

A Practical Guideline to the Implementation of Online Shops

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Abstract

Implementing an Online Shop can be a risky project, since there's no widespread and profound knowledge and experiences. This guideline is intended to support managing the organizational, technical and human challenges in Online Shop implementation projects.

An overview of the implementation process is given. Subsequently the development of a concept, using the services offered by a company to its customers, is discussed. Prototyping, Realization and Operation of the Online Shop are further topics. The last part introduces some practical 'Helper' tools for the implementation of Online Shops.

1 Introduction

Subsumption Electronic Commerce is a growing market and many different kinds of businesses are already conducted and emerging. Before you are going to implement a special application, it should be clear what you are doing. Timmers uses in [5] the term *business model* in the context of electronic markets, which makes it possible to subsequently classify Electronic Commerce applications. A business model is described as "an architecture for the product, service and information flows, including a description of the various business actors and their roles, a description of the potential benefits for the various actors and a description of the sources of revenues". Various business models are E-Auctions, E-Procurement or E-Malls. One major and currently often applied business model is that of an E-Shop, better known as an Online-Shop.

Online-Shops An Online-Shop has two main purposes for a company which likes to sell goods and services over the Internet, *merchandising* and *order processing* (cf. [4], [5]). There are several functions supporting these purposes, e.g. hypermedia presentation techniques and multimedia

which support merchandising. Order processing can be supported, for example, with an online basket, with online payment or depending on the traded goods with digital delivery. These functions are integrated into a software called *Commerce Server* (or *Merchant Server*) which is used to run an Online-Shop. The technology of Commerce Servers is still evolving, but there are already some standard software applications covering this area.

Online-Shops are not isolated elements in a company. They have to use the information of the company, like product lists, catalog structures or customer data. The need to be integrated into the companies business processes: an order, e.g. should usually be forwarded immediately into the company's ERP system.

Timmers [5] sees the benefits looked for from a company's perspective "in increased demand, a low-cost route to global presence and cost reduction of promotion and sales. The benefits for the customers can be lower prices, a wider choice, better information, and convenience of selecting, buying and delivery, including 24-hour availability".

Implementation For the implementation of a concrete Online Shop for a company it is very helpful to have a practical and handy guideline for the whole implementation process. Such a guideline will be presented here. It has evolved through our practical experiences in setting up Online Shops.

Guideline To get a coarse structure of the implementation process for the Online Shop, it can be split into four major steps as shown in figure 1.

(A) The first step is the *strategic decision* to implement an Online Shop in the company. The decision should be supported by global goals to which the shop is directed, e.g. to create a new marketing channel or simply to gain an advantage over the competitors.

(B) The *development of a concept* for the Online Shop is the second and often the most extensive step. Business and technical issues, e.g. the structure of the offer made by the

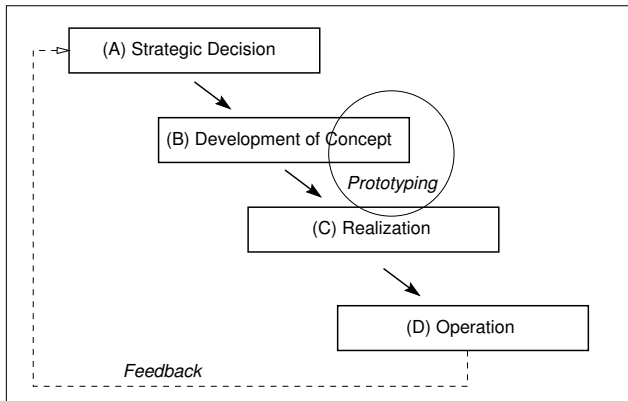


Figure 1. Implementation Steps

company, the technical architecture for the data exchange between the online shop and the ERP system or the software to use, have to be clarified. The concept development step will be elaborated in detail later.

(C) In the third step *realization*, the Online Shop is instantiated by configuration and customization of electronic commerce standard software and/or by programming and web design. Other important parts in this step are testing and marketing of the online shop.

(D) The final step is the *operation* of the online shop, which often is outsourced today. An important success factor for the Online Shop is the actuality of the information provided and prompt responses to customer questions and orders.

(Prototyping:;) An integral part of the process model is the prototyping of the solution. It supports in finding a good business model in the concept phase and also can speed up development of the final solution. Prototyping is discussed in detail in section 3.

(Feedback:;) As shown in figure 1 with the dashed line from operation to strategic decision, feedback is required. Online Shops are a very new part of the business processes of companies, this feedback has to be processed in modified or new strategic decisions.

Process models This practical guideline compiles techniques from different process models. The four steps shown in figure 1 are based on a classical waterfall process model [1] for simplicity. The integrated prototype should be seen in conjunction with a potential use of the evolutionary model [1] in the steps 'Development of Concept' and 'Realization', since today often the companies can not give explicit and clear requirements and specifications for their Online Shop.

2 Developing a concept

Starting with the strategic decision to implement an Online Shop, the most complex step is the development of an initial concept. The concept is the basis for realization and later operation. It is guided by the goals defined in the strategic decision, since these goals should be reached by the resulting system. In general a business model as mentioned in the beginning is instantiated.

Concept Structure An Online Shop is a computer based system which consists of many separate elements and interacts with several other computer based systems, such as the company's ERP system or customer's systems. It also interacts with humans: with customers through their web browsers or with the administrators of the Online Shop through the administration interface. A basic step is to isolate and name the elements of the Online Shop (refer to section 5.2 for examples).

To develop a concept for an Online Shop, it is useful to structure these elements. There can be different views on the bulk of elements. It helps to cluster all relevant elements into groups. But what are the most relevant criteria for clustering?

One first proposal in our projects for clusters was *presentation and design, functionality* and the *environment of the Online Shop*. This clustering had no deeper underlying criteria.

Another proposal is to use a technical view and build up the clusters from the *software architecture elements* of an Online Shop. This represents a good view for the software developer.

The last proposal is to use a *services centered* approach. All Online Shop elements are used to offer various kinds of services to the customers. This is an intuitive view for the company and customers.

The SERVICES approach The main clusters in the services centered approach are

- the SERVICES offered, including a substructure to reduce complexity,
- the customers which will use the services offered,
- the technical data integration with the ERP system, which has to fulfill the requirements stated by the services offered and
- the solution/software selection, as a base for the realization of the planned services.

The clusters to be considered are shown in figure 2. The main sequence in which the clusters should be handled at development time is from top to bottom.

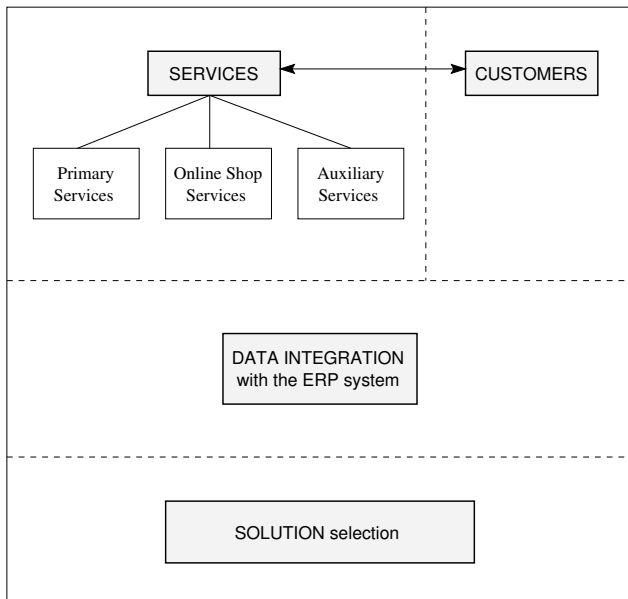


Figure 2. Concept clusters

2.1 Customers

An Online Shop offers services to customers. There should be a good match between the offered services and the targeted customers, also considering the new media to be used.

In Business-to-Consumer eCommerce there often is a discrepancy between the typical internet user - male, between 30 and 40 years old, academic - and the typical retail customer: female and in the early 40's. In Business-to-Business eCommerce there often is much more certainty about the customers, e.g. a wholesale company knows its retail stores and what they expect.

This should be in mind, designing the offer - or - vice versa defining the customers to be reached with the offer.

2.2 SERVICES

By means of an Online Shop a company is offering a complex bundle of services to its customers. These services are partly inside the Online Shop and partly outside the shop, in the latter case directly provided by the company. An integral part of the implementation process is the decision on the services to be offered by various means of the Online Shop. To make it possible to handle the complexity of the service bundle, a structure over the potential service types is defined.

Primary Services Primary services are the offer of products and services the company provides in its core busi-

ness field. Primary services are basically concerned with the steps information, order, logistics, and payment.

A music compact disc retailer, e.g. may inform its customers of the available CDs, receive an order and deliver the CD via postal mail. The payment also has to be managed, e.g. by invoice or credit card. (See also the Helper at section 5.2.1 for a list of possible primary services.)

The applicability of products and services for online commerce is often structured with a chart that classifies the potential products and services along two dimensions: product complexity and emotional product relation of the customer. In order to be easy sellable, products should be simple and rational. This is true for most of the products in the mail order business. Cars are complex and can raise emotions, they are harder to sell online. This is just a rule of thumb - each scenario is individual, but the risk of failure is higher when complex and emotional products are to be sold. One should also have the targeted customer in mind.

Online Shop Services Online Shop services are made possible only due to the installation of the Online Shop and directly serve the primary services. These are mainly the typical surplus values, examples are a comfortable search function, actual product availability information, One-to-One Marketing (e.g., favorite products), 24 hours / 7 days a week availability for information and ordering, list of new products or order tracking. Digital payment or digital delivery (e.g., music with MP3 download files) can also be special Online Shop services. (See also the Helper at section 5.2.2.)

Auxiliary Services Services of auxiliary type are needed to support the operation and economic success of the shop in general. They differ from Online Shop services as they do *not* directly serve the primary services. Examples are the presentation of useful background information which is of interest to the customer community, special rebates in the Online-Shop or a contest to enhance the customer binding. Another auxiliary service field is security. Using a security service like using the https protocol can generate confidence at the customer's side. (See also the Helper at section 5.2.3.)

Excluded Services It is useful to state what will *not* be offered by the Online Shop. For example, if payment is only done by invoice out of the ERP system, no services related to payment have to be discussed.

2.3 Data Integration

To provide the specified services the Online Shop requires the related data. Typically these are data about products, a catalog structure and customer information. The On-

line Shop will generate orders which have to be processed by the company.

Concerning the type of connection between the Online Shop and the ERP system one can distinguish three models:

- Online: The Online Shop has automatic synchronous access to the required data
 - Integrated: This is a special form of Online, where the Online Shop is provided by the company's ERP system (an example is SAP's ITS-system)
- Nearline: The data inside the Online Shop are automatically, periodically and asynchronously updated
- Offline: The Online Shop is set up and updated manually

For some hints to a typical technical realization of the integration see section 5.3.

2.4 Solution selection

As soon as the various parts of the offered services are specified, the targeted customers are defined and the Data Integration needs are clarified, the base for a successful realization has to be selected.

The commerce server software, standard or individual (if standard, which software to choose?) and the shop hosting (inhouse or outsourcing) has to be selected.

3 Prototyping

Prototyping should begin and help with the development of the concept. Its also useful at the realization step.

We have seen from experience that a practice which integrates *Prototyping* is important for the success of Online Shop implementation projects. A major element in this context is the way a prototype can help to improve the communication of the project partners at an early stage. Today most companies do not know much about Online Shopping, especially about the details and scenarios unique to their business area. However, these issues can be critical for the success of the Online Shop, having in mind the customers and the competitors.

A prototype can help at an early stage to develop a concrete notion of Online-Shopping. The prototype can be used to discuss the special details which are unique to the company or the business branch.

Consequently Prototyping should be an integral part of a practical process model for the implementation of Online Shops.

Building a prototype To set up a prototype of an Online Shop it is usually sufficient to generate a set of basic screen masks (e.g., the main screen, product lists, product display, basket). Using a standard software for Online Shops one can also very easily set up a simple prototype shop with some basic functionality to discuss about. To further enhance the prototype with little effort, company logos and layouts from the corporate identity may be used.

4 Realization and Operation

4.1 Realization

Based on the concept and the prototype, using only the specification or also the coding of the prototype, the Online Shop can be realized.

As a result of the solution selection in the concept phase eCommerce standard software will be used or individual programming of a solution is needed. In the latter case, which will not be covered here, a complete software development project is on its way.

When eCommerce standard software is used, it has to be configured in accordance to the services needed and customized to the company's requirements. It should be considered that often additionally individual programming has to be done to fully satisfy the company's needs as specified in the concept.

The web design is another important part of the realization step. Personal tastes of design by the developers are different, focus the design which seems to be most useful to the targeted customers.

One central issue of the online shop should be *actual* data. So the data integration with the ERP system as specified in the concept must be realized and set up for continuous operation. There are often major efforts necessary to realize the data integration, depending on the interfaces of the Online Shop and the ERP system and the kind of coupling chosen.

Testing should be done extensively. A simple first test could be done by a member of the own sales force staff, or by a pilot customer.

Marketing is an important part for the success of the online shop. The strategy will depend on the business branch and the targeted customers - but as a general guideline many customers today are reached through conventional offline marketing. Promote the shop in the paper catalogs, the notepaper etc. Online marketing through search engines, banners or portals should also be considered.

4.2 Operation

In the operation phase the complete integration of the Online Shop into the company's business processes has to

be guaranteed. Actual data has to be provided in the Online Shop, quick responses to customer questions and orders are of the essence.

Statistics and feedback should be collected for a potential redesign or smaller additions and changes.

5 Helper

This section introduces some practical *Helper* tools, which proved useful in projects for the implementation of online shops. These tools are small and simple and should be easy understandable for all project members.

Since this is in general the implementation of standard software, one can confer to the implementation of other standard software, e.g. ERP software. The Helpers used here are basically conferable to the *Accelerators* (cf. [2]) used in the ASAP initiative for SAP implementations. These are various tools, documentations, and programs used to speed up, to standardize and to assure quality of an SAP implementation.

The following sections introduce some practical first Helpers which proved useful.

5.1 “Shop-Cloud” - Environment of an Online Shop

This Helper is a diagram of a “cloud”, which shows the potential environment of an Online Shop (see figure 3).

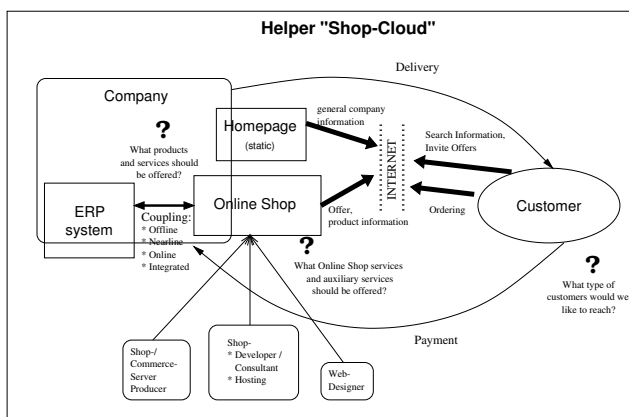


Figure 3. Helper “Shop-Cloud”

The diagram can be used as a starting point for the analysis of the real world scenario and the planned configuration. Change it to the required needs. To give an example, the payment methods may be discussed. Should the payment be done on account or should digital payment methods be offered. The payment arrow in the cloud can then be moved from the box representing the company to the Online-Shop, adding a digital payment system there.

Usage: The graphic is by intention open and at some points fuzzy designed. Use it to discuss the represented issues, add issues and change the diagram to suit your concrete scenario. Use it with your project partners, the company, or only internally to get quickly a raw concept for the project.

Timing: Use the diagram at the beginning of the project, when the raw business model has to be clarified.

5.2 Proposal lists

An Online Shop may provide various kinds of features and services. In proposal lists these possible features and services are enumerated.

It would be possible to assign the elements to sub groups, use another granularity or hierarchically refine the elements. For simplicity the elements here are only assigned to the major service type groups.

Usage: Pick from the lists the elements appropriate for the concrete scenario. Use the listed elements as starting point for new ideas, which may be special to your setting. Also refinement of the elements may be useful.

Timing: Use the proposal lists in the concept phase of the project.

5.2.1 Primary Services Proposal list

* catalog hierarchy
* product presentation
* bargain
* order
* invoice
* credit card handling
* automatic debit transfer system
(to be continued...)

5.2.2 Online Shop Proposal list

* search function
* One-to-One product list / favorite products
* realtime availability information
* all time availability of services (24 hours a day, etc.)
* order tracking
* logistic tracking
(to be continued...)

5.2.3 Auxiliary Services Proposal list

* background information for the customer community
* special rebates for Online Shop orders
* contest to enhance customer binding
* security functions to support customer trust
(to be continued...)

5.3 Patterns for Data Exchange

When ERP systems and Online Shops are loosely and automatically coupled via the exchange of data files - which happens frequently - the definition of data exchange formats are necessary. This paragraph covers patterns for typical data structures and discusses syntactic exchange formats with a proposal to use XML for this purpose.

Usage: Discuss with technical project partners, add, change.

Timing: From the beginning of technical concept aspects to the realization and also usable for documentation.

5.3.1 Product Data

The table below shows a typical example of a product data exchange structure. A short name of every field, a description, the type, numerical or textual, the length and a remark column are shown.

Name	Description	Type	Len	Rem.
prodno	Number of product	N		
prodname	Name of product	T	30	
proddesc	Description of prod.	T	255	
ean	European Art No	T		
price	Price	N		netto
stock	Stock	N		
entity	Entity	T	10	kg, ...
picfile	name of picture file	T	255	

5.3.2 Other Data and handling of the Data

To keep this section short, the example patterns for the *Catalog Structure Data*, the *Customer Data* and the *Order Data* are not shown. The *Order Data* is special in the way it may be transferred, maybe simply a fax to an agency is used or it is send via email to a host and parsed there. The product data, e.g., may be transferred periodically and automatically via FTP to the Online Shop.

5.3.3 XML

You may define yourself a simple exchange format, like a newline for every new field and a special delimiter line for

every new record. A better way is to use the new XML standard.

The eXtensible Markup Language [6] is a new, but already broadly accepted standard, which allows to define other markup languages via Document Type Definitions (DTD). You may define a DTD for each type of data to be exchanged (Product Data, Customer Data, ...).

The use of XML will result in data exchange applications which are robust and flexible, e.g. to future changes in the structure of the exchanged data.

5.4 Miscellaneous Helpers

Further proposed Helpers can be session diagrams, order diagrams, or check lists. *Session diagrams* can show a typical user session, in UML syntax (see [3]), from a login to a final order. The objects could be the customer, the Online Shop and the ERP system. *Order diagrams* can show in sequence the very detail of actions taken when an order is given and processed. *Check lists* can enumerate questions to consider in every step of the implementation process.

6 Conclusion

A practical guideline for the implementation of Online Shops was presented. Priority was on the project phase *development of a concept*. The starting basis for the concept are the services offered by the company to their customers, which are structured into primary services, Online Shop services and auxiliary services. Another priority was to give practical help with the so called 'Helper' tools.

Topics not - or with low priority - covered are a case study, a systematic commerce server and solution provider selection, and an in-depth discussion of the data integration with ERP systems.

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