are organized by partners in the network. Social relationship is very important.

**c) What is the process/method for partner selection currently (social relationships, reputation, price...)?**

Evaluation. Reputation. Trust.

**d) What are the main criteria for entering/leaving existing networks?**

- Entering: Recommendations. Open days. Conferences. Social relationship.
- Leaving: When a partner (hardware supplier) fails, the reputation suffers. This will lead to partner evaluation (see above).

**e) What was the motivation and objectives to develop such partnerships or networks?**

To build up a reputation and facilitate the awareness of potential customers.

### ***Relations***

**a) Describe the type of relationships established with your key business partners or networks (relation type, duration of partnership, supplier development, etc).**

- Trust and social relations are very important.
- Long lasting relationships with hardware suppliers. Frequently new suppliers are “discovered” (e.g. hitex).
- Often customers bring their own hardware suppliers.

**b) How is the relationship or network governed?**

- There is an standard evaluation at the end of each project.
- There is a standardized NON-Conformance reporting procedure for dealing with unexpected events (e.g. suppliers failing).

**c) Are periodic governance meeting organized?**

Evaluation at the end of projects.

**d) Does the company arrange any special event for the current suppliers/partners?**

Open days. Participation in conferences and conference organisation. Attachments.

**e) How do processes deal with unexpected events? (Identification of unexpected events within main processes, etc.)**

Unexpected events are very obvious (hardware not delivered in time, wrong hardware, defect hardware). *Non-conformance* reporting procedure.

### ***Activities***

Not relevant.

### ***Resources***

**a) What resources are shared?**

No critical resources.

**b) Did your company gain access to any critical resource?**

Email.

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**c) How the company is storing the information exchanged with the partners (emails, letters, CRM, memos, sales/purchase documents)?**

Email. PDF as standard data exchange format.

**d) How the employees share the information about the alerts, happenings etc among the partner network?**

The software installed at the customers is capable of automatically informing the company about critical errors (i.e. not error regarding hardware but errors regarding its core functionality).

**e) What kind of business documents are currently used with supplier and customers (purchase order, PO confirmation, sales order confirmation, reclamation documents)?**

All of the above.

**f) What other type of information is shared, structured or not structured?**

Unstructured.

**g) How the documents are currently exchanged?**

Email.

**h) How the data encryption of classified documents is managed?**

No encryption necessary.

**i) Does the case company know top-10 suppliers, if so what methods are used?**

Yes (e.g. Siemens). Depends on the machines present at the customers' production facilities. Often the customers know the recommend or required suppliers (and handle themselves).

***Evaluation / Strategy***

**a) Strong and weak points in collaboration**

- Suppliers: Initial Evaluation. Trust. *Non-Conformance* forms.
- Customers: They provider their own forms and methodologies.

**b) Opportunities / threats for collaboration**

Hardware suppliers may fail (see above).

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c) **Success and failure factors.**

—

d) **Potential benefits (Has networking enabled you to gain the advantage of scale? Is there special advance that just network offers?).**

Recommendations by customers and/or hardware suppliers.

e) **Have you archived any of the following benefits from you network:**

Partially all of the below points are true. Summary: Good relationships to our suppliers and customers contribute to reputation. Yet, there are no out-of-the-expected effects, except the recommendation by hardware suppliers as an integrator. This benefits the hardware suppliers in that it supplements their offering.

1. **Increased scale, scope of activities or sales volume:** ---
2. **Shared cost and risks:** ---
3. **Improved ability to deal with complexity:** Utilize partners expert knowledge to identify potential sources of problems.
4. **Enhanced learning effect:** ---
5. **Positive welfare effect:** ---
6. **Flexibility:** Yes, wider audience.
7. **Efficiency:** Through price.
8. **Speed:** Yes. Good relationship and thrust.
9. **Increased visibility:** Yes. See above.

## Annex B

### Process for Business Requirements Finding

The data collection process for the Target market sector and the statement of requirements has to achieve the following objectives:

- a) To collect the needed background information about the aspects of each company;
- b) To describe and analyse current status and practices of networking;
- c) To identify the future needs for collaboration and respective support, through the iterative construction and analysis of future business networking scenarios;
- d) To understand the business context and understand how the business performance can be enhanced by using the adventure Platform.

It will be very important to promote the ideas of the project and encourage the discussion and brainstorming with case companies to define future scenarios of target market sector. The analysis of these future scenarios will allow the identification of major requirements for the ADVENTURE platform.

The identification of major requirements will be based on the analysis of the Virtual Factory business processes. This analysis will be developed at two different levels: A global process analysis that will lead to the organization process map and a detailed analysis that will lead to the detailed models of the manufacturing processes that will be supported by the adventure framework (annex I provide guidance for the analysis and modelling of the Business Processes).

To achieve such objectives several meetings and workshops will be necessary. The precise methodology will be agreed and fine-tuned along the process by the partners involved in each business case, however some general guidelines are proposed:

- A first meeting with each company of each Business Case will be held to collect background information and review the current networking practices. Depending on the size and organization of each company it may be necessary to conduct more than one interview with key persons (responsible for different areas of the company; for instance, general manager, logistics or procurement);
- Similar interviews can be organized with *key partners* from the business cases or specific experts in the respective industry (these companies or experts to be interviewed should be identified in the first meetings);
- Several subsequent meetings should be foreseen to define future business networking scenarios. In principle it will be advantageous to join all involved partners (companies of each business case and local RTD partners) in workshops or brainstorming sessions, but other approaches can be identified.

The scenarios to be built must describe the business environment and the interactions with business partners. Scenarios should be defined for the different steps of the life cycle of the envisaged business networks.

Information exchange between the 3 project Business Cases and inputs from the analysis of the state-of-the-art should be foreseen, in order to enrich and allow the iterative construction of the final business scenarios.

The defined scenarios will be then analysed in order to extract a formal description of the business requirements.

The date, personal involved and the results of each meeting should be recorded. The meeting situation should be informal (either in a meeting room, lunch meeting type or other suitable environment). The essential objective is to arrange a meeting environment where the group (participants from the company and from the local RTD partners) can concentrate on the topic with maximum creativity and with minimum interruptions.

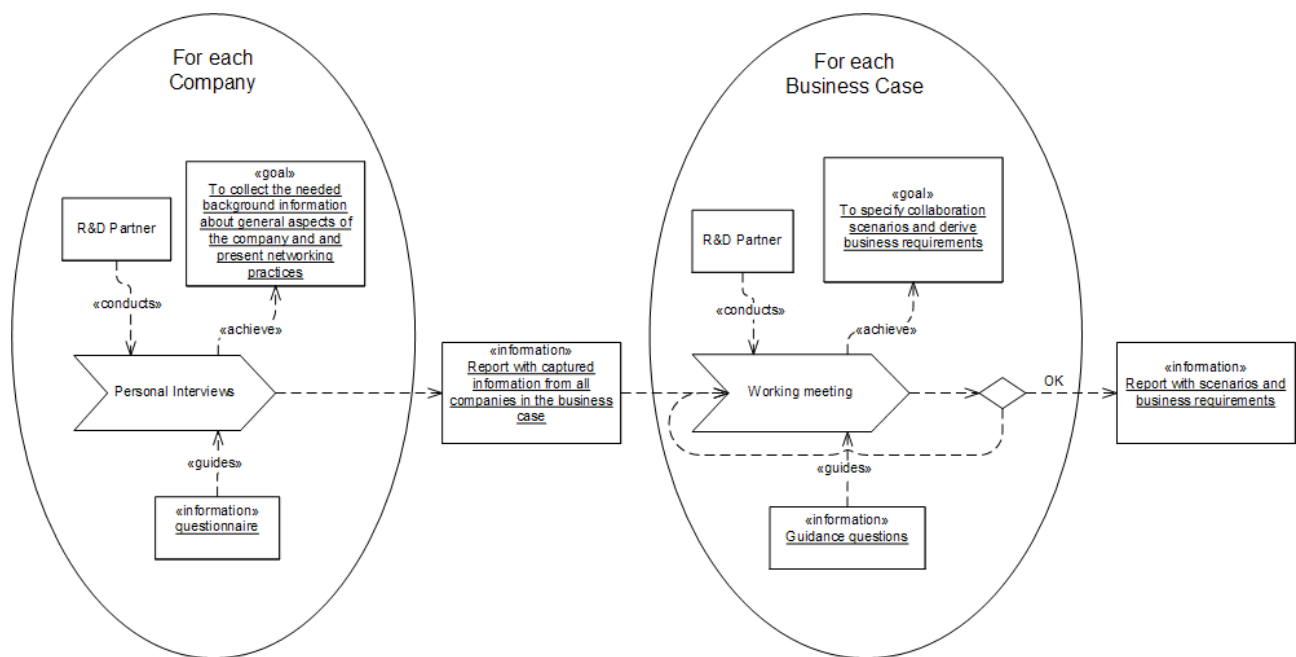
After the first meeting, follow-up meetings should be arranged preferably within a week timeframe.

The meeting partners are as follows:

<b>Research partner(s) (first one is the convener)</b>	INESC Porto	UVA	UVI
<b>Business Case companies</b>	AZEVEDOS INDUSTRIA S.A.	ABB	Tanet

To track the progress of the business scenario definitions a couple of telephone conferences will be arranged. The goal for the first discussion is to exchange the status of current networking activities of the case companies. During the second telephone conference the future business scenarios will be discussed. The schedule for the first meeting is **2011-10-04 at 13:00 CET** and the second discussion **2011-11-01 at 14:00 CET**. The representatives of the research partners should be available during that time. Participants: INESCPorto, UVA, UVI.

The overall process will be coordinated by UVA. The local activities will be coordinated by INESC Porto in Portugal, UVA in Finland and UVI in Austria/UK.



A first interview was scheduled with each case company and local RTD partners.

The objective of each interview was to collect the relevant background information and the present networking practices of each company.

In each interview, one or several key business partners is identified that should be included on this study and that should be subject to similar interviews, to allow a better understanding of the networking practices, business environment and future trends.

These interviews were informal conversations where the information described in the following subsections has been collected. The topics described were used to structure the conversation and as a check-list in the final of the meeting to assure that the main topics were covered. The order of the topics could have been adjusted in accordance with the business type and the flow of the conversation.

These topics should not be seen as a sequence of questions that have to be posed. Further information such as process diagrams can be attached.

**Interview with case company - Azevedos**

Interview Partner: Tiago Gomes (AZV)

Interviewer: Filipe Ferreira

**Company information**

The first part of the interview should provide information about the business of the company, its objectives, strategies (business models), products, operations and ICT infrastructures.

The following topics should allow the classification of the company to a predefined value chain architecture classification based on the current procedures of the daily work.

***Company presentation*****a) Business objectives (vision, mission, ...)**

The Mission of AZEVEDOS INDUSTRIA is to conceive, develop and deliver technological solutions for the cork production/transformation industry. Its Vision is to be recognized as a technology excellence centre by its target market.

**b) Business models and processes****Business Model****i) Key Partners**

- Suppliers of electrical equipment, motors, drives, etc.;
- Automation technology companies (e.g. Omron);
- Casting Service Suppliers;
- Cutting and bending sheet metal Service Suppliers;
- Sheet surface treatment Suppliers;
- Suppliers of standard mechanical parts (bearings, belts, screws, etc.).
- Customer ( participates in functional and validation phase, before machine entering in AZEVEDOS INDUSTRIA portfolio)

**ii) Key Activities**

- Client Requirements Analysis (Consulting – help client to understand what he really needs);
- Product concept and development of equipment / machines;
- Production of electrical parts (this includes electric boards mounting, PLC programming, HMI interfaces development;
- Production and assembling of mechanical parts (cutting, machining, welding, mounting);
- Integrated tests and verification in house and in customer plant;

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- Fine tuning (electric, interface, mechanical) based on client reporting;
- After-sales-assistance;

### iii) Key Resources

- Specialized human capital for each area (conception, development, machining, mounting, welding etc.);
- Plant facilities including the following functional areas: technical office, automation systems laboratory, components warehouse, raw materials warehouse, painting, pre-assembly, final assembly, management and administrative offices;
- Machining equipment: universal lathes, boring machines, universal milling machines, CNC milling machines; threading machines; portable welding machines;
- Painting Equipment and water treatment system;
- Test equipment for electrical safety;
- Computers structured network;
- Application of information technology management (ERP and MES);
- 3D CAD Station;
- High resolution plotters and printers.

### iv) Value Proposition

AZEVEDOS INDUSTRIA delivers high-quality, with high-usability machines and equipment for cork industry according each customer requirements. AZEVEDOS INDUSTRIA leads customers to innovate and achieve better performance and cost/risk reduction in their business by offer consulting services, helping clients to choose the best fit machines / equipment for each case.

In some cases, AZEVEDOS INDUSTRIA develops entirely new equipment in order to satisfy specific customer requirements. (**Fully customized machines**). In this case AZEVEDOS INDUSTRIA becomes a very close partner with its customer and builds a work team with its costumer for that specific project.

### v) Customer Relationship

AVEZEDOS INDUSTRIA deals directly with its final costumers, from the commercial consulting to the product delivery and after-sales support.

The initial client contact can be done by phone, fax, and email or directly in website, but an AZEVEDOS INDUSTRIA Sales consultant will always visit the client in order to support him with answers to his business needs.

### vi) Channels

*Awareness (How do we raise awareness about our company's products and services)*

AZEVEDOS INDUSTRIA products and services are well known in cork industry due to its 47 years old presence in the market. AZEVEDOS INDUSTRIA has a wide contact network which makes it easier. However,

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some channels are used in order to raise the AZEVEDOS INDUSTRIA products and services:

- Commercial consultants and technical staff visit the costumers facilities periodically;
- Participation in international exhibitions;
- Periodically newsletters spreading;
- Press releases in a trimestral basis in a specialized International cork industry magazine (EUROPACORK);
- Promotion in the Cork Portuguese Association annuity which has an international spreading;

*Evaluation (How do we help customers evaluate our organization's Value Proposition)*

- Specialized technicians and deep knowledge in this industry acquired during many working years;
- Disruptive Innovation make part of company's culture;
- AZEVEDOS INDUSTRIA is centred on customer final satisfaction and not only on product sales.
- Quality is also a strong commitment between AZEVEDOS INDUSTRIA and its customers and business partners. From the process of receiving raw material to the process of managing customer relationships, a quality management system (ISO 9001) ensures compliance with the most demanding requirements in order to total customer satisfaction and continuous improvement of the organization.

*Purchase (How do we allow customers to purchase specific products and services)*

One of the main business processes of AZEVEDOS INDUSTRIA is the customer request processing and management, so AZEVEDOS INDUSTRIA has defined a set of strategic goals and performance indicators which supports all decisions related to customer first contact.

There are many ways to customer do his first contact with AZEVEDOS INDUSTRIA: it can be done by phone, fax, internet website, email or directly with a sales a sales consultant. The next step is to understand and clarify what customer really need. To do it, we can have a presential meeting with customer or arrange a skype meeting if we are talking about international customers. On that meeting we will define all the requirements based on pre-defined layouts, technical datasheets, example photos and videos to help customer clarify his needs.

*Delivery (How do we deliver a Value Proposition to customers)*

Before machine being delivered, they are all tested (electrical safety and mechanical movements validation), cleaned and packaged with plastic film and a wood box.

Concerning the delivery, we can have 2 different situations:

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If the customer is located in a 30 km radius from AZEVEDOS INDUSTRIA facilities, the delivery is always done by AZEVEDOS INDUSTRIA technicians. AZEVEDOS INDUSTRIA delivers and mounts the product at the client Facilities.

If we are talking about an international delivery, transport arrangement is from our customer's responsibility. When we are talking about a more complex and tailored equipment, mounting and installation is always done by AZEVEDOS INDUSTRIA, if we are dealing with a standard machine it is usually done by customers.

*After sales (How do we provide post-purchase customer support?)*

The after-sales assistance encompasses three types of services:

- Technical assistance of machines and equipment at client facilities;
- Technical assistance of machines and equipment in client facilities at AZEVEDOS INDUSTRIA facilities (upgrades and maintenance services ;).
- Component or subsystem maintenance at AZEVEDOS INDUSTRIA facilities;
- In case of international customers, when it's possible, a Skype meeting can be tried in order to solve problems. Otherwise a technical staff goes directly to the customer facilities;

vii) Customer Segments

Global Cork industry companies;  
Global Food and beverage industries;

viii) Cost Structure

AZEVEDOS INDUSTRIA is a Value Driven Factory, focused on value creation; it has a premium value proposition)  
AZEVEDOS INDUSTRIA most important costs are:

- salaries,
- Electronic and automation parts;
- facilities buying and maintenance;
- equipment buying and maintenance;

Most expensive key resources are the human capital, Electronic and automation parts and CNC milling machines.

Most expensive key Activities: Concept and development, machining.

ix) Revenue Streams

AZEVEDOS INDUSTRIA Customers pay for new machines, After-sales assistance (upgrades and repairs), maintenance contracts and viability project studies.

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## Processes

Please refer to the Process Management point (2.1.2)

### a) Products and services offered (identify the different product variants/families)

AZEVEDOS INDUSTRIA is a leader company in several production operations segments, such as:

- cork stoppers manufacture (natural, technical and agglomerated stoppers);
- surface printing;
- surface treatment;
- counting and packaging;
- visual inspection of surface quality;
- Specific solutions for quality laboratories.

AZEVEDOS INDUSTRIA also offers after sales services, machines repairs and machine upgrades as well as project viability studies.

### b) Target markets(local/regional/global)

AZEVEDOS INDUSTRIA products are marketed for the cork industry all over the world; more than 50% of overall production is sold to the external market.



### c) Position in the value chain(s)

In case of equipment value chain, AZEVEDOS INDUSTRIA is at the end of the value chain. AZEVEDOS INDUSTRIA sells its products directly to the final customer, there are no distributors.

If we think about the beverage market, AZEVEDOS INDUSTRIA enters at middle of the value chain. AZEVEDOS INDUSTRIA supplies sealants industry.

**d) Company's competitive advantages****People**

AZEVEDOS INDUSTRIA has an interdisciplinary team who creates and produces the projects, machines and services available in their business. For AZEVEDOS INDUSTRIA, people are the main asset, as so, AZEVEDOS INDUSTRIA consider each person as an essential piece of a team that makes AZEVEDOS INDUSTRIA a leading company in the market.

**Quality**

Based on a development strategy, supported by partnerships with R&D national and international entities, AZEVEDOS INDUSTRIA uses a wider range of Technologies in order to deliver solutions to the most demanding requirements and explore three main axes:

- agility in product configuration;
- total integration with information systems;
- highly user friendly;

More than a goal, Quality is a strong commitment between AZEVEDOS INDUSTRIA and its customers and business partners. From the process of receiving raw material to the process of managing customer relationships, a quality management system (ISO 9001) ensures compliance with the most demanding requirements in order to total customer satisfaction and continuous improvement of the organization.

***Process Management*****a) Is the company process oriented? If so how many processes are involved?**

Yes, it is process oriented. AZEVEDOS INDUSTRIA has 6 identified core processes.

**b) What are the core processes (order, design, production, delivery, services, etc.)?**

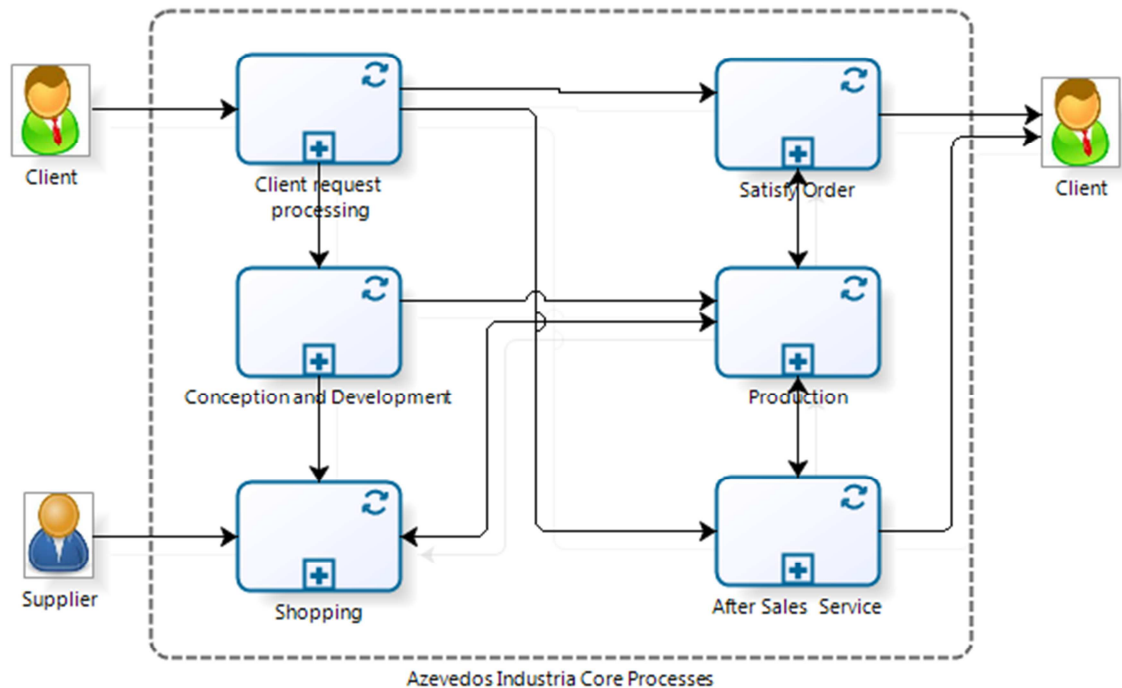
AZEVEDOS INDUSTRIA has 6 core processes:

1. Customer order processing;
2. Conception and Development;
3. Shopping
4. Production
  - a. Mechanical;
  - b. Electrical;
  - c. Production planning and control;
  - d. Final assembly verification and testing.

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5. Order satisfy
6. Technical assistance

The following picture shows the AZEVEDOS INDUSTRIA core processes and its interactions:



**c) Are the core processes identified, well defined (mapped) and documented? If so, how?**

Yes, they are mapped, well defined and documented, using swim lane diagrams.

**d) How does the company manage its core processes?**

AZEVEDOS INDUSTRIA uses the Balanced Scorecard tool to manage and improve all core processes.

**e) Are the processes internally managed or outsourced? If outsourced, how many of them?**

The processes are internally managed.

**f) Are the processes run by manually or automatically (ICT support)?**

Some of the processes are partially supported by ICT tools: ERP (ADONIX) and MES (SYBUS)

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The process management is done by using Excel.

**g) Is there a Business Process Management System?**

No.

***Business Model and Process***

**a) What type of business model the company is currently following?**

AZEVEDOS INDUSTRIA is currently following a directly-sales business model. (Make to Order or engineer to order) In point 2.2.1-b) the business model is detailed using the Osterwalder's 9 building blocks structure.

**b) How the high level business needs are accommodated within the business model(s)?**

The business needs are directly connected to each building block. These building blocks give us the following information:

- The key partners that we need to run the business;
- Key resources that we need to acquire from partners;
- Key activities performed by partners;
- What key activities do our value propositions require?
- What key resources do our value propositions require?

**c) What type of business process model (BPM) company is presently following?**

AZEVEDOS INDUSTRIA has 6 core processes identified. Please refer to point 2.1.2b (process map).

**d) How are the detailed business requirements integrated within the BPM?**

The business processes detailed models include information for each activity of the process. Analysing the business process model we identify detailed business requirements.

**e) How often are the business model(s) and BPM(s) updated / revised within the company?**

AZEVEDOS INDUSTRIA Processes are updated / revised every year in order to improve its performance.

**f) Do the adapted business model(s)/BPM(s) fulfil the current market needs?**

Yes. AZEVDOS is ISO 9001:2008 certified. The ISO 9001:2008 is the client as a main actor, so every business processes is mapped aligned to this philosophy. AZEVEDOS INDUSTRIA is always seeking for continuous improvement of the

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organization. Improvements in business models lead company to fulfil new market needs and client satisfaction. When the business model change, the business processes need to be adapted in order to fit the business model.

### **Product structure**

**a) For the main product families, identify the average number of levels in bill-of-materials (BOM)**

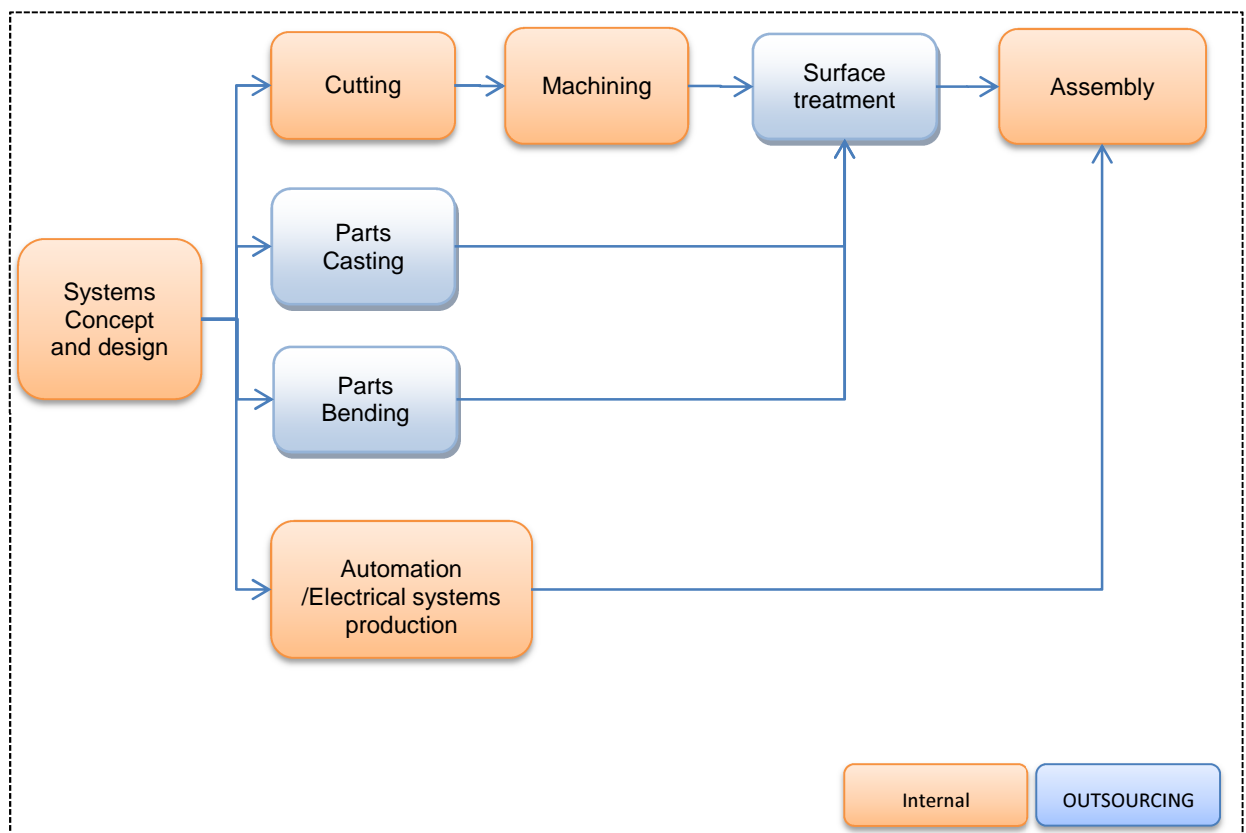
AZEVEDOS INDUSTRIA Product BOM have mainly 3 levels (system > subsystem > component).

**b) Number of components within the BOM of end item/product**

Whereas most products are Industrial machinery, its complexity is significant and it easily reached several hundred (<500) of components involving different technologies, including mechanical technology, electrical technology and automation.

**c) Number of production phases involve to develop the end product**

The production involves 7 phases as illustrated in the following figure.





**d) Number of subcontracted/outsourced stages to develop the end product.**

AZEVEDOS INDUSTRIA subcontracts at least 3 areas: casting, bending and shaping, and surface treatment operations.

**e) Does your partner(s) have any influence on your Product Design (if so, how regular do you receive requests for changing Routings and BOM lists? Or work on a stand-alone process?**

No, the product design is entirely done by AZEVEDOS INDUSTRIA. The only one who can influence product design is the customer.

***What are the value added activities by the company related to the total product value chain? Manufacturing strategy***

**a) Is the company focusing on regional markets (domestic) or for global markets (EU-wide, Global)?**

AZEVEDOS INDUSTRIA is focused in global markets; more than 50% of overall production is sold to the external market.

**b) Are the main finished goods/products (based on the turnover) custom-tailored or mostly generic?**

The main finished goods are mostly generic (make-to-order).

**c) How is planning done in the company? Is the company using material requirements planning? How about net MRP?**

AZEVEDOS INDUSTRIA uses an IT System called "SYBUS" that has MRP functionality.

**d) How does the company consider/deal with "external" production capacity? How is production scheduling done? How often is it changed? How long is the frozen period?**

AZEVEDOS INDUSTRIA doesn't control the external production capacity, the production scheduling is done by using SYBUS, and it is changed weekly. The frozen period is 1 month.

**e) Do you consider ATP (Available to Promise) or CTP (Capable to Promise)?**

CTP. AZEVEDOS INDUSTRIA considers availability of both materials and capacity.

**f) How is the total load of the company calculated/stored?**

The total load of the factory is calculated based on the human resources and production. It is 350 machines per year.

**g) How is the company's process planning done?**

The planning and control sub process included in production process details how the company plans its production.

**h) What are the reasons for subcontracting (if subcontracting is applied)?**

AZEVEDOS INDUSTRIA outsources services for which is not qualified to perform and does not have necessary equipment. These services require substantial investment that is not justifiable in relation to turnover of the company. For example, it makes no sense to have a furnace to produce only a few casted components needed to build some equipment.

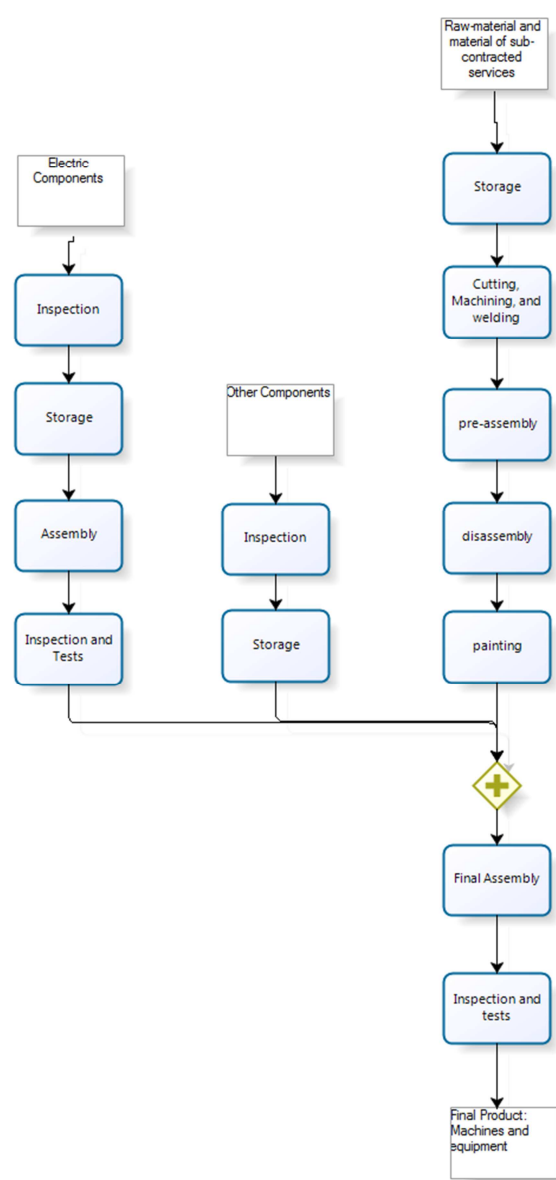
**i) Is the company using standard graphical notations to describe its manufacturing processes modelling?**

AZEVEDOS INDUSTRIA is using flowcharts and swim lane diagrams.

**j) As-Is Manufacturing processes analysis and modelling.**

AZEVEDOS INDUSTRIA is characterized as a manufacturing industry with a discrete production model. The production flow is linear and convergent.

Then we present the flowchart of the production process of a generic machine.



<b>Process Name:</b>	Produce Machine
<b>Process Objective:</b>	Plan and perform the product according to the established requirements
<b>Scope (Entities, boundaries)</b>	Internal Products and services. The process starts with a new accepted client order and ends with the final tests (machine ready to deliver).
<b>Inputs and Outputs</b>	Inputs: Electric components, raw material, sub-contracted components/parts, other components. Outputs: High-quality Machines and equipment for cork industry.
<b>Stakeholders</b>	
<b>Process Execution Short Description</b>	<p>The AZEVEDOS INDUSTRIA production system is order oriented. The company plans its production based on orders from its clients and the available manufacturing capacity, producing in small series.</p> <p>At the production level, there may be different situations (standard product, special product, etc.). The products are mostly standard products. However, there are special products (standard products with changes or new products based on customer requests). The Production Department is responsible for defining the specifications for the products manufacturing according to customer orders, as well as the preparation of all information used throughout the production process (drawings, routings, tests and check instructions, etc.).</p> <p>In the general case, the production cycle associated with a machine is long. Typically a series of machines can take about 2-3 months into production, depending on product type and quantity. Production planning defines the type and quantity of goods to be manufactured based on orders and sales forecasts.</p> <p>Often there is a change in production orders due to the need to advance deliveries or meet specific orders are considered strategic for the company.</p> <p>The production process has four sub-process, namely:</p> <ul style="list-style-type: none"> <li>• Planning and control;</li> <li>• Mechanical production;</li> <li>• Electrical Production;</li> <li>• Assembly, Verification and Final Tests.</li> </ul>
<b>Interaction with other processes</b>	The production process interacts with all core processes except the "Client Request Processing".

***Customization and order fulfilment strategy*****a) Are there customized features in the products? If so, what kind of?**

AZEVEDOS INDUSTRIA deals with 2 kinds of customization:

- Total customized equipment based on special requirements of customers (tailored product).
- Partial customization, i.e. adaptations to the catalogue products. This includes for example human machine interface adaptations, mechanical adaptations, type of material, etc.

**b) How are collected the specific customer requirements if not a make-to-stock product?**

Based on interviews a system's needs (high-level) document is elaborated. Then the AZEVEDOS INDUSTRIA Conception and development department representative will analyse the client needs and run some interviews in order to well define the requirements document. The requirements are then well established and validated by AZEVEDOS INDUSTRIA and the costumer.

**c) Are the customized features just components that exist in inventory or a supplier is delivering those components?**

There are several situations:

- The customized features can be only some new standard components added or replaced;
- It can be an entire new sub-system developed total internally, Total external (black box with interfaces) or in collaboration with partners.
- An entire new machine, developed to meet specific requirements.

**d) Are the features that the customer wants to change exactly the same than BOM second level components?**

It can be or not, depending on customer requirements.

**e) Do the customers require/allow the product engineering during the sales order fulfilment process?**

Yes, sometimes the order fulfilment includes the product engineering (ETO).

**f) How does the lead-time vary from order confirmation to final delivery?**

From 30 days (catalogue machine) to 180 days (tailored machine).

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**g) How does the lead-time vary from the initial offer request to the final delivery?**

From 30 days (catalogue machine) to 180 days (tailored machine).

**h) What are the main sources of variability?**

The tailored products have higher lead-time than the standard products.

**i) How long does it take to send a quotation, from the initial offer request (and how critical is it for your business)?**

It takes 1 day maximum.

**j) What is the share of standard components/products in annual turnover?**

90%

**k) Are the inventories located close to the customer?**

No. The entire inventory is located in AZEVEDOS INDUSTRIA facilities.

**l) If the customer can state, what is their main production typology: MTS, MTO, ATO or ETO?**

If the client can state, he would prefer a MTS production. However it is not possible in AZEVEDOS INDUSTRIA because AZEVEDOS INDUSTRIA produces specific solutions for cork industry and the catalogue has many types of machines/models.

**m) How the data of customised product shared with the suppliers / subcontractors?**

AZEVEDOS INDUSTRIA sends specification documents to its suppliers by email. For bending services the drawings are sent attached to the specification documents. For casting supplier AZEVEDOS INDUSTRIA sends moulds too. In case of surface treatment, parts are sent and all the features associated with type of treatment are specified (material type, thickness, resistance, etc.)

**n) Is the order fulfilment process and modelling using standard notation?**

Yes, using swim lanes diagrams.

o) **As-Is Process analysis and modelling**

<b>Process Name:</b>	Order Fulfilment
<b>Process Objective:</b>	Assure that the client Orders are satisfied
<b>Scope (Entities, boundaries)</b>	This process covers all activities since the orders reception until the delivery of products / services to the customer. At services level, only the services related to equipment on internal premises of AZEVEDOS INDUSTRIA are subject to orders.
<b>Inputs and Outputs</b>	Inputs: Outputs:
<b>Stakeholders</b>	
<b>Process Execution Short Description</b>	<p>Production department takes knowledge of the orders through the information system. Requirements and any changes requested by the client are entered into the system to ensure the information transfer between sales and production.</p> <p>AZEVEDOS INDUSTRIA preserves the conformity of the product during its internal processing. In this sense it is planned to identification, handling, packaging, storage and protection of the product and its constituent parts. In this process, and for services, if any damage occurs during the stay of customer property on the AZEVEDOS INDUSTRIA premises, loss or damage is due for registration and its communication to the client. The packaging and shipping activities are carried out only after being successfully completed the checks and tests required.</p>
<b>Interaction with other processes</b>	The Order Fulfilment process interacts with "Client Request Processing" and "Produce Machine" Process.

***Sourcing strategy*****a) Is the initial sourcing strategy one key supplier, one backup supplier instead of open competition in every purchase order?**

There is a list of classified suppliers, which are subject of six-monthly reviews by the AZEVEDOS INDUSTRIA, taking into account the quality of supplied parts, terms, and their organizational level. Usually there is more than one supplier for the same type of component, but the strategy is not to have many suppliers.

AZEVEDOS INDUSTRIA has few internationally recognized vendors and establishes a close collaboration with them.

**b) Does the company have annual agreements with the suppliers / partners?**

Yes, for electric and electronic components only.

**c) If there is an annual agreement how is that managed?**

It is controlled at the reception. The responsible for the warehouse analyses the order and verifies if everything is in accordance with the partner's annual agreement.

**d) Is there a role for supplier management (job position – what)?**

There is one person responsible for supplier management but not at full time.

**e) Number of potential suppliers in the market (many or few)?**

There are many potential suppliers in the market.

**f) Where are suppliers / partners located? Is distance an issue?**

The distance is a critical aspect and AZEVEDOS INDUSTRIA prefer national suppliers and if it's not possible AZEVEDOS INDUSTRIA prefer suppliers who have a worldwide implementation (e.g. Omron, festo, Etc..)

**g) Does the company practice suppliers' selection and evaluation process? If so what are the selection processes?**

Yes, AZEVEDOS INDUSTRIA has a supplier selection process implemented. The main criteria for the partner selection are the quality of supplied parts, terms, organizational level, location and distribution centre location.

**h) Is the company practicing standard notation to describe Sourcing Processes analysis and modelling?**

Yes.

**i) As-Is Process analysis and modelling**

<b>Process Name:</b>	Sourcing
<b>Process Objective:</b>	Meet the shopping needs to ensure that products are purchased in accordance with specified requirements.
<b>Scope (Entities,</b>	Raw materials, sub-contract material, components, sponsored raw and



<b>boundaries)</b>	subcontracted equipment.
<b>Inputs and Outputs</b>	Inputs: Outputs:
<b>Stakeholders</b>	
<b>Process Execution Short Description</b>	<p>AZEVEDOS INDUSTRIA ensures that purchased products conform to specified purchase requirements through an appropriate evaluation of its suppliers. To do this, a quality management system integrates methodologies for:</p> <ul style="list-style-type: none"> <li>• Regulate the process of placing orders and suppliers follow-up;</li> <li>• Evaluate and select suppliers based on their ability to supply product in accordance with the requirements that directly affect quality and set the type and extent of control to exercise over them. The company has an updated system of records of its suppliers to consistently develop the process of selection and evaluation.</li> </ul> <p>The purchase documents relate, in addition to precise details of the purchase and, where necessary, specifications, standards, procedural requirements, inspection instructions and other relevant technical. Before being sent to the suppliers, the documents are reviewed and approved with regard to their suitability in relation to specified requirements.</p> <p>Upon receipt and in accordance with the applicable inspection procedures, it is verified that the products comply with the requirements referenced.</p>
<b>Interaction with other processes</b>	The Order Fulfilment process interacts with “Conception and Development” and “Production” Process.

### ***Distribution and customer interface***

#### **a) Define the sales channels of the company**

AZEVEDOS INDUSTRIA sells directly to its end-costumers, from the initial consulting to the after-sales support. There's no distribution interfaces.

#### **b) How close to the end-customers the distributors are located?**

N/A. AZEVEDOS INDUSTRIA has no distributors.

**c) What is the delivery time to the end-customer after sales order?**

30 to 180 days, depending on whether it is a tailored product or not.

**d) How does the company forecast demand? How visible are distributors / customers policies and final customers' demand and market trends?**

The company has a daily or weekly contact with the major international players in the food industry. Hence it is simple to foresee trends and even to anticipate the needs of new products being launched. AZEVEDOS INDUSTRIA also participates in international shows, conferences and seminars.

**e) Is the company practicing standard notation to describe Distribution Processes analysis and modelling?**

AZEVEDOS INDUSTRIA has no distribution. AZEVEDOS INDUSTRIA sells directly to its end customer.

**f) As-Is Distribution Processes analysis and modelling**

N/A

***Buffering mechanism*****a) Is there any variation in capacity utilization rate during the year? If so, what kind of variation?**

Most (80%) of the time, AZEVEDOS INDUSTRIA is working for secured orders. However, when there are no orders AZEVEDOS INDUSTRIA produces small quantities of standard parts / equipment to stock taking into account the market trends.

**b) What types of buffer-inventories are used: material, semi-finished goods or final products? What is the share of each?**

AZEVEDOS INDUSTRIA uses material and semi-finished goods inventories. 47.5% of the inventory is raw material and standard components. 47,5% is semi-finished goods and 5% of the inventory can be finished equipment.

**c) Are the finished goods kept in distribution centres, how many?**

No. there is no distribution centres.

**d) Are there subassemblies inventories in the manufacturing sites?**

Yes, namely electrical and mechanical subsystems.

- e) **Are all the materials/components acquired on sales-order based?**

Mainly.

- f) **Do you have suppliers' materials in your storage?**

No.

- g) **Does your subcontractors work with your material (is there bi-directional material flow between the supplier and you)?**

Yes, but only the surface treatment suppliers. AZEVEDOS INDUSTRIA sends the parts to be treated and get it back treated.

- h) **Do you have to manufacture finished goods in very early stage balance the capacity to the seasons?**

No. However, if we know from the trends that standard equipment will be saleable, it can be produced only if the factory is not at full capacity.

### ***ICT-solutions***

What ICT solutions are used in the company?

- a) **What is the name and version of ERP-application? Modules?**

ADONIX by SAGE infologia (CRM, invoice, accounting)

- b) **What is the name and version of CRM- application?**

ADONIX by SAGE Infologia.

- c) **What is the name and version of PDM- application?**

N/A

- d) **What is the name and version of MES- application?**

Softmaker SYBUS.

- e) **What is the name and version of CAD-application?**

SolidWorks and Autodesk Mechanical and Electrical AutoCAD.

- f) **What is the name and version of Project Management solution?**

Microsoft Project.

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**g) What is the name and version of email server solution?**

Microsoft Exchange.

**h) What is the name and version of FCS or APS application?**

N/A

**i) What is the name of EDI or other interoperability solutions? What kinds of data formats is your company using? Do you have any other communication protocols?**

N/A

**j) Do you have other planning ICT tools?**

No.

***Target market sectors***

**a) How do you tackle the market peak/off-peak currently?**

AZEVEDOS INDUSTRIA “acts” for a market niche, named Cork Transformation Industries. This market doesn’t have seasonality, i.e., AZEVEDOS INDUSTRIA cannot plan our machines production for a season peak, because it does not exist. Our market grows in a linear correlation with wine consumption all over the world.

The way we tackle our market is supported by four main subjects/tools;

- Website systematically updated;
- Periodic newsletters promoting new solutions, services or talking about our evolvement in advanced R&D projects;
- Face-to-face contacts with main players from our market, due to our privileged geographic location.

AZEVEDOS INDUSTRIA customer’s perception is a reliable, innovative and credible company. This image was built due to 47 years acting for this market niche.

Our business model is mainly a Make-to-Order, or in some situations an Engineer-to-Order (for tailored products), but when our Production Plan is made (monthly based), we take into consideration all market trends which we can understand from:

- customers’ direct contact/talking;
- proposals done and its success probability

**b) Do you have any readymade solution to tackle abnormalities/fluctuations in the market? If so, what's that?**

If we talk about an excess of orders, we outsource the production of one/two types of finished products to a specific and reliable partner/supplier, to release our production processes.

If we talk about lack of customer orders we seat and talk concerning new ideas/products. We bet more in after sales assistance, like machines upgrading, maintenance.

**c) What are scopes and challenges you currently are facing from the market sector?**

- Very tailored solutions and with a short time frame;
- Conception of automatic lines, minimizing the use of working men and product handling;
- Technical support/consultancy to improve their production layouts.

**d) What are the tools you are currently using for forecasting?**

Any specific tool. Only our know-how and experience.

**e) What tools you are using to manage your order taking process?**

AZEVEDOS INDUSTRIA uses an ERP and a MES System.

**f) How do you currently monitor your operational processes? Are you using any tool for that?**

AZEVEDOS INDUSTRIA is using a MES system named SybuS and Microsoft Excel, where they have different performance indicators to monitor the production process. These performance indicators were created based on a BSC philosophy.

**g) How do you manage your quotation process? What are the tools you using for that, if there any?**

With the support of ERP, named Adonix X3 SAGE and with Microsoft Excel.

**h) How is information exchanged between your organization and the customer?**

By mail, fax and website – what is related with documentation and data. By phone or direct contact in other cases.

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**i) Are you offering any configuration tools for the customers' to participate in the product design process? If so what's the name?**

Our MES – SybuS is already prepared to do that. At this moment we are not using it, but we have intentions to implement it in a near future.

**j) What are your concerns and expectations from ADVENTURE tool or framework?**

AZEVEDOS INDUSTRIA has the expectation of improve the performance of its collaborative processes, mastering the unpredictability's in order to reduce the time-to-market. AZEVEDOS INDUSTRIA thinks that the ADVENTURE could expedite these processes by providing the following functionalities:

- Partner search in a more fast and efficient way, with a direct access to the production data and load of each one of the potential partners / suppliers;
- Identify and evaluate new partners which propose to supply interesting services. These potential partners will be viewable in the ADVENTURE poll;
- Fast and controllable exchange of information and documentation between partners;
- Collaborative Processes simulation in order to obtain an optimal result for the entire process, selecting the adventure reliable partners that have better conditions to supply the services involved, based on real data of each partner plant that will be provided by the ADVENTURE Platform;
- Fast forecasting of collaborative (inter-organizational) processes, allowing AZEVEDOS INDUSTRIA to give fast responses to the client orders that includes special requirements.
- Expedite the negotiation process between AZEVEDOS INDUSTRIA and its partners;
- Real-Time monitoring of the internal and external activities giving to AZEVEDOS INDUSTRIA a wide view of the whole collaborative manufacturing process.
- Solve unpredictable problems in a more expedite way, by adapting the processes supported by the tools of the ADVENTURE Platform.

AZEVEDOS INDUSTRIA is concerned about the integration questions. AZEVEDOS INDUSTRIA has an ERP and a MES system. Nowadays, the internal processes and part of collaborative processes are managed within these systems. AZEVEDOS INDUSTRIA is expecting that the entire collaborative process will be managed in the adventure platform. However, as an example, when a task is outsourced, a source order is created in AZEVEDOS INDUSTRIA ERP System. Will ADVENTURE integrate with our ERP system in order to create this automatically? The same applies to the MES system. Will ADVENTURE manage all collaborative process? If so, then adventure will need information from the MES system, regarding the internal activities?

**k) How can the ADEVENTURE tool help you to change your current business environment?**

By expediting and controlling the Collaborative Processes. By being an adventure member, AZEVEDOS INDUSTRIA will be visible to the adventure environment; this will contribute for new participation opportunities in collaborative networks as equipment suppliers. AZEVEDOS INDUSTRIA will not participate in a manufacturing process as a parts or subsystems supplier, AZEVEDOS INDUSTRIA sells the entire solution.

**Current business networking practices**

The objective in this point is to analyse the current networking practices of the interviewed company. The main business partners, the type of relations established, the motivations for cooperation, the activities developed and the resources used should be identified.

***AS-IS Inter-enterprise processes analysis and modelling***

**a) Identify cross-organizational processes;**

There are no mapped processes relatively to current inter-enterprise relationships.

The typical inter-enterprise processes that occur nowadays are:

- (1) Project Acquisition using specifications provided by AZEVEDOS INDUSTRIA;
- (2) Sheet conformation and / or surface treatment ordering, in material supplied AZEVEDOS INDUSTRIA and with its specifications;

**b) For each identified cross-organizational process include:**

- **Process Objective;**

Process (1) - **Project Acquisition using specifications provided by AZEVEDOS INDUSTRIA**

Outsourcing of project activities, i.e., mechanical systems project and / or subsystems to be integrated in AZEVEDOS INDUSTRIA equipment.

Process (2) - **Conception of new equipment, in this case the project is always AZEVEDOS INDUSTRIA property.**

Outsourcing of operating tasks that AZEVDOS has a lack of know-how nether de technology to execute them.

- **Scope (Entities, boundaries):**

Process (1): The process encompasses the mechanical project and the product Conception until the electrification and automation phase, according with the specifications defined by AZEVEDOS INDUSTRIA. The

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project/product is property of AZEVEDOS INDUSTRIA. There is an exclusivity and confidentiality contract between all involved firms.

Process (2): The process applies to Sheet conformation and / or surface treatment services.

These services are realized in accordance with the AZEVDOS specifications. In some cases, AZEVEDOS INDUSTRIA supplies the parts that will be conformed or treated.

- **Inputs and outputs**

### **Process 1**

#### **Inputs**

- a) Multidisciplinary meetings between enterprises;
- b) Requirements discussion and specification;
- c) Continuous project monitoring.

#### **Outputs**

- a) Mechanical Project;
- b) System or subsystem to be integrated;
- c) Machine in last assembly phase.

### **Process 2**

#### **Inputs**

- a) Drawings/Order Note/Technical Specifications

#### **Outputs**

- a) Conformed parts;
- b) Parts with surface treatment.

- **Stakeholders (costumers, suppliers, partners);**

AZEVEDOS INDUSTRIA and the services suppliers

- **Process Execution Short Description;**

Bending - are activities of cutting and bending sheet metal (1.5 to 5 mm thick) steel plate or stainless steel machines that are made specifically for this purpose, known as press-brakes.

Surface Treatment - are activities of anodizing metal parts and / or coating with low friction material (Teflon), which are made in large tanks, according to the specifications defined by AZEVEDOS INDUSTRIA (colour and type of treatment, thickness)

### **Interaction with other processes;**

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These processes interact with the manufacturing internal process and with the order and billing processes

***Key business partners and networks***

**a) Identify the company key business partners (identify the type of partners and give some examples of the main partners in each type).**

The key business partners are:

- Automation technology companies;
- Metal surface treatment service suppliers;
- Casting service suppliers;
- Sheet metal cutting and bending companies;

**b) Identify key networks in which your company is participating**

In fact there is a network of partners but it is managed partner to partner, is not integrated or automated.

**c) What is the process/method for partner selection currently (social relationships, reputation, price...)?**

The suppliers are evaluated and selected based on their ability to supply product in accordance with the requirements that directly affect quality. The company has an updated system of records of its suppliers to consistently develop the process of selection and evaluation.

**d) What are the main criteria for entering/leaving existing networks?**

The main criteria are the quality of supplied parts, terms, and their organizational level. Location is also important

**e) What was the motivation and objectives to develop such partnerships or networks?**

AZEVEDOS INDUSTRIA does not have technology to make certain operations. Moreover, make investments in this technology is not profitable for AZEVEDOS INDUSTRIA. Sometimes AZEVEDOS INDUSTRIA also relies on partners to not disrupt the normal flow of work.

### ***Relations***

- a) **Describe the type of relationships established with your key business partners or networks (relation type, duration of partnership, supplier development, etc.).**

Close, reliable and long lasting relations.

- b) **How is the relationship or network governed?**

The relationship is managed in a commitment basis.

- c) **Are periodic governance meetings organized?**

Yes, but partner to partner. Each one of the partners make an isolated operation, there are no dependencies.

- d) **Does the company arrange any special event for the current suppliers/partners?**

No.

- e) **How do processes deal with unexpected events? (Identification of unexpected events within main processes, etc.)**

If it's possible, a project change is made in order to mitigate these risks, otherwise AZEVEDOS INDUSTRIA and its client will adapt their process case a case. There are no predefined procedures. The case is managed on-the-fly. AZEVEDOS INDUSTRIA assumes the responsibility and manages the relation with the client clear and transparently.

### ***Activities***

- a) **What are the main activities developed within your company?**

The main activities are the conception and development, machining, automation systems development, systems assembly and tests.

- b) **What are the responsibilities of the different partners within the current business network?**

To follow the AZEVEDOS INDUSTRIA specifications.

**Resources****a) What resources are shared within the network?**

Only specialized human resources.

**b) Did your company gain access to any critical resources of other partner company?**

Yes, namely the partner's specialized human resources.

**c) How is the company storing/retrieving the information exchanged within the partner organizations (emails, letters, CRM, memos, sales/purchase documents)?**

AZEVEDOS INDUSTRIA uses a document management system where every documents and specifications are stored and managed.

**d) How the employees share the information about the abnormal situations (events), alerts, happenings, etc. among the partner network?**

By phone or email.

**e) What kind of business documents are currently used within suppliers and customers (purchase order, PO confirmation, sales order confirmation, reclamation documents)?**

Purchase order, purchase order confirmation, sales order confirmation, specification sheets and complaints documents.

**f) What other type of information is shared, structured or not structured?**

AZEVEDOS INDUSTRIA Specification documents.

**g) How are the documents currently exchanged?**

By email.

**h) How is the data encryption of classified documents managed?**

N/A.

- i) **Does the case company know top-10 suppliers, if so what methods are used?**

Yes, AZEVEDOS INDUSTRIA has a partner evaluation process and a 6-monthly audit process.

***Evaluation / Strategy***

- a) **What are the strong and weak points in the existing collaboration?**

Strong: Solid relationship with all partners.

Weak: There is no integrated management of the collaborative network.

- b) **What are the opportunities / threats for the current collaboration?**

***Opportunities***

- Respond to requests for which AZEVEDOS INDUSTRIA not have all the know-how or ability required.
- Download AZEVEDOS INDUSTRIA production system to maximize the production flow.

***Threats***

- In the case of outsourcing project, the risk of plagiarism or competition exists.
- If the network becomes very complex is more complicated to manage it, and if some partners do not meet deadlines or specifications, it becomes difficult to guarantee the delivery date and product quality.

- c) **What are the success and failure factors within the collaboration?**

***Success***

Best people involved in the network;

Clear and detailed specifications for everything;

Agile process execution and management;

Continuous monitoring and improvement of the collaborative processes;

***Failure***

Lack of partner commitment;

Partner does not follow AZEVEDOS INDUSTRIA specifications;

The alert for unforeseen events is given too late.

- d) **What type of potential benefits have you already achieved from this collaboration (Has networking enabled you to gain the advantage of scale? Is there special advance that just network offers?)?**

Best time-to-market. Special orders delivery, with new and very specific requirements and with the maximum quality.

- e) **Have you archived any of the following benefits from your collaborative network?**

- a. **Increased scale, scope of activities or sales volume**

No.

- b. **Shared cost and risks**

No.

- c. **Improved ability to deal with complexity**

Yes

- d. **Enhanced learning effect**

Yes

- e. **Positive welfare effect**

Yes

- f. **Flexibility**

Yes

- g. **Efficiency**

Yes

- h. **Speed**

Yes

- i. **Increased visibility**

No.

## Future Scenarios

The second step in the business requirements analysis is the description of future business scenarios, where new networking strategies and practices are defined.

As stated above, these Future Scenarios will be built in an iterative way. In principle several meetings and brainstorming sessions will be needed, involving each business case companies and local RTD partners. These sessions should be prepared considering the analysis of the information collected from the interviews conducted in the first phase, the ideas coming from the state-of-the-art and the experiences of the other business cases.

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The scenarios to be built must describe the business environment and the interactions with business partners. Scenarios should be defined for the different steps of the life cycle of the envisaged business networks (Partners qualification, network formation and network operation).

**Important note:** To guide the discussions it is possible to use the first definition of the ADVENTURE for creation and operation of business networks described in the DOW. However, this definition should be seen as a first version that can be changed based on the analysis done. So, it is possible that we end up with a Methodology with slightly different phases or structure. Especially, regarding the first phase of the Methodology we have to be careful with the title of this phase. The objective of the first phase is to create all environmental conditions necessary to efficiently create and operate business networks (trust, information services, etc.). It is not only about qualifying suppliers, which in a classical view can be a much more focused activity.

The following questions can be used to foster discussion and brainstorming:

***TO-BE inter-enterprise processes definition and modelling***

- a) How the processes could be Re-engineered assuming ADVENTURE implementation?
- b) For each future process models include:
  - **Process Objective;**
  - **Scope (Entities, boundaries);**
  - **Inputs and outputs;**
  - **Stakeholders (customers, suppliers, partners);**
  - **Process Execution Short Description;**
  - **Interaction with other processes;**
  - **Model of the process flow;**
  - **Process Flow Activities Details;**

<b>Process Name:</b>	Produce special wood cap machine
<b>Process Objective:</b>	Assure that the special wood cap machine is produced on time and on budget, meeting all the customer requirements.
<b>Scope (Entities, boundaries)</b>	This process applies only to the special wood cap machine, this is a process developed to reply to a specific customer order (a business opportunity)
<b>Inputs and Outputs</b>	Inputs: Outputs:
<b>Stakeholders</b>	AZEVEDOS INDUSTRIA; Head subsystem supplier, surface

	treatment suppliers, Automation Systems Supplier.		
<b>Process Execution Short Description</b>	<p>AZEVEDOS INDUSTRIA, which is a Portuguese SME manufacturer of machines, receives an ordering from its Italian customer GANAU. GANAU wants to offer a high-quality variant of their capsulated cork stopper. This different type of product should have a special wood cap on the top. While AZEVEDOS INDUSTRIA is actually able to fulfil this specific order, there are a number of obstacles which may prevent the successful business transaction, as, e.g., GANAU requires AZEVEDOS INDUSTRIA to assure that the machines have a throughput of at least 20.000 corks per hour and that a specific automation technology with a specific programming language is used, which AZEVEDOS INDUSTRIA doesn't use at the moment. Furthermore, GANAU wants the machine with a minimum carbon footprint and a delivery frame of 45 days. Due to a much tailored wood cap, it will be necessary to conceive a totally new system for handling these caps. The head cap's subsystem is one the main parts of the whole solution.</p> <p>Analysing this set of main requirements and constraints, AZEVEDOS INDUSTRIA figures out that it will be necessary to involve further partners. In order to fulfil the order's needs, AZEVEDOS INDUSTRIA requires and demands, respectively, specific manufacturing capabilities to:</p> <ul style="list-style-type: none"><li>1) conceive the new head cap subsystem;</li><li>2) perform all surface treatment required; and</li><li>3) Develop, implement and test all new automation subsystems.</li></ul> <p>AZEVEDOS INDUSTRIA starts with the design and development of a new machine. The new head cap subsystem is entirely outsourced. The surface treatment and the new automation systems are outsourced too.</p> <p>AZEVEDOS INDUSTRIA produces other subsystems. When the new head cap subsystem is delivered, AZEVEDOS INDUSTRIA tests and integrates it into the system. When the automation system is delivered a final assembly is done and the integrated tests are done by AZEVEDOS INDUSTRIA and the automation system supplier.</p> <p>Once the automation system is validated and verified the finals tests are carried out in order to deliver the machine to</p>		
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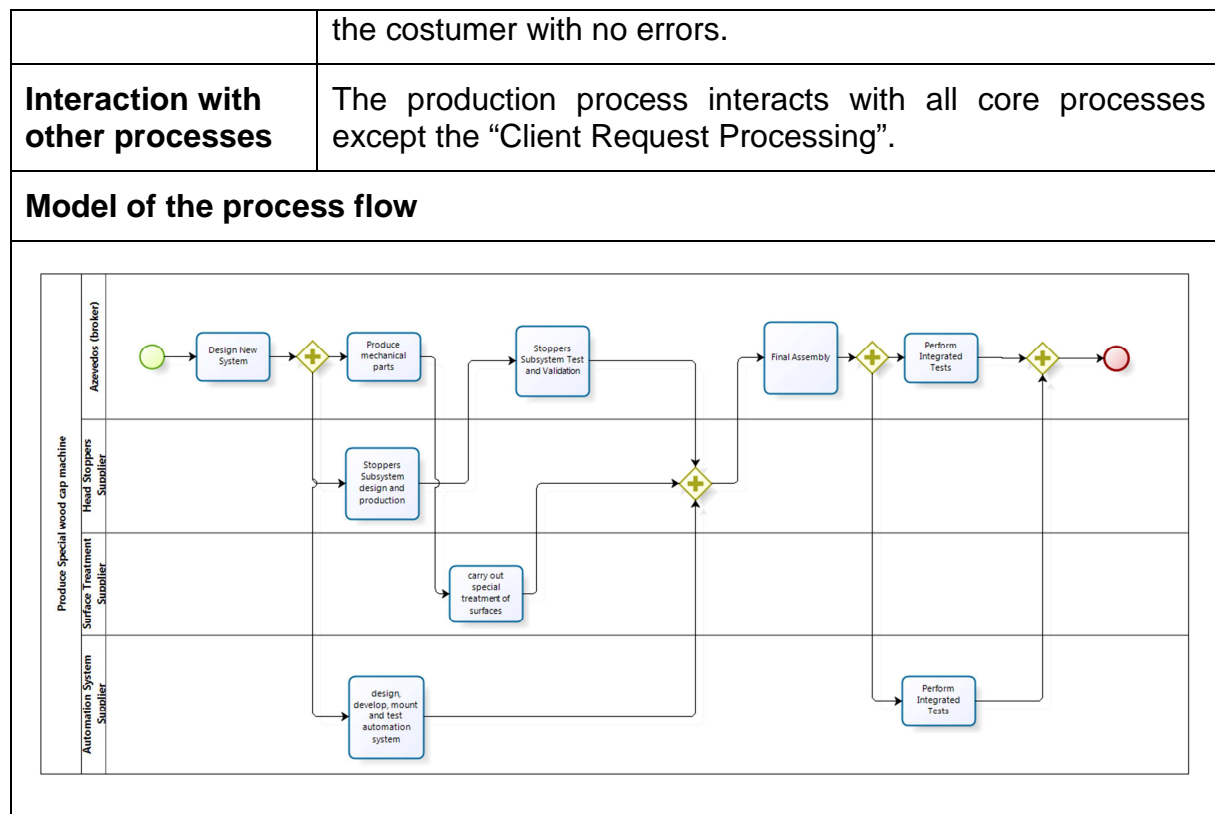


Figure 1 - Special wood cap machine production process

### Virtual Factory Management

a) Are the potential partners well known?

Yes

b) What are the levels of trust among potential partners (high, medium, low)?

High

c) Is there a need for solution to find more cost-effective or experienced partners?

Not at all.

d) Who is in response to select new partners (centralized or other)?

Centralized, one person only.

e) Do you lack of information about the existing partners? If so what kind of?

- Availability (capacity of the supplier);
- The order status;



- Time to deliver;

**f) How have the current partners been captured to the network?**

The current partners have been captured through visits to partner facilities and references from other companies.

**g) What is the search pattern/model your company would like to follow (location, business field, competitors, product area)?**

Location, Quality, Price Range, Availability and Customers trust index.

**h) Is there a need to inform other suppliers/partners concerning a new supplier/partner?**

No.

**i) Is there a need to compare the potential partners using a heuristics method?**

Price, Trust, Level of support...

**j) Is there a need to analyse the existing partners constantly?**

Yes to maintain the partners information database updated.

**k) What kind of analyse is needed (quality, environmental, productivity, cost-efficiency, on-time deliveries)?**

Quality. Cost-efficiency. On time deliveries, level of support, commitment of representatives inside company.

**l) Should the partner analyse the result to be integrated to an existing solution (ERP, CRM)?**

Yes, in order to integrate the collaborative processes data with the internal processes data.

**m) Are you willing to promote your own products and services for new partners? If so, how?**

Yes, but always as a virtual factory broker.

**n) Are you using already Internet –based marketing? If so, how (Google ads, web pages, online shop, catalogues)?**

Yes, website and newsletters.

***Business collaboration and networking***

**a) How the network should be building (one-to-one partnership) and how it can be renewed later on?**

One-to-one partnership by the broker (a person);

**b) How important it is to visualize the networks and own position in networks or the status of the network?**

This is very important. Allows and overall view and management of the collaborative process as a whole.

**c) What are the main advantages the pilot companies are trying to achieve from this business networks?**

- Quick responses to new business opportunities for which AZEVEDOS INDUSTRIA needs collaboration;
- Improve time-to-market;
- Run time Monitoring and Control all collaborative process;

**d) How do the pilot companies observe the business lifecycle of the networks?**

AZEVEDOS INDUSTRIA has a potential new business opportunity. Thus, AZEVEDOS INDUSTRIA starts a Virtual Factory Lifecycle process with the business analysis's activity where a business reference model can be used to produce the business model. Once the business model is defined, AZEVEDOS INDUSTRIA will jump to the Virtual Factory Design Phase and define the set of cross-organizational processes that will implement the business model. After that, AZEVEDOS INDUSTRIA will search for partners and assign it to the different activities of the designed manufacturing process. The next step of the design phase is the simulation and forecasting. If the simulation and forecasting results are satisfactory, then AZEVEDOS INDUSTRIA will contact the set of suppliers in order to obtain an agreement. The next step is the process execution and monitoring. This includes runtime adaptation if unforeseen events occur during the execution. If a new partner is included during the adaptation, a new agreement must be done. Before the Virtual factory dissolution, AZEVEDOS INDUSTRIA wants to run a members inquiry in order to obtain feedback and improve processes. The following Figure illustrates the AZEVEDOS INDUSTRIA ADVENTURE VF Lifecycle view.

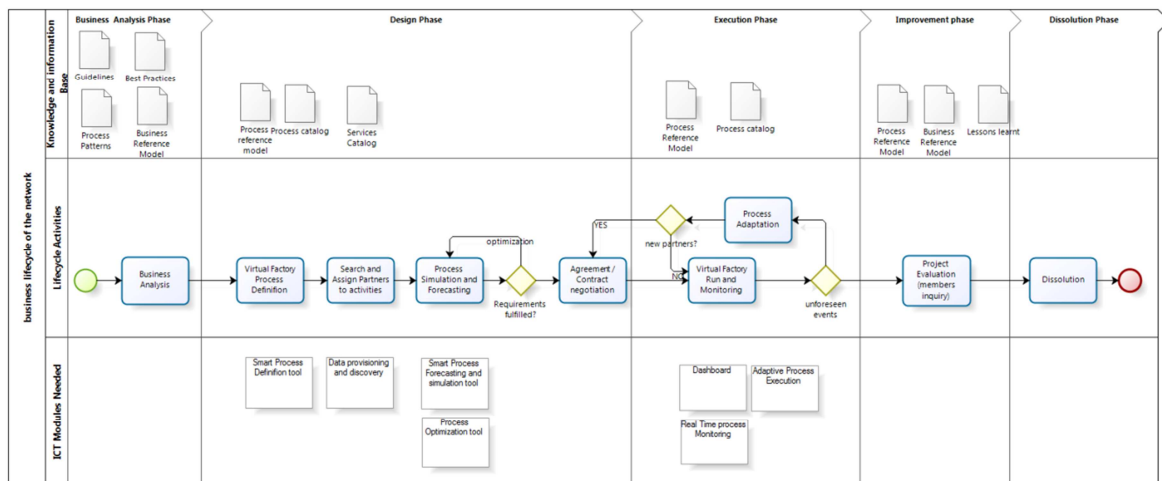


Figure 2 - ADVENTURE Virtual Factory Lifecycle - AZEVEDOS INDUSTRIA View

**e) How would networking affect the pilot company's current operations and revenues/profits in the best case scenario?**

With the decreasing of time to market and by optimizing the collaborative process, AZEVEDOS INDUSTRIA will have a better response to its clients.

**f) How experts and experienced networking companies are selected and how their inputs are included at this point?**

***Real-time Monitoring, Process Adaptation and Dashboard***

**a) Do you have a need for more effective to change product information and business documents?**

Yes.

**b) Is there a need to manage online the work queue even with the partner?**

Yes.

**c) What kind of techniques do you prefer using in next ten years (semantic data, SOA, etc...)?**

AZEVEDOS INDUSTRIA prefers to use the most standard techniques, wide adopted by industry and software vendors, in order to make integration easier.

**d) How could the visibility of operations in the network be improved?**

By giving information about the current status of each task for each of the partners.

**e) Do you show the online status of the sales orders to your suppliers?**

No.

**f) What kind of measures would you use to evaluate the network performance (productivity, on time, minimize total inventories, optimize buffers)?**

Productivity and lead time.

**g) How would the network be used to fasten the information of business possibilities or losses?**

By expediting the process and with a real time management.

**Interview with case company – ABB Oy, FI-DA**

Interview Partner: Harri Ronnholm, Indrajit Jadhav (ABB)

Interviewer: Ahm Shamsuzzoha

**Company information**

The first part of the interview should provide information about the business of the company, its objectives, strategies (business models), products, operations and ICT infrastructures.

The following topics should allow the classification of the company to a predefined value chain architecture classification based on the current procedures of the daily work.

***Company presentation*****a) Business objectives (vision, mission, ...)**

We are the Preferred Global Provider of Distribution Automation Solutions with  
Recognized Product Leadership and Customer Closeness.

We Make Grids Smarter!

**b) Business models and processes****Business Model****i) Key Partners**

Customers

ABB Switchgear

ABB Power Systems

ABB Distribution Automation (DA) Channels

OEM

Suppliers

Electronics

Mechanics

Electrical components

Service (e.g. R&D)

Production technology (e.g. test systems)

Forwarding agents

**ii) Key Activities**

Product Management (PM)

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R&D

Production (assembly & testing)

SCM

Marketing & Sales

After Sales (Customer Support, spare parts, repair)

Customer Training

iii) Key Resources

Human resources (e.g. R&D, PM and Sales)

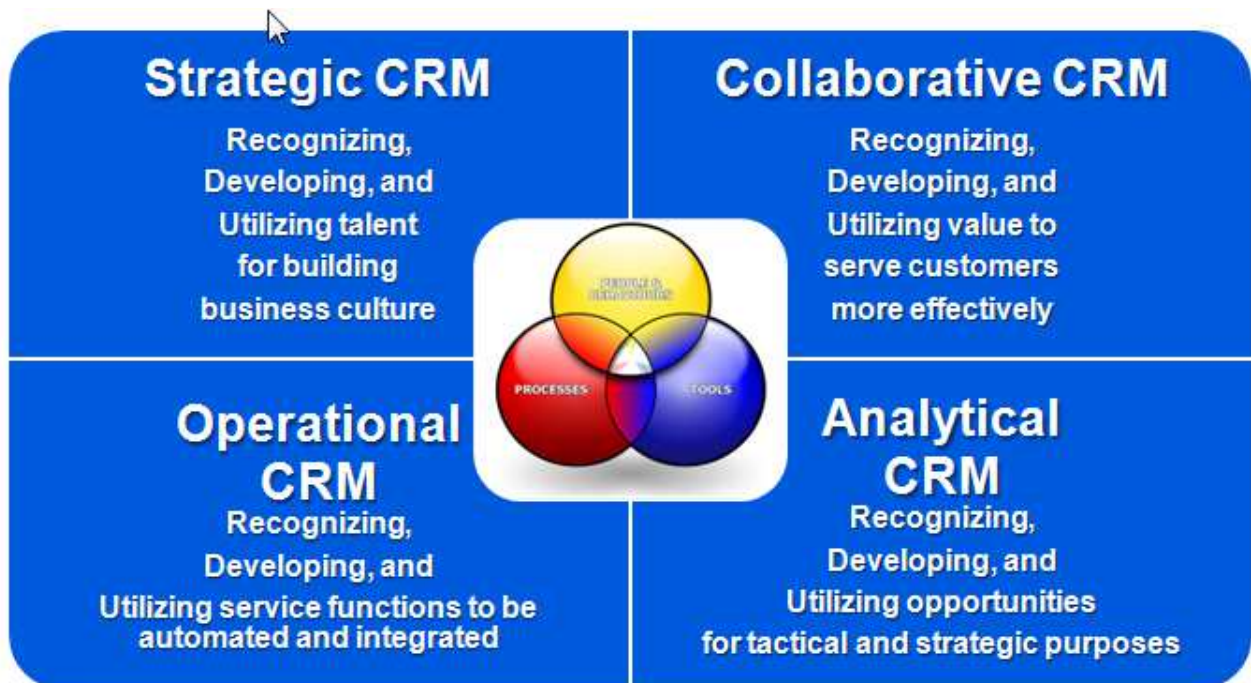
Production Testing Equipment

IT/IS management

iv) Value Proposition

Global responsibility for the development, marketing, sales and production of protection and control IEDs, software tools and communication devices for distribution automation In Medium Voltage Networks, distribution automation solutions improve personnel safety, power Network reliability and protection performance of utility substations, marine and industrial power Systems

v) Customer Relationship



vi) Channels

*Awareness (How do you raise awareness about our company's products and services)*

Marketing communication: product launch events, seminars, conferences, marketing material, Intranet, Internet, DA Road Shows

*Evaluation (How do we help customers evaluate our organization's Value Proposition)*

QMS, several certificates (ISO, UL, ATEX)

Approvals

Factory visits and audits

Customer trainings

Customer support

Customer surveys

*Purchase (How do we allow customers to purchase specific products and services)*

Sales channels

tools like configurator and ASCC

Front End Sales (FES)

Mainly internal ABB business

*Delivery (How do we deliver a Value Proposition to customers)*

Fulfilling commitments to customers by **consistently delivering products on time.**

Increasing the value of our products and minimizing cost by continuously **improving operating efficiency, quality, productivity and asset utilization.**

**Increasing the business speed** to offer competitive lead times to customers and improve our internal efficiency

*After sales (How do we provide post-purchase customer support?)*

Customer support

Service/repair

Warranty and extended warranty

## vii) Customer Segments

Utilities

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## Industries

Regions 2010  
In MEUR

■ NEU ■ IMA ■ NAS ■ SAS  
■ CEU ■ MED ■ SAM ■ NAM

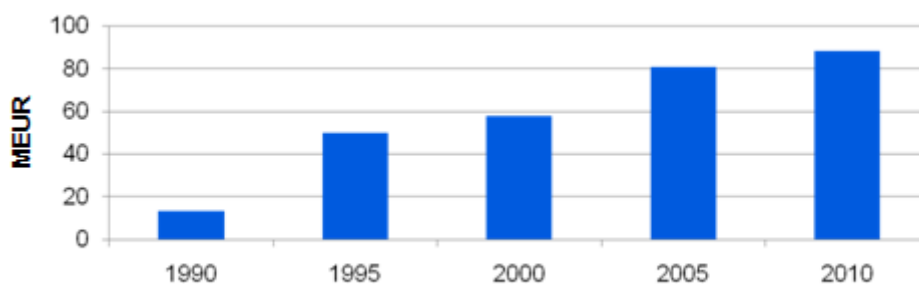
## viii) Cost Structure

High fixed costs (e.g. salaries in R&D)

Material costs (high outsourcing rate)

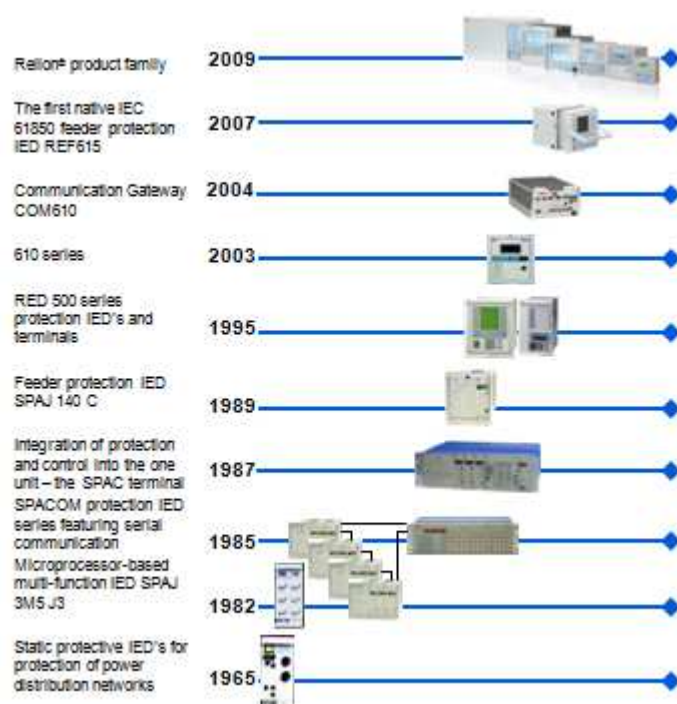
Low direct labour

## ix) Revenue Streams





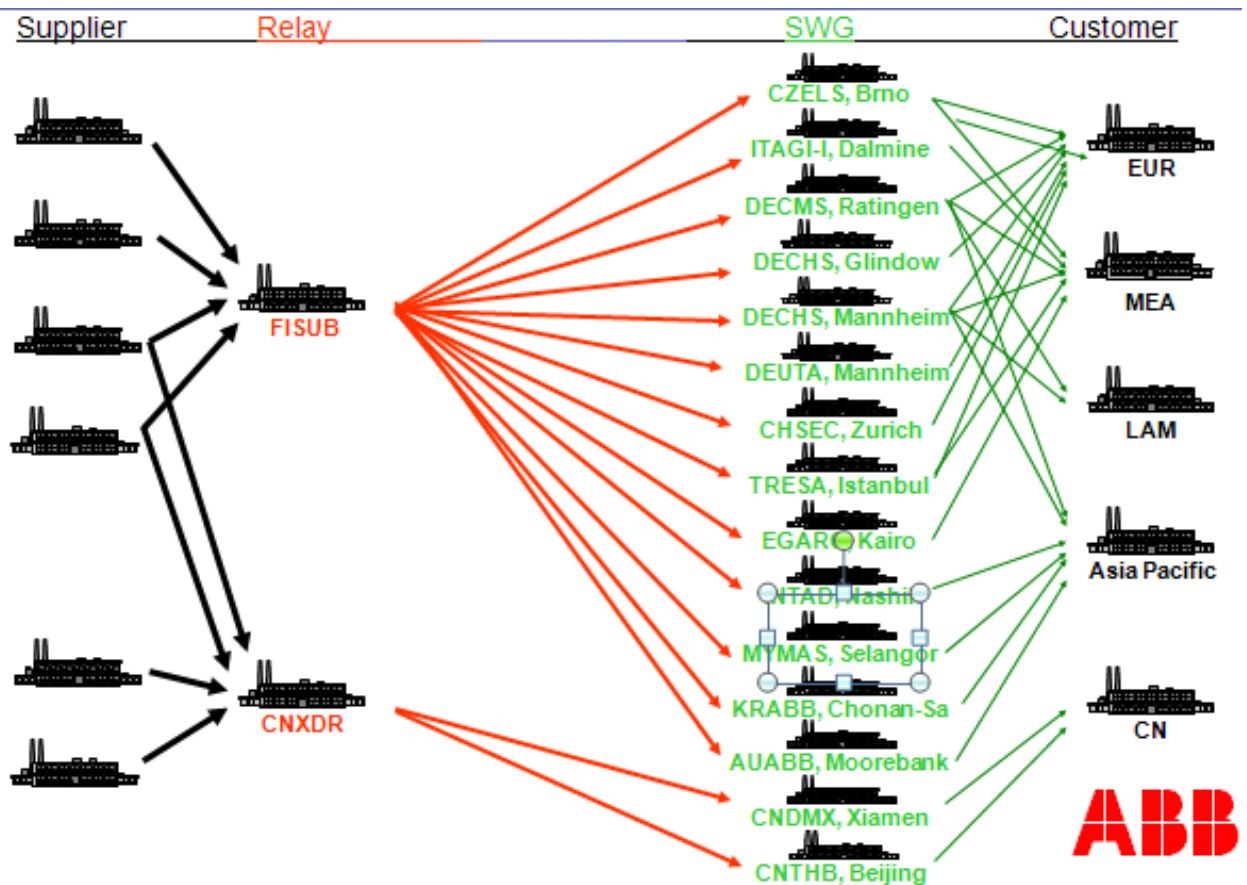
**c) Products and services offered (identify the different product variants/families)**



**d) Target markets(local/regional/global)**

Global market excluding the market for local productions units (India, China and USA)

## a) Position in the value chain(s)



## b) Company's competitive advantages

High quality products  
 Short delivery time  
 Technical Support

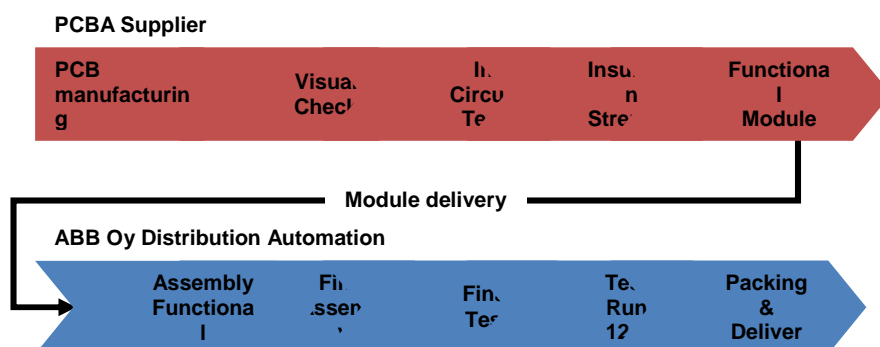
**People**

Personnel 241, average age 41 years  
 79 % men, 21 % women  
 Salaried employees 82.5 %  
 Blue collars 17.5 %  
 40 % of the workforce involved in R&D  
 60 % engineers / technical background

**Quality**

Several certificates and approval  
 Continuous Improvement Process

### Extreme testing during design and production phases



### Process Management

a) Is the company process oriented? If so how many processes are involved?

Three processes

**SCM**

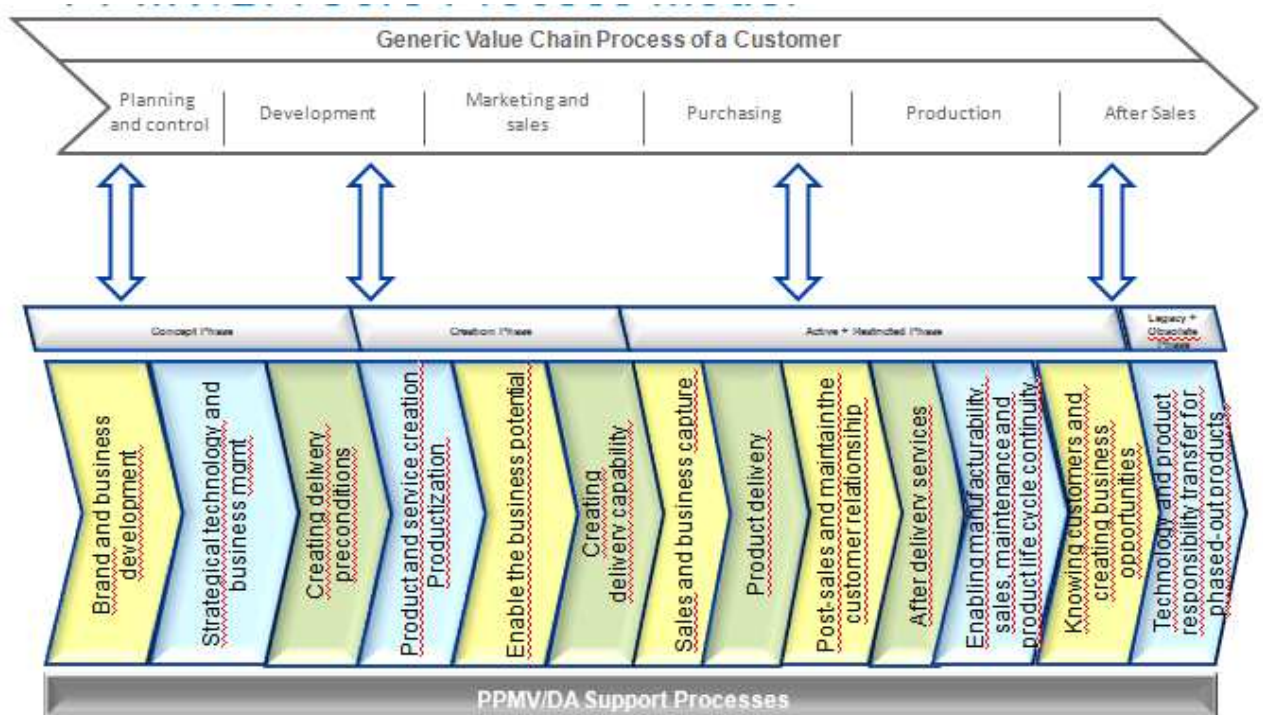
**PM**

**CRM**

b) What are the core processes (order, design, production, delivery, services, etc.)?

As above.

- c) Are the core processes identified, well defined (mapped) and documented?  
If so, how?



- d) How the company manages its core processes?

—

- e) Process owners and developers

—

- f) Are the processes internally managed or outsourced? If outsourced, how many of them?

Some processes like design or production of legacy products partly outsourced but managed internally.

- g) Are the processes run by manually or automatically (ICT support)?

Manually with IT tools.

- h) Is there a Business Process Management System?

No.

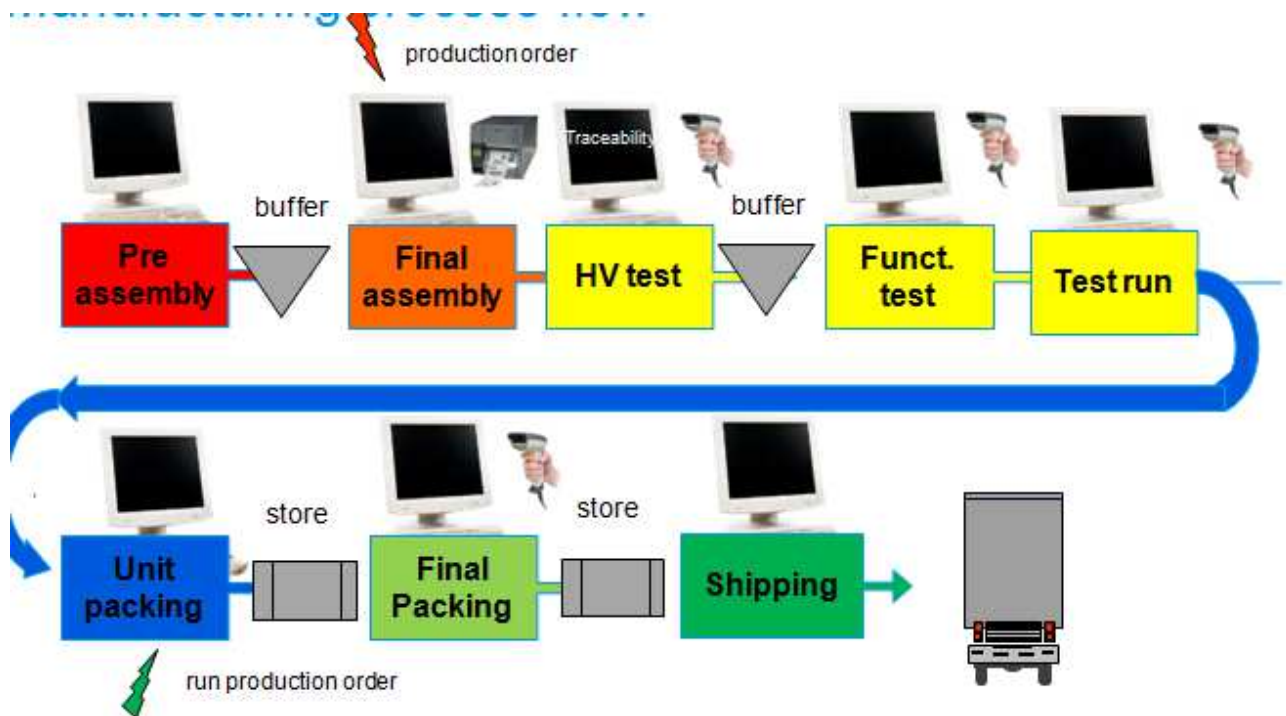
***Business Model and Process***

- a) **What type of business model the company is currently following?**  
MTO.
- b) **How the high level business needs are accommodated within the business model(s)?**  
Usage of material buffer where feasible  
Flexible labour  
Usage of ToC  
Forecasting
- c) **What type of business process model (BPM) company is presently following?**  
—
- d) **How the detailed business requirements are integrated within the BPM?**  
—
- e) **How often the business model(s) and BPM(s) are updated / revised within the company?**  
—
- f) **Do the adapted business model(s)/BPM(s) fulfil the current market needs?**  
—

***Product structure***

- a) **For the main product families, identify the average number of levels in bill-of-materials (BOM)**  
Three.
- b) **Number of components within the BOM of end item/product**  
By Design ..... > 2000 including pcba components  
For Manufacturing ..... 50 ~ 100 components

c) Number of production phases involve to realize the end product



d) Number of subcontracted/outsourced stages to develop the end product.

Pre-assembly in some products, box build approach also in use (i.e. until final packing)

e) Does your partner(s) have any influence on your Product Design (if so, how regular do you receive requests for changing Routings and BOM lists? Or work on a stand-alone process?

EMS suppliers are involved in DFM reviews and can contribute to quality improvements

***What are the value added activities by the company related to the total product value chain?***

***Manufacturing strategy***

a) Is the company focusing on regional markets (domestic) or on global markets (EU-wide, Global)?

Global (IEC, ANSI ands CN markets)

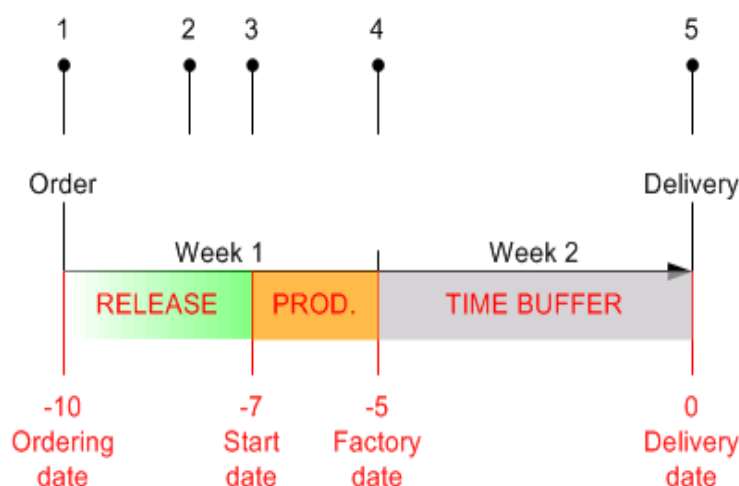
**b) Are the main finished goods/products (based on the turnover) custom-tailored or mostly generic?**

Standard products, most of them are configurable

**c) How is the planning done in the company? Is the company using material requirements planning? How about net MRP?**

MRP in SAP is deployed, as well as Kanban and ROP. Material buffer levels are based on the forecast

**d) How does the company consider/deal with “external” production capacity? How is production scheduling done? How often is it changed? How long is the frozen period?**



**e) Do you consider ATP (Available to Promise) or CTP (Capable to Promise)?**

ATP – No .... Wish!

CTP – No .... Wish!

Standard lead times

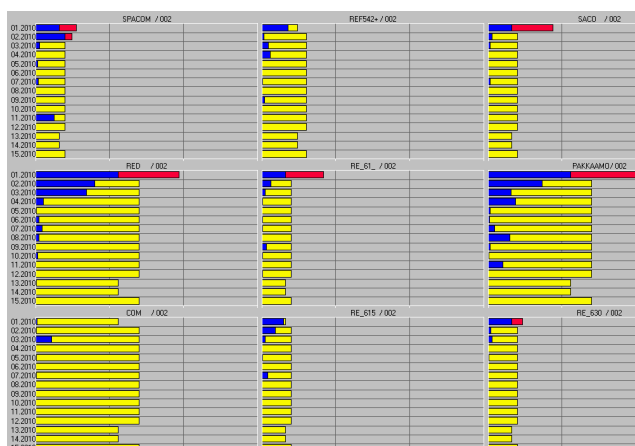
**f) How is the total load of the company calculated/stored?**

—

**g) How is company’s process planning done?**

Capacity (and load) of test systems of each productions line is monitored in SAP (ToC).





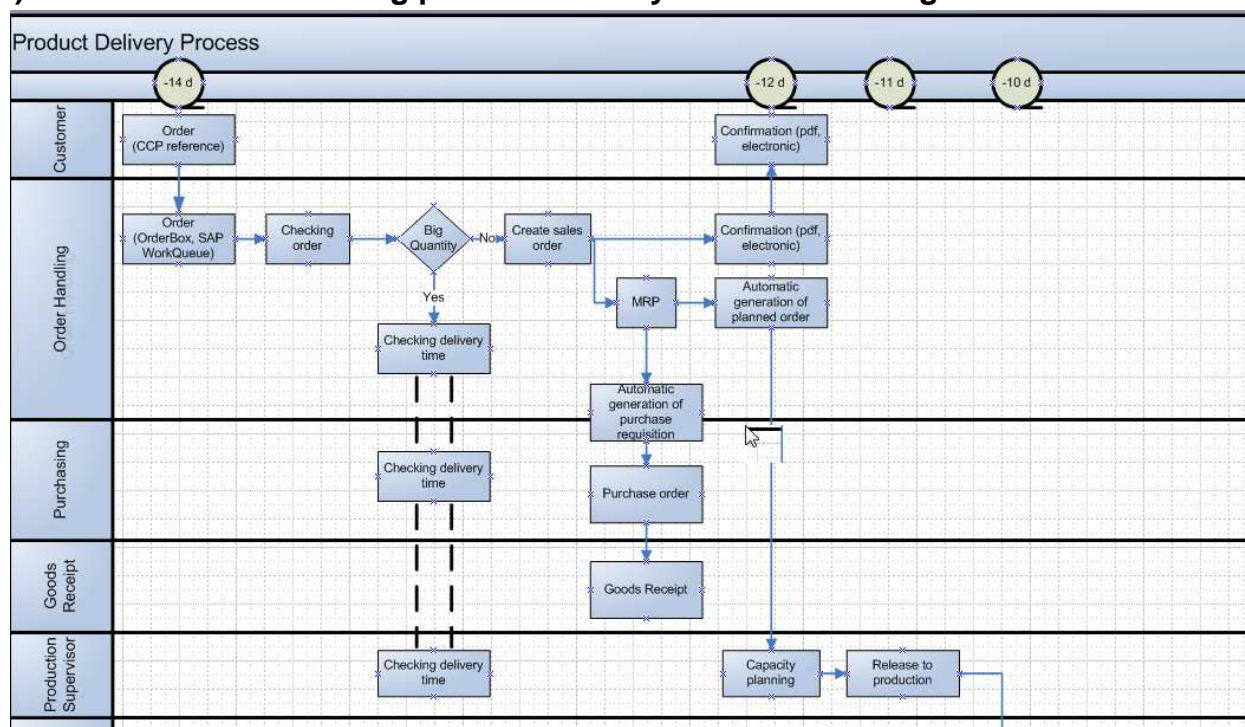
What are the reasons for subcontracting (if 2.1.4 d)?

Capacity, space, focus on new products.

h) Is the company using standard graphical notations to describe its manufacturing processes modelling?

—

i) As-Is Manufacturing processes analysis and modelling.





***Customization and order fulfilment strategy***

**a) Are there customized features in the products? If so, what kind of?**

No.

**b) How are the specific customer requirements collected if not a make-to-stock product?**

Standard configurable products.

**c) Are the customized features just components that exist in inventory, or is a supplier delivering those components?**

Standard HW and SW components.

**d) Are the features that the customer wants to change exactly the same than BOM second level components?**

No customization.

**e) Do the customers require/allow the product engineering during the sales order fulfilment process?**

Standard products.

**f) How does the lead-time vary from order confirmation to final delivery?**

Standard lead times for limited quantities.

**g) How does the lead-time vary from the initial offer request to the final delivery?**

1~6 months.

**h) What are the main sources of variability for delivery time after order confirmation?**

Material availability, test equipment capacity, quality issues, customer request.

**i) How long does it take to send a quotation, from the initial offer request (and how critical is it for your business)?**

Standard products are offered with offering tool, does not take much time and is not critical.

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**j) What is the share of standard components/products in annual turnover?**

All products are standard, i.e. no ETO products.

**k) Are the inventories located close to the customer?**

Products are delivered globally from factory in Vaasa. Local stocks at customers might exist.

**l) If the customer can state, what is their main production typology: MTS, MTO, ATO or ETO?**

Usually ETO (switchgear), sometimes even MTO, MTS e.g., repeat orders.

**m) How is the data of customised product shared within the suppliers/subcontractors?**

No customized products.

**n) Is the order fulfilment process and modelling using standard notation?**

See order delivery process.

**o) As-Is Process analysis and modelling**

Same as above.

***Sourcing strategy*****a) Is the initial sourcing strategy one key supplier, one backup supplier instead of open competition in every purchase order?**

Yes. Open competition is not possible as components/modules produced by suppliers are as per ABB designs and establishment of suppliers processes/vendor development is a big activity by itself, involving investments. We try to have 2 - 3 suppliers for each module and component

**b) Does the company have annual agreements with the suppliers / partners?**

Yes, most of the times.

**c) If there is an annual agreement how is that managed?**

By agreements and purchase orders

**d) Is there a role for supplier management (job position – what)?**

Yes, global and local supply management organizations

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**e) Number of potential suppliers in the market (many or few)?**

Few (5 – 20) potential suppliers - depending on the commodity – for main commodities

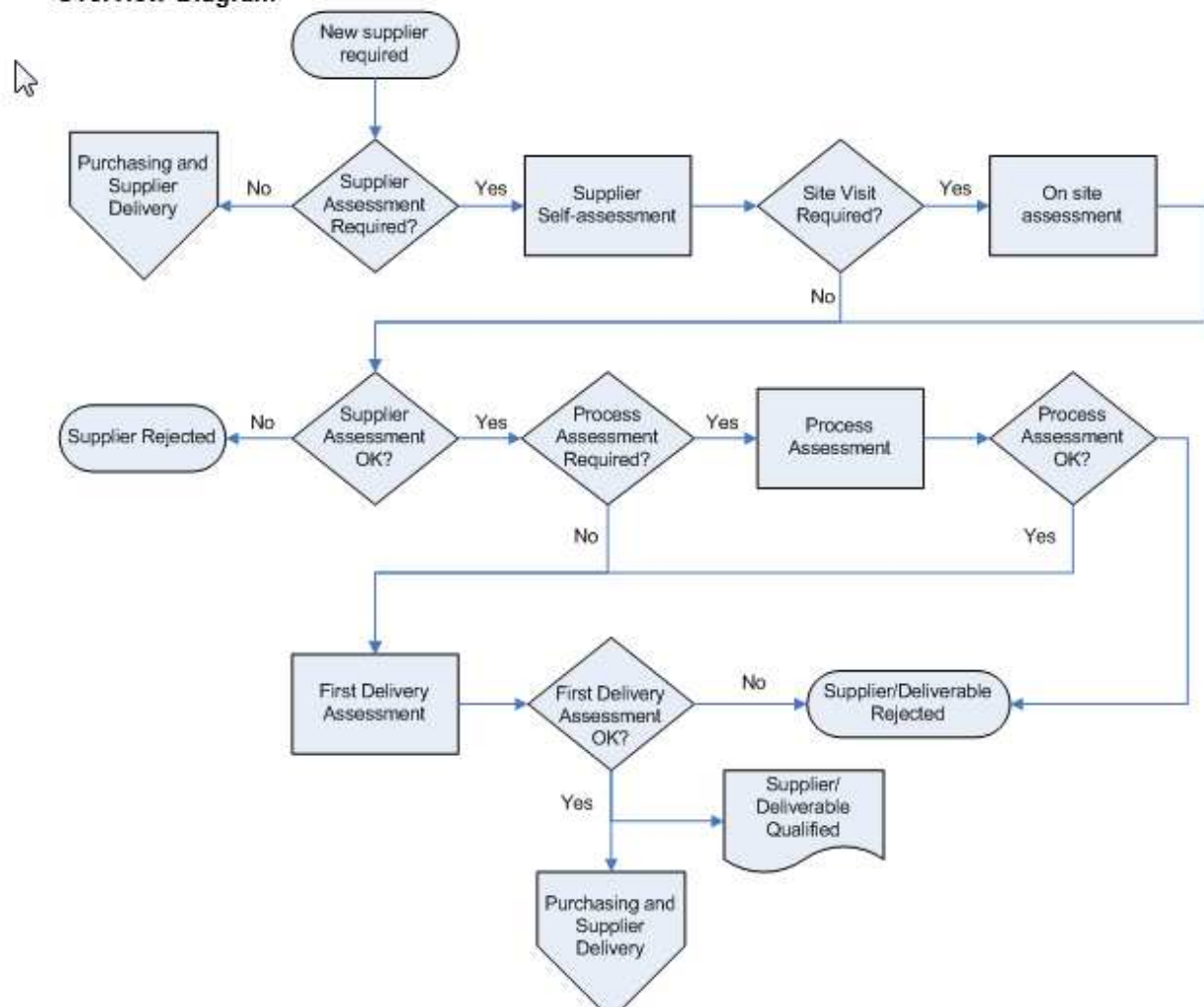
**f) Where are suppliers / partners located? Is distance an issue?**

Worldwide supplier base (mainly Asia and Eastern Europe)

Under normal circumstances distance is not issue, . Transportation time can be an issue in some cases.

**g) Does the company practice suppliers' selection and evaluation process? If so what are the selection processes?**

Overview Diagram



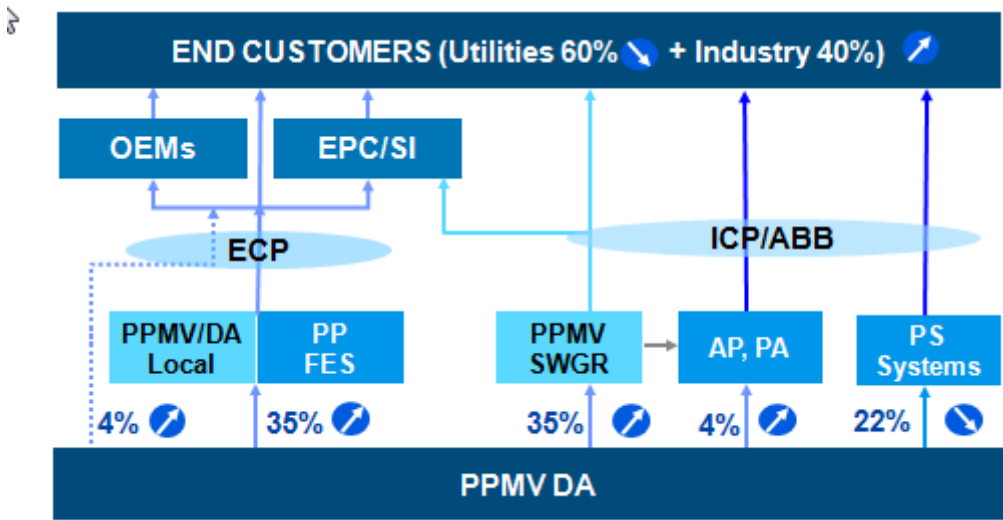
**h) Is the company practicing standard notation to describe Sourcing Processes analysis and modelling?**

Yes, see order delivery process.

- i) As-Is Process analysis and modelling
- As above.

Distribution and customer interface

- a) Define the sales channels of the company



- b) How close to the customers the distributors are located?



**c) What is the delivery time to the customer after sales order?**

All products have standard delivery times (2 – 4 weeks EXW). Delivery time to real 'end customer' i.e. Industry or Utility could vary from 3~12 months.

**d) How does the company forecast demand? How visible are distributors / customers policies and final customers' demand and market trends?**

Three inputs are considered for forecast

Annual budget with quantities of product families (e.g., Euros -> YYYY - 615 series – xx nos).

Statistics of previous year/s is used to break down the annual budget into product types, manually in Excel sheets.

Product management inputs for new releases (particularly related to ramp-up and ramp-down) are managed manually.

**e) Is the company practicing standard notation to describe Distribution Processes analysis and modelling?**

—

**f) As-Is Distribution Processes analysis and modelling**

—

***Buffering mechanism*****a) Is there any variation in capacity utilization rate during the year? If so, what kind of variation?**

Utilization rate of test system, utilization rate of manpower, efficiency of flexible labour

**b) What types of buffer-inventories are used: material, semi-finished goods or final products? What is the share of each?**

Material 90%, final products 10% (waiting for shipment); semi-finished is not controlled in SAP (i.e., part of the material stock).

**c) Are the finished goods kept in distribution centres, how many?**

No, FGS is in factory and mainly just waiting for shipment (some exception like box build). This is an interesting idea for the future though.

- d) **Are there subassemblies inventories in the manufacturing sites?**  
Yes, and inventories exist in subassemblies. Some subassemblies and material buffers stored in separate building managed by DHL.
- e) **Are all the materials/components acquired on sales-order based?**  
No.
- f) **Do you have suppliers' materials in your storage?**  
No, but interesting idea for the future.
- g) **Does your subcontractors work with your material (is there bi-directional material flow between the supplier and you)?**  
No, with few exceptions in case of ramp-up times and EOL components
- h) **Do you have to manufacture finished goods in very early stage balance the capacity to the seasons?**  
No seasonal product, so no seasonal balancing on FG level.  
Occasional balancing is done by utilizing free capacity earlier than planned and making subassemblies.

**ICT-solutions**

What ICT solutions are used in the company?

- a) **What is the name and version of ERP-application? Modules?**  
SAP (MM; PP; SD; QM; FICO; HR)
- b) **What is the name and version of CRM- application?**  
None.
- c) **What is the name and version of PDM- application?**  
Smarteam.
- d) **What is the name and version of MES- application?**  
ECS.
- e) **What is the name and version of CAD-application?**  
AutoCAD, SolidWorks.

f) **What is the name and version of Project Management solution?**

Microsoft Project.

g) **What is the name and version of email server solution?**

Lotus Notes.

h) **What is the name and version of FCS or APS application?**

—

i) **What is the name of EDI or other interoperability solutions? What kinds of data formats is your company using? Do you have any other communication protocols?**

ASCC.

j) **Do you have other planning ICT tools?**

No.

***Target market sectors***

a) **How do you tackle the market peak/off-peak currently?**

Material and component buffers, flexible capacity, subassembly buffers.

b) **Do you have any readymade solution to tackle abnormalities/fluctuations in the market? If so what's that?**

Rental labour, temporary workers.

c) **What are scopes and challenges you facing currently from the market sector?**

No forecast from our customers. We have difficulty to estimate, e.g., the ramp up of new products.

d) **What are the tools you are using currently for forecasting?**

Excel SAP.

e) **What are tools you are using to manage your order taking process?**

CCP/Selectica (configurator), ASCC, SAP.

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**f) How do you monitor your operational processes currently? Are you using any tool for that?**

Data from test systems, SAP etc. (SPC) by using Cognos reporting (ReportNet).

**g) How do you manage your quotation process? What are the tools you using for that if there any?**

CCP.

**h) How information is exchanged between your organization and the customer?**

Through ASCC, DeliverIT or email.

**i) Are you offering any configuration tools for the customers' to participate in the product design process? If so what's the name?**

Yes, Selectica.

**j) What are your concerns and expectations from ADVENTURE tool or framework?**

Expectations: Increase visibility and predictability of the whole supply chain with early warning

Concerns: How does it fit in ABB's current tools (interfaces, access limitations)

**k) How can the ADVENTURE tool help you to change your current business environment?**

Higher OTD and shorted lead times with less inventories in the whole supply chain

### **Current business networking practices**

The objective in this point is to analyse the current networking practices of the interviewed company. The main business partners, the type of relations established, the motivations for cooperation, the activities developed and the resources used should be identified.

### ***AS-IS Inter-enterprise processes analysis and modelling***

Not conducted.

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***Key business partners and networks***

- a) **Identify the company key business partners (identify the type of partners and give some examples of the main partners in each type).**

See previous statements.

- b) **Identify key networks which your company is participating**  
ABB Group.

- c) **What is the process/method for partner selection currently (social relationships, reputation, price...)?**

Preferred supplier list from the Group SCM.

- d) **What are the main criteria for entering/leaving existing networks?**

Performance (price, OTD, quality, responsiveness).

- e) **What was the motivation and objectives to develop such partnerships or networks?**

SCM: To consolidate ABB's volume (economics of scale).

***Relations***

- a) **Describe the type of relationships established with your key business partners or networks (relation type, duration of partnership, supplier development, etc.).**

Long term supply agreement.

- b) **How is the relationship or network governed?**

E.g., balanced scorecards with KPI's.

- c) **Are periodic governance meeting organized?**

Business review each quarter.

- d) **Does the company arrange any special event for the current suppliers/partners?**

Supplier day.

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- e) How do processes deal with unexpected events? (Identification of unexpected events within main processes, etc.)**

Emails, phone calls.

### ***Activities***

- a) What are the main activities developed within your company?**

HW and SW for protection relays, supply chain for the products. customer support and after sales.

- b) What are the responsibilities of the different partners within the current business network?**

Part of the design and supply phase.

### ***Resources***

- a) What resources are shared within the network?**

R&D.

- b) Did your company gain access to any critical resources of other partner company?**

Yes.

- c) How the company is storing/retrieving the information exchanged within the partner organizations (emails, letters, CRM, memos, sales/purchase documents)?**

Email, portals, databases.

- d) How the employees share the information about the abnormal situations (events), alerts, happenings, etc. among the partner network?**

Email, portals.

- e) What kind of business documents are currently used within suppliers and customers (purchase order, PO confirmation, sales order confirmation, reclamation documents)?**

PO, acknowledgement, supply Agreements (terms and conditions, price list), reclamations, scorecards, shipping docs, invoices, forecasts, RFQ's

**f) What other type of information is shared, structured or not structured?**

Business plans (including product road maps).

**g) How are documents currently exchanged?**

By email, through Sharepoint, or network drives and databases.

**h) How is the data encryption of classified documents managed?**

Limited access rights.

**i) Does the case company know top-10 suppliers, if so what methods are used?**

Yes. Volume and scorecards.

***Evaluation / Strategy*****a) What are the strong and weak points in the existing collaboration?**

Economics of scale is partly lost

See d)

**b) What are the opportunities / threats for the current collaboration?**

Opportunities:

Decreased price level in the whole chain with increased quality and flexibility → increased business and EBIT

Threats:

Major forecasting errors or quality problems. Failure in components markets (single source components, disasters like tsunami etc.)

**c) What are the success and failure factors within the collaboration?**

Success: Long term cooperation, continuous improvement, open discussions

Failure: The opposite as above.

**d) What type of potential benefits you have already achieved from this collaboration (Has networking enabled you to gain the advantage of scale? Is there special advance that just network offers?)?**

Dual sourcing increases competition between suppliers (price, quality, performance) and security for material availability.

R&D resources.

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e) Have you archived any of the following benefits from your collaborative network?

a) Increased scale, scope of activities or sales volume

Yes

b) Shared cost and risks

Yes

c) Improved ability to deal with complexity

Yes

d) Enhanced learning effect

Yes

e) Positive welfare effect

N/A

f) Flexibility

Yes

g) Efficiency

Yes

h) Speed

Yes

i) Increased visibility

Yes

### Future scenarios

The second step in the business requirements analysis is the description of future business scenarios, where new networking strategies and practices are defined.

As stated above, these Future Scenarios will be built in an iterative way. In principle several meetings and brainstorming sessions will be needed, involving each business case companies and local RTD partners. These sessions should be prepared considering the analysis of the information collected from the interviews conducted in the first phase, the ideas coming from the state-of-the-art and the experiences of the other business cases.

The scenarios to be built must describe the business environment and the interactions with business partners. Scenarios should be defined for the different steps of the life cycle of the envisaged business networks (Partners qualification, network formation and network operation).

**Important note:** To guide the discussions it is possible to use the first definition of the ADVENTURE for creation and operation of business networks described in the DOW. However, this definition should be seen as a first version that can be changed based on the analysis done. So, it is possible that we end up with a Methodology with slightly different phases or structure. Especially, regarding the first phase of the Methodology

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we have to be careful with the title of this phase. The objective of the first phase is to create all environmental conditions necessary to efficiently create and operate business networks (trust, information services, etc.). It is not only about qualifying suppliers, which in a classical view can be a much more focused activity.

The following questions can be used to foster discussion and brainstorming:

***TO-BE inter-enterprise processes definition and modelling***

**a) How the processes could be Re-engineered assuming ADVENTURE implementation?**

**b) For each future process models include:**

- **Process Objective;**
- **Scope (Entities, boundaries);**
- **Inputs and outputs;**
- **Stakeholders (costumers, suppliers, partners);**
- **Process Execution Short Description;**
- **Interaction with other processes;**
- **Model of the process flow;**
- **Process Flow Activities Details**

—

***Virtual Factory Management***

**a) Are the potential partners well known?**

Yes.

**b) What are the levels of trust among potential partners (high, medium, low)?**

High.

**c) Is there a need for solution to find more cost-effective or experienced partners?**

No. Improve the operations of the chain.

**d) Who is in response to select new partners (centralized or other)?**

Global SCM.

e) Do you lack of information about the existing partners? If so what kind of?  
No.

f) How the current partners have been captured to the network?  
Suppliers by a selection process.

g) What is the search pattern/model your company would like to follow (location, business field, competitors, product area)?  
Location and business field (product offering).

h) Is there a need to inform other suppliers/partners concerning a new supplier/partner?  
Yes.

i) Is there a need to compare the potential partners using a heuristics method?  
Yes.

j) Is there a need to analyse the existing partners constantly?  
Yes.

k) What kind of analysis is needed (quality, environmental, productivity, cost-efficiency, on-time deliveries)?  
Also, financial status.

l) Should the partner analyse the result to be integrated to an existing solution (ERP, CRM)?  
OTD and quality.

m) Are you willing to promote your own products and services for new partners? If so, how?  
Yes.

n) Are you using already Internet –based marketing? If so, how (Google adds, web-pages, online shop, catalogues)?  
Yes

***Business collaboration and networking*****a) How the network should be building (one-to-one partnership) and how it can be renewed later on?**

Dual sourcing must be possible.

Later possibility to deliver (capacity balancing) from different ABB factories

**b) How important it is to visualize the networks and own position in networks or the status of the network?**

Very important. One of the key ideas for ADVENTURE

**c) What are the main advantages the pilot companies are trying to achieve from this business networks?**

Speed, flexibility and predictability with improved KPI's. Finally more business and EBIT.

**d) How the pilot companies observe the business lifecycle of the networks?**

—

**e) How networking would affect the pilot company's current operations and revenues/profits in the best case scenario?**

More business. Improved NOWC and EBIT.

**f) How experts and experienced networking companies are selected and how their inputs are included at this point?**

Partner interviews have been carried out.

***Real-time Monitoring, Process Adaptation and Dashboard*****a) Do you have a need for more effective to change product information and business documents?**

Yes.

**b) Is there a need to manage online the work queue even with the partner?**

Yes.

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**c) What kind of techniques do you prefer using in next ten years (semantic data, SOA, etc...)?**

RFID.

**d) How the visibility of operations in the network could be improved?**

Online info, early warnings.

**e) Do you show the online status of the sales orders to your suppliers?**

No.

**f) What kind of measures would you use to evaluate the network performance (productivity, on time, minimize total inventories, optimize buffers)?**

OTD, FPY, buffer levels, transportation times.

**g) How the network would be used to fasten the information of business possibilities or losses?**

By quick information for decision support.