# Implementation of Arca ERP Software to

# Efficient Manage of Construction Sector

# Inside the COSMA Impianti S.r.l.

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## Abstract

Cosma Impianti S.r.l. is a company that has been operating for over 30 years in the industrial refrigeration sector as a manufacturer of cold rooms. The company, which applies the standard on quality control according to the ISO 9001 standard, obtained certification of its management system in 2002 and was also one of the first in Italy to obtain product certification and the possibility of CE marking its panels. The Cosma Impianti S.r.l. panel has been specifically designed for the construction of agro-food premises, work rooms, internal and external cold rooms, ripening and drying rooms, leavening cells, clean rooms, industrial freezers, drying ovens.
In 2016, the company decided to start a process of computerization of its business flows, obtaining funding included in the call for applications for grants to SMEs (Small and Medium Enterprises) to support innovative investments of the Treviso Chamber of Commerce. This process began with the definition of the computerization requirements, which were subsequently processed and formalized with the help of the company Eureka informatica S.r.l., which, being the official distributor of the Arca Evolution management system, firstly proposed the adoption of this software tool and secondly began a process of implementation of

modules to complete the software offering with the requirements expressed by Cosma Impianti S.r.l..

The company flows that have been computerized cover all the productive, organizational and commercial aspects of the company; examples of this are the management: of the quotations, of the orders, of the production, of the supplying, of the resources and of the invoicing.

The company, following this path, has covered a major organizational hole, inevitably drawing substantial benefits, such as:

- better control of the company at all levels;
- less time spent on routine procedures;
- total uniformity of the documents produced;
- acquisition of planning power in any context (human resources, procurement, order management, etc.)..

# 1 Introduction

The metalworking sector is historically one of the driving sectors for the economy of Veneto and for the national economy, both for the large number of companies operating in the territory, and for the workforce that it employs.

However, in recent years, there have been important changes that have profoundly changed the market, making it increasingly competitive: from an increase in tertiarisation, to the massive penetration of products on the Italian market from emerging countries where the cost of labour and raw materials is more favorable. This contributed to a decrease of around 30% in industrial production and a quarter in production capacity.

The measures taken by Italian companies in the sector to reverse the deflection are:

- opening up to new markets;
- development of new products and services;
- training and re-training of personnel;
- computerization and digitalization of business processes.

By carrying out such operations, companies can have a larger market, managed and efficiently attacked by qualified personnel, justifying the higher price with the quality offered.

The computerization of business processes, in Italy, is a subject that day after day makes its need more and more felt in daily operations, not only in the metalworking sector. Computerizing business processes basically means taking the more naive concept of mathematical function (a procedure that provides an output from a set of input data) and applying it to contexts that do not normally share the same principles of mathematics (there is no rigor in the process, the same input is not always associated with the same output, it conceives the presence of human errors, etc.).

The computerization of a business process, must therefore reshape the process itself on the basis of the need to be met and accompany it with a set of algorithmic procedures that may not necessarily coincide with those used before the transformation, but which, on the other hand, can ensure the most important requirements of a mathematical function: accuracy and consistency.

However, computerization is not only a migration from poorly formalized methodologies to rigid mathematical procedures, but it is above all a process that can make each company's weak points strong, providing for example a better system of management and control of human resources, production processes, commercial relations and document archives. Better management has a positive impact on the time required and the spectrum achievable by the management itself. A company that decides to computerize processes, therefore decides to earn in absolute terms.

Any business process to be computerized can fall into one or more classifications, each of which sees a number of software on the market, more or less mature, which can be used to meet the need.

The examples most related to the research in question are:

- ERP (Enterprise Resource Planner): management systems to which reference is normally made with the nomenclature of "Management" or "Information System", which integrate the business processes relevant to a company such as: sales, purchases, warehouse management, accounting, production, project management, plant maintenance, etc. Known examples in the enterprise environment are SAP, Dynamics and Zucchetti. -CRM (Customer Relationship Management): software systems oriented to the analysis and optimization of interactions with customers (and potential customers), improving their level of satisfaction and loyalty.

The most used software in this situation are BPR Online CRM, Salesforce CRM, Oracle CRM, but you can also find the CRM versions of SAP and Dynamics.

- SCM (Supply Chain Management): software systems that address the different logistical activities of companies, with the aim of controlling performance and improving efficiency, with related concepts of systematic product cataloguing and strategic coordination of the various members of the chain of distribution.
- BI (Business Intelligence): systems that allow people to make strategic decisions by providing accurate, up-to-date and meaningful information in the referenced context, acquiring and manipulating masses of data present in the archives and providing reports, statistics, indicators and graphs that can be customized easily by the user on the basis of the context sought.

Commercialized examples are: JasperReports, Pentaho or Qlik. By adopting a commercial software, the company and its staff must necessarily adapt to the operating flow established by the software manufacturer, which in many cases may not be very relevant (consider, for example, the adoption of an ERP to be used for accounting and warehouse management: in most cases these procedures are standard and therefore the need for computerization is satisfied by the adoption of a commercial product). Frequently than we can imagine, inside the

company, the process to be computerized is however so linked to the specific company and its policies, we can two viable solutions can be envisaged:

- customize, if possible, the chosen software
- Implement from scratch an ad-hoc software that can accurately map the company situation.

The first route may not always be viable, as commercial software systems are not always flexible enough to allow deep-rooted customization, and often what is achieved at the operational level is a compromise between the original functionality and the effective optimal request. The implementation of an ad-hoc software, on the other hand, is a very demanding operation that must respect the canonical criteria of software engineering: analysis, preparation of requirements, implementation and testing, with release times normally longer than those deriving from the adoption of a commercial software system. In the modern era, but prior to the mass spread of smartphones, the corporate concept of the terminal was solely to be attributed to the object of the Personal Computer (PC). Much Computers in a company network were typically connected to each other in a local network (LAN), in which there was also a central server that contained all the information and data of interest to the company. Such a network has intrinsic technical and operational limitations, relating, for example, to the difficulty of maintaining a server in the company respecting the data security constraints and the impossibility (not theoretical, but in common use) of dialogue with IT systems from outside the company. Over the years, the trend has been to decentralize server locations, guaranteeing higher security standards and better accessibility, first with the outsourcing of machines in special server and subsequently with cloud systems. Today, therefore, a good information system allows you to manage flows that provide mobility from smartphones or tablets, leaving the "office" processing to laptops mode and workstations The project of production efficiency and building site has had as its main purpose the reduction of costs at parity with the result obtained, aiming at the same time to improve the management of the order both internally (production department) and externally (installation of polyurethane panels on site).

The two paths identified for company innovation were:

- new simplified working methods (elimination of paper and introduction of terminals);
- use of technologically advanced and integrated IT tools and applications.

The integration with the company practice of new software and hardware allows:

- for the workers in production to optimize the times in order management, previously managed with traditional methods, through the application of barcode/qrcode from the stock in storage (as shown in figure 1), to the loading of metal coils (as shown in figure 2) ) in the profile (Figure 3);
- the workers on site to manage the installation of the panels in the terminal (smartphone), through a specific App, and send the outputs to the project managers and to the production manager for the production of the next batch of panels, providing, at the same time, a real-time situation relative to the progress of the delivery of the goods to the customer, with relative respect of the agreed contrac-

tual terms. The management of the design, production and installation of the product has been computerized, with undoubted economic advantage and reduction of non-compliance relative to the previous situation.



(a)(b)

(c)

**Figure 1**: Warehouse, metal coils and profiles.

## 2 Materials and methods

### 2.1 *Business context*

Cosma Impianti S.r.l. is a company that has been operating in the industrial refrigeration sector for over 30 years as a manufacturer of cold storage cells. The first experiences date back to the '70s, at the time when the sandwich insulated panel technology began to establish itself in Italy gradually replacing the insulation applied on masonry, with collaboration with production companies of Veneto, for which the activity of Cosma Impianti S.r.l. consisted of installing the panels on the construction site, creating plants in Italy and abroad. Putting the acquired knowledge to fruition, Cosma Impianti S.r.l. began to propose itself as a

direct manufacturer, exploiting the knowledge of the product acquired on site and becoming loyal to the best producers in the sector; in these years the decision to continue to manage the assembly with internal staff was fundamental, supporting young technicians with experienced men, ensuring continuity in the training and qualification of the personnel. In the following years the need arose to create a well-structured organization; for this reason the company has decided to adhere to the quality control standard according to the ISO 9001 standard, which led Cosma Impianti S.r.l., in 2002, to the certification of its management system. The company was also among the first in Italy to obtain also product certification and the possibility of CE marking its panels. The Cosma Impianti S.r.l. panel is specifically designed for the creation of agro-food locales, work rooms, internal and external cold cell rooms, ripening and drying rooms, leavening chambers, clean rooms, industrial freezers, drying ovens. The company decided, in 2016, to start a process of computerization of company flows, also obtaining financing, with a research project called "Production efficiency and building site" included in the call for grants to SMEs to support innovative investments of the Treviso Chamber of Commerce. The project in question began with the adoption and customization of an ERP system called Arca Evolution, distributed by the company Eureka Informatica.  Cosma Impianti S.r.l. has its own IT infrastructure, composed of hardware devices (including smartphones and PDAs) and various software necessary for the development and management of the business. Following the project to improve production efficiency, Cosma Impianti S.r.l., in 2017, started the feasibility study of an innovative IT project that aims to manage the order in all its phases from the procurement of the material to the installation (order management, design, material purchase, production, delivery and installation), including interaction with warehouse management and operational flows, in order to guarantee a fluid and qualitatively efficient process. The study takes into account the compatibility and integration of existing technological infrastructures. Thanks to the management of computerized production, it will be possible to obtain various processing and/or purchase proposals linked to the customer's order and subdivided by order. The information and processes at the beginning and at the end of the supply cycle will allow the user to reduce manual processes and paperwork as much as possible, to process orders to suppliers quickly and completely, to create requests for offers, to track the goods already received, those ordered and to be received and of movements of material related to the orders.

The objectives of the research project are:
- reduction of costs;
- improvement of contract management;
- optimization of site planning and contextual verification in real time on the progress of the pre-single contract installation.

In this regard, the company has joined:
- external consultants for management control and management systems;
- IT consultants used to support the study of the applicability of the innovative project.

## 2.2 The project "Production efficiency and building site"

The investment launched in 2016 by Cosma Impianti S.r.l. was related to the acquisition of innovative digital hardware, software and technologies (specific apps) aimed at daily use in the production of company goods and services (sandwich panels in polyurethane and their installation on site). The main purpose of this financial activity is attributable to the achievement of greater corporate productivity as a consequence of the elimination of obsolete practices (purchasing management, production, warehouse and installation by order), with the introduction of new technologies. For the implementation of this project the company Eureka informatica S.r.l. was identified, which proposed a compliant solution to the needs identified by the management of Cosma Impianti S.r.l..
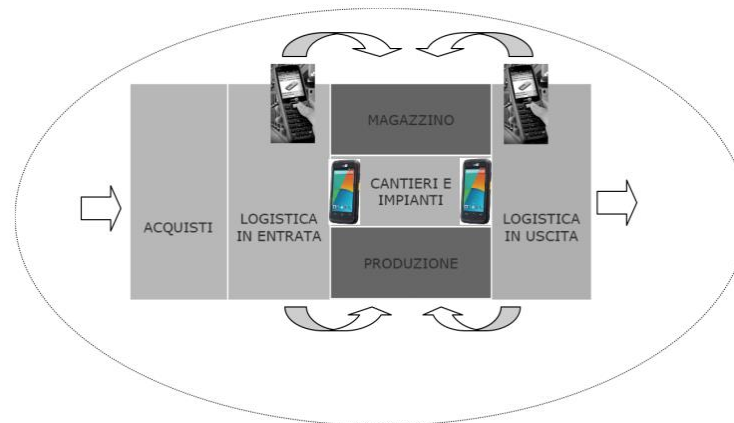


**Figure 2:** Representation of a computerized process in the cloud

The formalization of the 2016 objectives was as follows:
- computerized planning and programming of the production and of the related installation of the finished product;
- Warehouse computerization and raw material loading for each order;
- computerization of the profiling process, foaming and finished material packaging (e.g. panel sheet management for single metal coil and single order);
- computerization/digitalization of the site reporting and progress of the installation by means of a special mobile app developed in the Android environment.
The efficiency improvement project required the purchase of the following hardware, in order to allow full interaction with the information system to operators that operate on the move:
- 2 series 8630 Chiperlab Laser terminals, assigned to warehouse managers, technologically advanced and designed to meet the needs of the warehouse, distribution center and industrial production. In order to achieve the objectives set at the beginning of 2016, Cosma Impianti S.r.l.  and Eureka S.r.l. have agreed and developed customized software, interfaced with the Arca ERP, for:

- advanced production management: software module through which it is possible to issue purchase proposals characterized by the specific reference to the customer and subdivided by order, manage processing proposals and provide assignment reports (also with any external suppliers);
- site management: software module that allows sequencing of installation activities based on the calendar of the resource, the number of units available, the priority of the order and the load of the resource. It is also possible to make alternative schedules and to monitor work progresses;
- mobile application: Android application that allows the teams of technicians working on site to consult the commitments according to the programs scheduled. Furthermore, it allows the reporting of individual installations with real-time verification of times and materials used.

The results obtained in 2016 consisted of a small software ecosystem, some incorporated into the ERP, others distributed as stand-alone products but interfaced with the main system.

Cosma Impianti S.r.l. needs to complete the idealized ecosystem and to extend it in the following areas:
- General Accounting;
- Analytical accounting;
- Warehouse (purchases);
- Classification of documents;
- Production;
- Planning and estimates;
- Management of external work sites;
- Budget / Cash Flow / Report;
- Final Statement.

### *2.3 Methodology, procedures and protocols used in research and experimentation*

As Cosma Impianti's core business was not software development, the company relied totally on Eureka's professionalism. The designing flow provided for an analysis of the macro-objectives of Cosma Impianti S.r.l. at the beginning of the year, which were shared between the two companies. Subsequently, releases of the year were planned. Each item to be released was analyzed in detail by the interested personnel of Cosma Impianti S.r.l., was implemented by Eureka and was finally tested by the same personnel who expressed the requirements.

At the end of the test activities the functionality was released.

Since most of the implementations effectuated are integrations to the Arca ERP, the development process has been constrained by maintaining compatibility with the original software. The development of the Android mobile application has instead been made using the Java programming language with Android SDK.

## 3. Results

The implementations carried out after the preparation of the requirements, based

on the results of 2016, were focused on the development of software changes to the ARCA Evolution management software, distributed by the Cosma Impianti S.r.l. supply company: Eureka informatica S.r.l. Work was also carried out on the Android mobile application with the aim of replacing the version released in 2016, which only partially covered the "on-site" control needs. These processes were referred to topics such as: measuring the processing times of a specific plant and tracking the attendance and hours worked by the individual resources of a team of operators. However, the application has not yet been released in a version that can be used at the end of 2017 and will probably be put into production at the beginning of the year 2018.

### 3.1 Arca Evolution

Arca, as it is called by the operators who use it, is an ERP software by Wolters Kluwer and distributed, among others, by Eureka informatica S.r.l.. The software is a typical Windows management with SQL Server database. It is issued by the manufacturer in a modular form, so that it can be installed by the official distributors, in a customized way based on the customer's needs. The module structure allows Wolters Kluwer's partners to effectuate software implementations to meet needs not expected by the parent company, as Eureka did in the case of Cosma Impianti S.r.l.. A description of the software features is attached in the documents arca_digitale_def.pdf and sp1407_arcaevo_pdf.pdf. The modules used out-of-the-box by Cosma Impianti S.r.l. are as follows:
- document archive management;
- personal data management;
- process management;
- accounting;
- timetable;
- management of agents;
- assets management;
- analytical management;
- document management;
- article management;
- list management;
- warehouse management;
- bill of materials (BOM).
The customized modules during the research and development activities are instead:
- management of estimates;
- production management;
- e-Assistance;
- Cosma Impianti S.r.l..
The last module of the list contains all the software elements built on the basis of specific company requests.
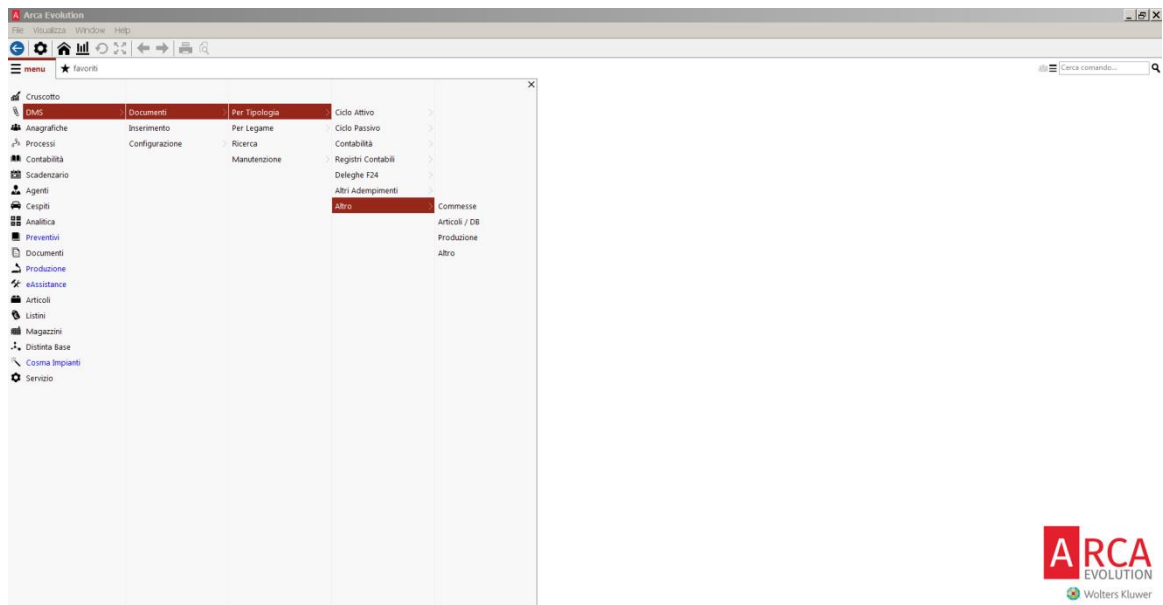
Figure 3: Arca Evolution interface, with highlights on the menu. Custom forms
are marked in blue

### 3.2 Software implementations

Software development activities have been many and varied.
Below we will provide a salient extract of the work carried out:
- implementation of a mechanism for the importation of warehouse inventories
from an Excel spreadsheet;
- implementation of a new feature to zero out warehouse inventories;
- creation of a print form of a customer's order;
- implementation of changes to the estimation software modules;
- implementation of changes to the supplier order software modules;
- implementation of changes to the D.D.T. software module;
- implementation of changes to the customer order software module;
- implementation of changes to the billing software module;
- implementation of changes to most of the document printing features;
- implementation of changes to the advance payment procedure;
- creation of utility procedures and facilitation of use;
- implementation of modification to the document management software module;
- implementation of an export Excel file format with formulas;
- development of a new functionality related to the management of doors, printed
profiles and small metal products;
- development of a new functionality related to the management of panels, floors,
cans and generics;
- creation of a procedure for the automatic generation of a contract document and
automatic purchase generation starting from a contract;
- implementation of a contract management system;

- definition and creation of a software module for document flow management;
- creation of a report for the analytical control phase;
- creation of a report for the movement list phase;
- software implementation for the creation of new documents;
- changes to the calculation procedures in many software modules;
- implementation of changes to the software component for the collection of materials and services;
- implementation of a new module for the management of down payment invoices;
- implementation of a new software module for deposit management;
- design and implementation of a software module that allows the creation of an estimate starting from a simplified graphical interface;
- implementation of a time-tracking software module.

### 3.3 Analysis and Training

As can be seen from the annex containing the details of the works, the development cycle of each new feature starts from a meeting in which a problem is analyzed, then an implementation phase takes place, then the tools are provided to be able to test the functionality and carry out a possible debug, to end with the production. When a new functionality is released, an activity is assigned to the operators who must use it; some examples of training sessions carried out are:
- description of warehouses (Cosma - processing - Construction site);
- documents routes for processing (Other documents - Manufacturing Orders and Production Loads);
- document management (good lines, expense lines, discounts);
- personal data articles: membership accounts for purchases and sales;
- valuing of items with a bill of materials;
- instruction on coding standard price lists and maintenance ;
- invoice management for partial amount and VAT movements;
- time recording insertion;
- entry of expense collection.

## 4 Conclusions

From the results presented in this project we can see how the Cosma Impianti S.r.l. company has continued its investments in the digitalization of business processes with the aim of covering all the functional processes.
The digitization process starts from the estimate phase, through an immediate tool that provides uniform offers, and follows the phase of order, procurement, production, control, reporting and billing. The results obtained are mainly attributable to the choice of the company Eureka informatica S.r.l., which through an always comprehensive dialogue with the members of the Cosma Impianti's team are able to provide complete solutions suitable for the resolution of the new needs that have emerged. In 2018 the work will continue and the ecosystem built around the Arca ERP will be completed also thanks to the release of an Android

mobile application, which will replace the first version of 2016 and allow a punctual management of the field operators. The benefits obtained from the implementation of digital renewal are evident and to measure them it is enough to measure the degree of satisfaction of the operational team, both in offices and on construction sites.

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