

Delivery of Information for Use in Electronic Form – eDoc

excerpt

Guidelines

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excerpt

Preface

These guidelines are a result of the efforts of the tekomp working group, "eDoc", formed in 2015.

tekomp's Board of Directors welcomes the initiative and is pleased that these guidelines have described the delivery of information for use in electronic form in a practical and professional manner with various aspects considered. We would like to thank these members of "eDoc" for their expertise and invaluable contribution towards the development of this guidelines:

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The tekomp board expects these guidelines to motivate and support all interested parties in defining and implementing modern delivery formats based on user situation and their target group requirements.

Special thanks to the information development team for compiling and consolidating all relevant information and knowledge:

- Magali Baumgartner
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- Dr. Claudia Klumpp
- Jörg Michael
- Roland Schmeling.

*The tekomp board,
in August 2016*

1 Introduction

With these guidelines, tekomp wants to facilitate a need-based choice of appropriate media for the intelligent delivery of information for use.

The guidelines present the state of the art and provide recommendations on how information can be delivered in electronic form while taking into consideration legal requirements.

Chapters 2 to 5 of the guidelines explain the background, conceptual considerations, state of the art, and the legal position regarding the electronic delivery of information for use. Chapter 6 provides recommendations for a systematic creation of media concepts and more legal security for the implementation of electronic delivery. It focuses on EU law and the legal position of individual member states. Other legal areas remain open for manufacturers to explore.

To create electronic information for use, the requirements in chapter 6 must be fulfilled to ensure compliance with these guidelines.

The proliferation of mobile devices such as smartphones and tablets in recent years has revolutionized the way consumers utilize information. These electronic devices have become an important everyday medium in both service technology and among users. Expectedly, product information is increasingly being used in electronic form.

However, information delivery for the professional or private use of technical products falls severely behind new user habits. A survey of experts from the field of technical communication revealed that information for use remains predominantly delivered in paper form:

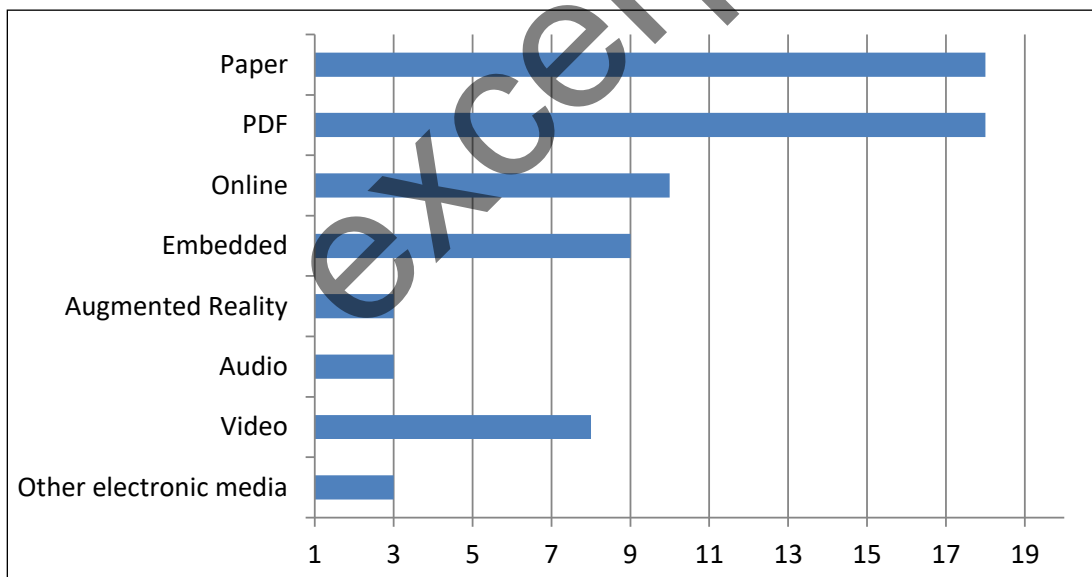


Fig. 1: Results of the survey: Forms of information delivery used by experts. Survey conducted by the tekomp workgroup eDoc in July 2015

This result is consistent with the tekomp industry figures for the year 2015.¹

¹ Industry Figures for Technical Documentation 2015, http://www.tekomp.de/fileadmin/Dokumente/de/tekomp_2015_07_08_Branchenkennzahlen_2015_DE.pdf [retrieved 03.11.2016], P. 44ff.

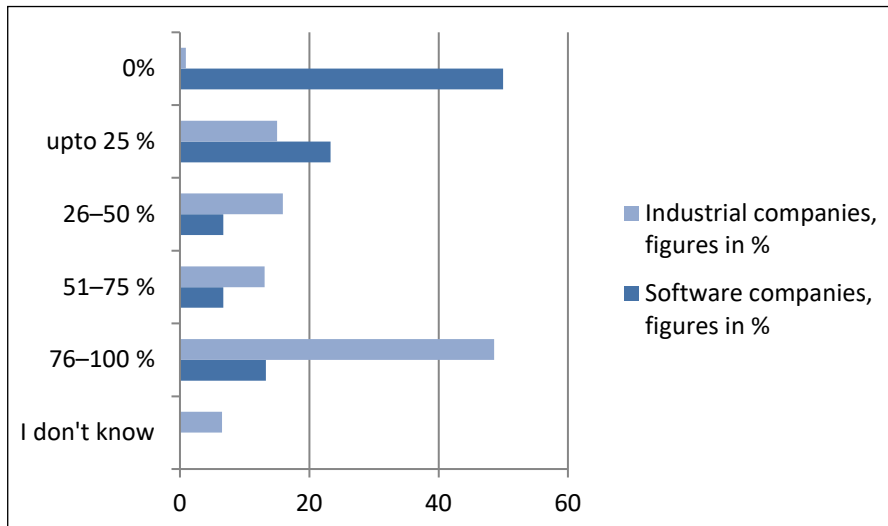


Fig. 2: Proportion of printed documentation to the overall documentation size

The survey shows that much less print documentation is generated in software companies as compared to industrial companies. In nearly 75% of surveyed software companies, the proportion of print documentation was less than 25% of the overall amount of documentation produced. On the contrary, the proportion of printed material was 75% or more in almost 50% of the surveyed industrial companies. Delivery in paper form is thus prevalent. Electronic delivery of information is considered complementary by most companies and generally serves as a medium for updates.

In industrial areas of application, information for use is still printed, filed, loaded onto pallets, and delivered to the customer in many cases. Machines, devices, vehicles, and most other technical products include printed manuals in their packaging and reach the customer in this form.

Consumers often receive information in the form of printed manuals. In the case of newer electronic devices such as smartphones, electronic delivery of information has become the norm. In addition, short, printed instructions are usually included for easy product commissioning and use.

The tekomp Spring Survey of 2015 found that applicable legal regulations and contractually regulated customer requests were primary reasons cited by industrial organizations for information predominantly being delivered in paper form:

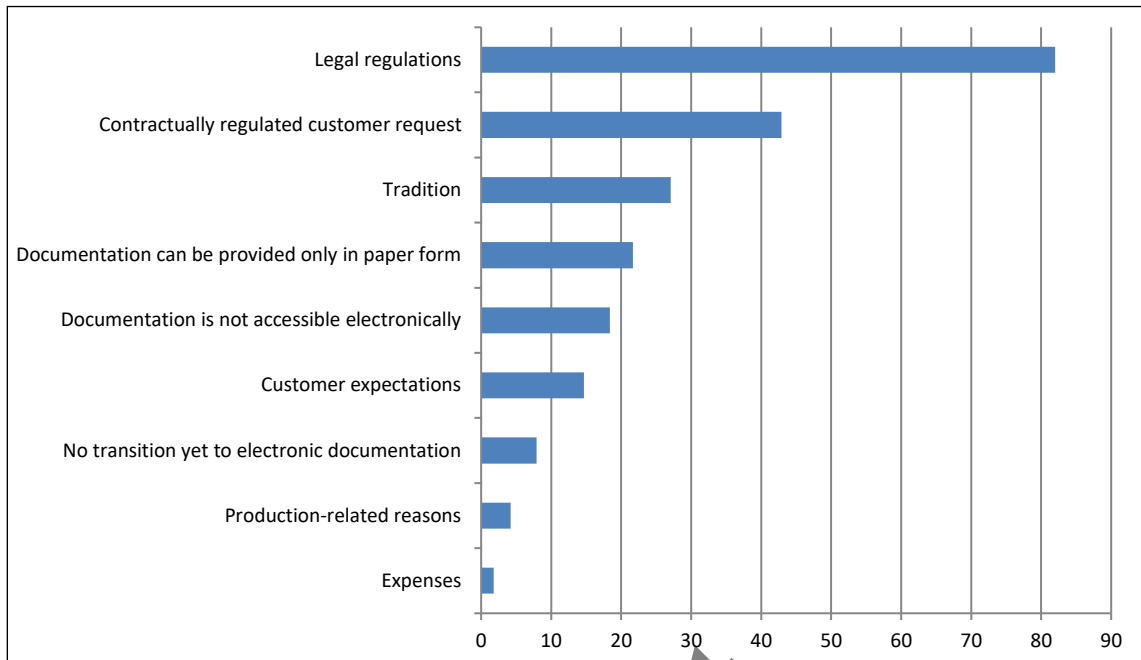


Fig. 3: Reasons cited by industrial companies for delivery of documentation in paper form

A study by BMW in 2015 shows that although customers expect a variety of media content, they still require a printed manual in the vehicle.²

In most cases, information is being delivered electronically in PDF files that correspond 1:1 to printed manuals. PDF files are either included with the product or are made available via website downloads. However, more companies are also trying to provide information for use on mobile devices and other forms of media, such as video or augmented reality. In some cases, they have already introduced these alternative forms. However, very soon enough, they still meet with perceived legal boundaries, and in the case of industries, a mounting level uncertainty from customers who still rely on paper.

Therefore, prevailing practices have yet to fulfill the expectations of users. This is especially true when obtaining technical product information for use in a mobile form. This is where information is presented in appealing media formats that make full use of the possibilities provided by electronic media.

² BMW Group, 01/2016, s. Annex D.

4 Aspects of Media Conception

Relevant criteria must first be identified to evaluate the choice of media and its suitability for product information. Next, suitable measures are taken in a methodical and structured manner. In addition to the legal perspective, the following perspectives are of equal importance:

- Usage perspective in the product life cycle
- Quality perspective from the user's point of view
- Economical and ecological perspectives.

4.1 Information for Use in the Product Life Cycle

In accordance with IEC 82079-1, the information provided by the product supplier must allow users to safely carry out permitted tasks. Information for use also includes safety notes and warning messages. If safety-related changes are made after the product's sale, users must be informed about the changes either individually or through announcements in the mass media. This is in addition to version updates on the website. Doing so fulfills the supplier's duties in accordance with the local legislation concerning product recall or product liability.

Conventionally, information was delivered in the form of manuals or documents of all types, such as instruction manuals or maintenance manuals. Considering dynamic media opportunities, companies from time to time depending on various influencing factors must address the form of information delivery¹⁴.

4.1.1 Media-related Characteristics of the Product

The possibilities of presenting information on various media platforms mostly depend on the product and its information-related characteristics. For example, a machine tool can be equipped with its own large display, software for displaying information and sufficient memory or network connection. In this case, the possibilities for presenting electronic information are considerably more extensive than a fully automatic coffee machine with a small display or for a power tool without display.

4.1.2 Product Life Cycle Phases and Use Cases

Other influencing factors include the individual product life cycle phases and concrete use cases: the user requires different information in each product life phase. Information for use may already be needed before a product is even purchased. Marketing and sales information, for instance, helps consumers make a purchase decision. Information about preparing an installation site generally pertains to product disposal. Information for installation, commissioning, operation, and troubleshooting, care, replacement parts, or changes and product improvement fall in between.

For each phase in the product life cycle, use cases can be described as an occasion when users will require information that lets them perform the tasks efficiently, effectively, and safely. Some examples include a software user or a technician who services an industrial plant.

¹⁴ In accordance with the current state of the art, this information for use must be named generically without reference to the form of media. E.g. "Maintenance information" in place of "Maintenance manual".

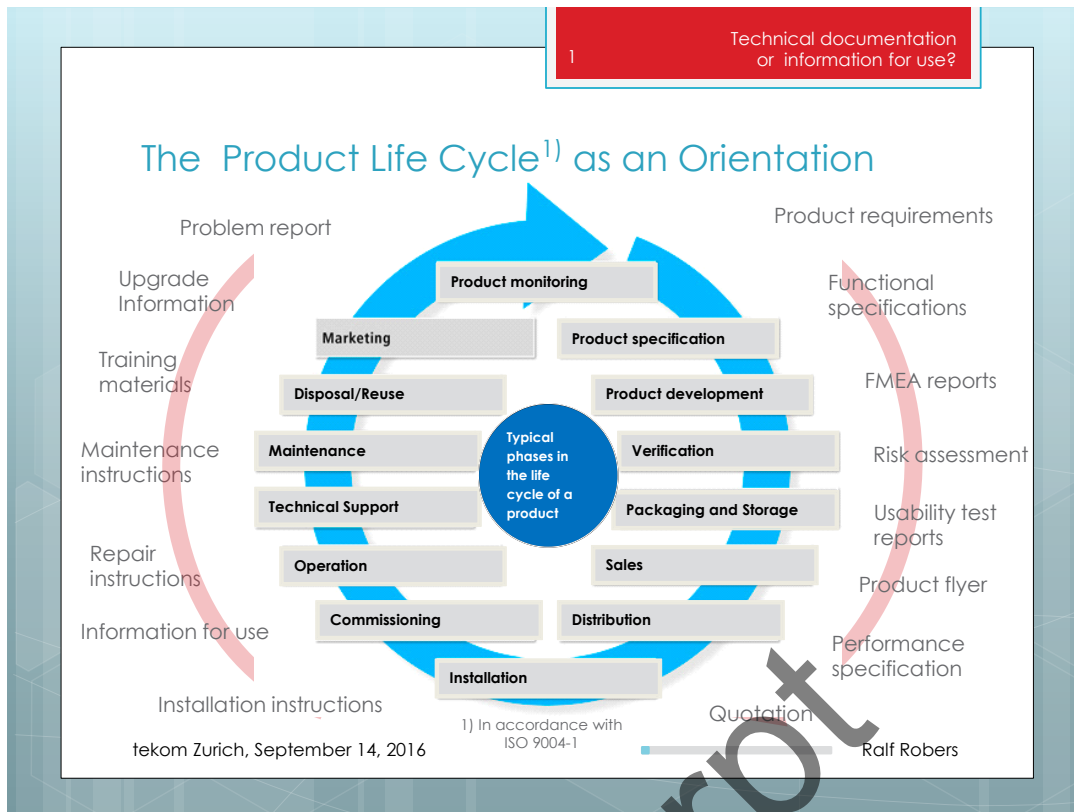


Fig. 4: Product Life Phases and Use Cases

4.1.3 User Groups

Finally, the scope and depth of this information depend on the intended user groups¹⁵. For example, information about the installation of an awning is mostly intended for specialists, whereas consumers require information for use. Hence, the possibilities for access to information on specific instructional media can vary depending upon the user group. As opposed to consumers, service technicians often have different information access options because of their expertise. Service technicians may have a mobile computer, electronic service instructions, and password-protected access to electronic information services from the manufacturer. This choice of electronic information media allows service technicians distributed access to comprehensive and up-to-date information. This extent of information dissemination would not be possible for hard copy material. In addition, the choice of languages¹⁶, terminologies, or graphical representations such as consumer illustrations and technical drawings for service technicians depends on user groups and can be made available in a greater variety of electronic forms.

4.1.4 A Need for a Differentiated Information and Media Concept

In addition to the above-mentioned influencing factors, the framework conditions of the manufacturer and other stakeholders in the value chain also have an impact on the choice of media. For example, the logistical possibility of including an electronic medium with the product during the production process while keeping it available and updated during use.

¹⁵ The world's leading standard for instructions, IEC 82079-1:2012, particularly emphasizes the influence of target groups on the concept of instruction.

¹⁶ See for example, Machinery Directive 2006/42/EU, Annex I, 1.7.4, 3. Paragraph.

The legal and normative provisions and their interpretations must also be considered. The requirements above cannot be fulfilled in general with a single piece of product information, e.g., instructions that come with the product and remain unchanged throughout the product life cycle. Varying information needs and dynamic content thus emphasize the need for a differentiated information and a differentiated media concept.

The focus is thus determining which information to convey through which media. It is crucial to first consider all media equally to achieve maximum user benefits. This means that no particular media must be used as a starting point (e.g., printed instructions). Rather, the most suitable medium with high availability, usability, and acceptance must be established based on use cases.

The figure below is an overview of the influencing factors for a differentiated information and media concept.

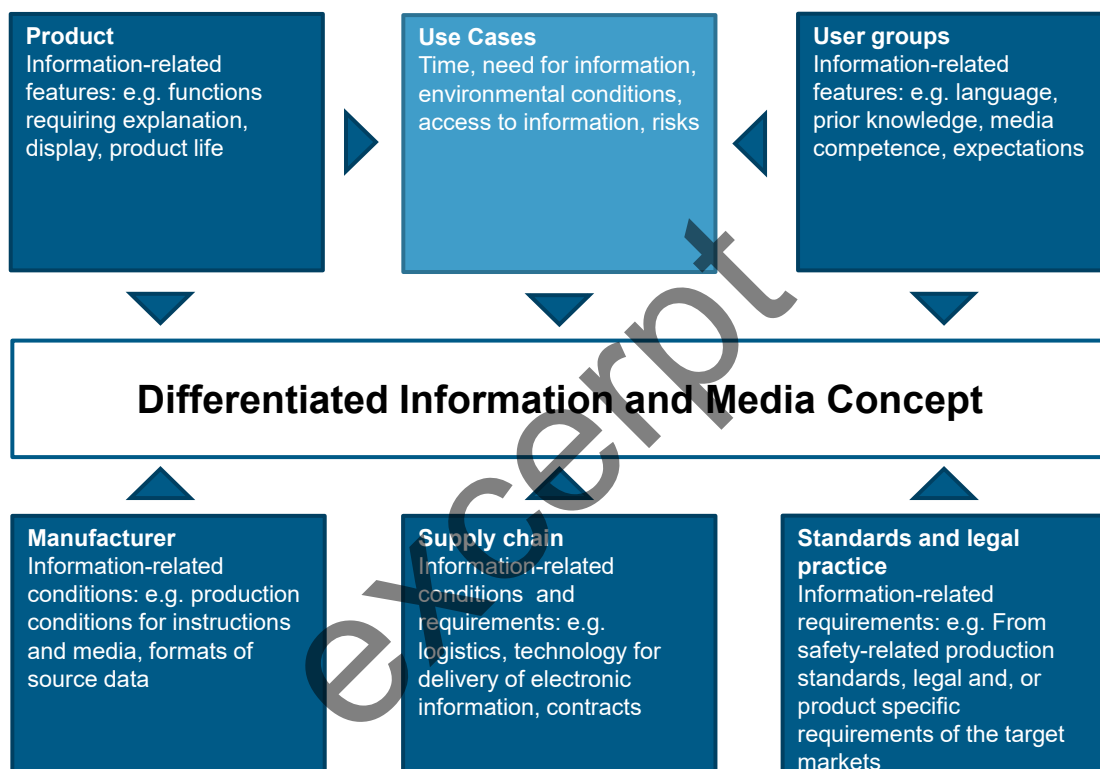


Fig. 5: Overview of the influencing factors for a differentiated information and media concept

4.2 User's Point of View

When deciding on a medium for information delivery, consider the following:

- How will potential users use information?
- Which medium has the highest usability in specific use cases?
- Which medium provides the best user experience?

The prerequisite for a comprehensive consideration of the choice of media for instructions is an assessment of the following:

- The extent to which instructional content is **available** to the user when it is delivered using different media in different ways — Availability).

- Suitability of the media selected for instructional content from a user's point of view, i.e., how does the selected media affect the **Usability**¹⁷ from the user's perspective?
- Does the choice of media affect the **Acceptance** of instructions and user behavior towards the instructions (User Experience¹⁸)?

Various normative sources can be used to assess the availability, usability, and acceptance of instructional media. The sources are outlined below:

Table 1: Assessment approaches

Aspect	Assessment approach	Source
Availability	Risk assessment	In line with the EU regulation 207/2012, the risk assessment must apply to all media, including printed instructions, because the availability of printed information is not higher than the availability of electronic media per se.
Usability	Accepted criteria	For instructions in general: IEC 82079-1:2012 Preparation of instructions for use – Structuring, content and presentation – Part 1: General principles and detailed requirements For electronic and multimedia information: ISO/DIS 9241-11.2:2016 Ergonomics of human-system interaction – Part 11: Usability: Definitions and concepts ISO 14915-1:2002 Software ergonomics for multimedia user interfaces – Part 1: Design principles and framework
Acceptance	Empirical study	IEC 82079-1:2012, Annex E

4.2.1 Availability

There should be a fundamental differentiation between printed and electronic information with regard to availability. Whereas printed information is largely limited by distribution, updates, and is bound to the carrier material, which is prone to ageing and misplacement, electronic information requires only hardware and software for display. The medium that provides sufficient information availability for the different use cases and how high the risks of non-availability are must be determined for individual use cases.

For this reason, failure risks must be evaluated¹⁹. The medium for instructions must be carefully chosen to ensure an adequately safe manner of information delivery. The EU Directive 207/2012 requires a corresponding risk evaluation. The directive assumes the delivery of instruction in hard copy as the standard for the safety level assessment. For the delivery of electronic instructions, the directive requires its safety level to be equivalent to that of printed delivery, if not higher. Although the safety level of printed instructions is not sufficient or higher per se than that of electronic instructions, both media must be considered equally, and the basic required safety level must be aligned with product safety. Analogous to product design, the chosen instructional media must not endanger users during regular operation.

¹⁷ Also: ease of use.

¹⁸ User Experience concerning instructions must describe instruction characteristics, resulting in motivation to use. It is assumed that usability is not the only factor that affects motivation. Other factors also influence expectations, acceptance, and emotional connections. Therefore, gamification or additional informational videos can considerably alter user experience although usability is hardly impacted.

¹⁹ See Annex B.

4.2.2 Usability

To ensure that product users can receive information correctly, the information and the chosen form of media must fulfill usability requirements.

Requirements for information and media are specified in IEC 82079-1:2012 and in other partly product-specific standards.

Requirements for the usability of electronic instructional media are described in the standards ISO 14915-1 and ISO 9241-110.²⁰

The overview below shows the essential requirements for usability of instructional media. It is compiled based on the ISO 14915-1 und ISO 9241-110 standards and shows that the choice of a suitable instructional medium cannot depend solely on availability:

- Appropriate for the task
- Suitability for the communication goal
- Suitability for perception and comprehension
- Self-descriptiveness
- Conformity to expectations
- Promotes learning
- Controllability
- Suitable for exploration
- Error tolerance
- Customizability
- Suitability for user motivation
- User preference.

4.2.3 Acceptance

The acceptance of instructional media can only be inadequately determined in theoretical terms. This is especially true because media-related options are developing rapidly and acceptance largely depends on user groups and the levels of user-friendliness (usability) achieved. Insights concerning acceptance therefore call for suitable empirical investigation and market observation.

A BMW study in 2015 on the use of owners manuals shows that acceptance of electronic information for use can vary for different cultural groups. Far more vehicle owners in Europe and North America continue to prefer the printed manual, compared to customers interviewed in Japan and China²¹.

The following methods are deemed suitable as per IEC 82079-1:2012, Annex E:

- Surveys (written, oral, group interviews)
- Usability testing
- Self-evaluation and checklists
- Opinions, reviews by experts, and certificates
- Findings of independent quotations or service programs
- Complaint management, hotlines, and customer service information.

4.3 Economic Considerations

In general, the objective of economic considerations is to achieve a given income with the lowest possible expense or to achieve the highest possible income with a given level of expense.²² In technical communication, expenses are usually kept to a minimum.

²⁰ The basic requirements of the standards mentioned above are largely applicable to print media.

²¹ BMW Group, 01/2016, s. Annex D.

²² de.wikipedia.org/wiki/Wirtschaftlichkeit [retrieved 03.10.2016].

The income is optimal user benefit that cannot be easily quantified in view of complex considerations. Thus, it is often a challenging task to establish an appropriate balance between cost and benefit. Therefore, in addition to user benefits, the costs of different delivery forms must be assessed.

The state of the art allows information to be created in an editing environment with the help of electronic systems e.g., standard office programs, professional desktop publishing tools, or database based content management systems (CMS). These systems are generally suited for both print and electronic media. Print files and electronic information for use are mostly generated from the CMS. A cost comparison between printed and electronic forms is only possible on company-specific and product-related bases.

4.3.1 Cost of Delivery in Paper Form

Various factors influence the costs of distributing printed product information. For delivery on paper, the process of printing, packing, and transporting must be analyzed and carefully planned. Clearly, supplying two tons of paper for a product poses a greater problem than supplying a brochure with fewer number of pages. In the case of batch production, especially when it happens with a high degree of automation, the logistical challenge lies in bringing together paper and product without delays.

Printing Costs

The scope of product functionality and complexity determine the scope of the information for use to a large extent. If this information has to be delivered to the user in paper form, it could fill hundreds of folders. This results in printing costs that can substantially increase the unit cost. High printing costs also means information with a narrower scope for each product and information that must be manufactured in large quantities, and thus a high print run. A wider scope can also result from the number of target languages. Other factors of printings costs include the color components and the printing process, e.g., digital or offset printing.

The number of printed copies depends on the quantity of finished products and customer requirements. The required number of documents cannot always be precisely determined in advance. This is especially true when foreign languages are involved.

If the manufacturer has to update the information for legal or contractual reasons, the additional expense will be added to the printing costs.

Paper Costs

If special paper such as moisture-resistant or very thin paper is used, then in addition to the high material costs, expensive printing and packaging procedures must be considered.

Material Costs

On top of printing costs, material costs that depend on the information presentation are incurred. When there are fewer pages, bound brochures, spiral bound documents, and glued brochures are commonly used. Extensive documentation, especially for the capital goods sector, is often published as a loose-leaf compilation. In such cases, the costs for folders, separator sheets, labels, and registers are added to the printing costs.

Manual labor required for packing, inserting, structuring, and labeling documents further constitutes another portion of costs. Finally, packaging cost must also be accounted for.

Transport and Logistics Costs

Similarly, transport costs are also accounted for. For mass production, transport costs are already incurred before delivery because of the correlation between the information for use and the product. Alternatively, this could be a case of great user documentation volume. Transportation costs can vary for different means of transport. This is largely dependent on the size and the weight of the printed material.

Reject Costs

In addition to product waste, if documents are created in advance and in fixed versions, the surplus may be destroyed if there is a version change. From an economic standpoint, all publication work procedures storage of prepared documents must be included.

Storage Costs

Costs for the storage and archiving of large volumes of information are borne by the user. These include, at the very least, investing in storage furniture and fire-fighting equipment, and management of the storage rooms that may include air conditioning.

Potential Cost Risks of the Logistics Process

Other financial aspects to consider include potential disruptions and failures during the logistics process. The manufacturer must ensure that the information for use is accurate and complete at the time of delivery. In addition to legal requirements, deadlines in contractual agreements must be strictly observed, because non-compliance could lead to substantial economic losses. Risk of disruption is higher when there are more process steps between the content release and its inclusion in the final product.

General Cost Risks

For each individual case, the overall, often multi-stage and company-wide, processes and value chains must be analyzed and evaluated. Unavoidable risks that cannot be resolved by another workflow or eliminated by remedying organizational deficiencies must be examined with regard to their impact on the overall process. The manufacturer must take suitable steps to limit the risks for a smooth workflow. If the remaining risks can lead to considerable economic losses, it is advisable to arrange for risk provisions. Payment is usually associated with a partial or complete product delivery. The same applies to the information for use that is a part of the final product. A penalty for delay in the delivery of information for use can also be contractually agreed upon.

4.3.2 Costs of Delivery in Electronic Form

Lower costs of production, distribution, and logistics in comparison to paper form are significant factors for the manufacturer. Likewise, shorter production times and immediate availability after completion are advantageous to electronic delivery. Depending on distribution channels, the lower costs for required updates also have a direct positive impact.

The processes involved in the delivery of information in electronic form are different. In this case, the availability of appropriate IT infrastructure, including a rights-based access control model, must be included. The tekomp guide "Mobile Documentation" discusses, for instance, the approaches to cost considerations when preparing information products on mobile media.²³

²³ tekomp Guide to Mobile Documentation, Stuttgart 2014.

4.4 Ecological Consideration

In addition to economic considerations, ecological aspects must also be evaluated.

Over the last decade, environmental awareness has increased significantly. Where ecological balance is concerned in the case of information delivery, minimally speaking, packing materials used are almost exclusively manufactured from renewable raw materials. Trends in sustainable forest management and an overall reduction in water and paper usage are also made public now.

Similarly, the transport, use, and disposal of paper must be assessed from an environmental perspective. For decades already, it goes without saying that paper recycling continues to be very important.

On the other hand, displays for electronic information are already available. They hardly affect the ecological balance of products, except for a minimally higher energy demand for showing information.

Recycling of materials in the case of electronic devices has long become a reality. They are mostly metals, plastic, and glass that contain hazardous substances such as heavy metals and organic compounds. Due to their complex composition, electronic devices require expensive separation and disposal technology compared to paper. Manufacturers, importers, and traders in Europe are already required to collect their used electronic devices at no charge. Ecological considerations aside, recycling of electronic devices has increasingly gained economic importance as well.

excerpt