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Developing and enforcing internal information systems standards: InduMaker's Standards Management Process

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Abstract:

It is widely agreed that standards provide numerous benefits when available and enforced. Company-internal Information Systems (IS) management procedures and solutions, in the following coined IS 'standards', allow for harmonizing operations between company units, locations and even different service providers. However, many companies lack an organized process for defining and managing internal IS standards, which causes uncertainties and delays in decision making, planning, and design processes. In this case study of the globally operating InduMaker (anonymized company name), an established manufacturing supplier, we look into the company-internal management of IS standards. Theoretically grounded in the organizational and IS-focused literature on business process modelling and business process commoditization, we describe and investigate InduMaker's newly developed Standard Management Process (SMP) for defining and managing company-internal business and IS standards, with which the multinational pursues offering clear answers to business and IT departments about existing IS standards, their degree of obligation, applicability, and scope at any time.

Keywords:

information systems; standards process; standards management; project management; practice case.

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1. Introduction and problem statement

It is widely agreed that Information Systems (IS) management procedures and solutions, in the following coined IS 'standards', provide numerous benefits when available and enforced [1, 2, 3]. They can be helpful in different areas within of IS and IT. A multinational's internal IS Standards¹ allow following up on strategic goals such as cost/quality optimization, agility, or flexibility. They provide the basis for quality comparison regarding the effectiveness and efficiency of operations and the cost-efficiency and speed of delivery, and they allow for harmonizing operations between company units, locations and even different service providers [9]. Ultimately, internal standards are the means for industrializing operations – both in IT and in business processes [e.g., 10, 11].

However, the active management of company-internal IS standards is still often an open issue. Managers typically hear questions about a specific standard in use such as: 'What is our standard in so and so? Why did we use standard *abc* in plant A, but then standard *xyz* in region B for the same purpose?' They find it challenging to compare their IS with what other companies are using, especially as often it is not clear how to benchmark their IT services in some process as they do not know what to compare and on what basis. Purchase managers across the globe wonder whether they can join strategies in purchasing equipment, services or licenses for *xyz*. Project managers on site have to quickly integrate a new acquisition or new plant into existing IT services. Overall, persons in charge in Information Technology (IT) departments and in management typically agree that they need a regulation on deployment of *xyz* throughout the company. All these issues arise in the absence of clearly defined and documented company-internal IS standards. Apparently, companies lack an organized process for defining and managing those standards. Missing such process generates uncertainties and delays in decision, planning, and design processes; employees – especially in IT – often express a gut feeling that their company is using a particular standard, but they cannot tell how or why.

Here this explorative case study delves deeper: Theoretically grounded in the organizational and IS-focussed literature on business process modelling [7, 12, 13] and business process commoditization [1, 10, 14, 15], we aim at describing and investigating a multinational's newly developed organized Standard Management Process (SMP) for defining and managing company-internal business and IS standards. It takes the case of globally operating InduMaker AG (InduMaker), an established, globally operating manufacturing supplier, and investigates how the company handles internal management procedures, standards – especially IS standards. How do standards within InduMaker come to life? Which standards get rolled-out globally? Who manages the disposal of a standard when a 'better way' seemed to have popped up somewhere around the world? In other words, how is a Life-Cycle approach applied to standards? To tackle these questions, we describe and investigate InduMaker's global company-wide *Standard Management Process (SMP)*, which is applicable to all InduMaker and its majority holdings as well as minority holdings under the multinational's management control. InduMaker's idea is to prescribe a company-wide clear and comprehensive routine procedure to request, define, approve, document and implement IT standards in a wide range of topics. The company's main objective for the effort to develop an organized process for defining and managing IS standards is to offer clear answers to business and IT about existing standards, their degree of obligation, applicability, and scope at any time. As so often, the devil is in the details – especially when it comes to a global, but standardized implementation and roll-out of IS management procedures.

The next sections outline the research approach and provide a short, anonymized company brief. Section 4 synthesizes the value of IS standards from the case company's perspective. This sets the ground for section 5 and 6, which offer a detailed description and analysis of InduMaker's Standard Management Process. Finally, section 7 presents Key

¹ In this paper, we use InduMaker's internally used term IS standard when referring to standardized IS management procedures. Hence, InduMaker's Standard Management Process (SMP), at the core of this study, refers to managing IS related rules and decisions in a standardized way through the globally active multinational. This definition is different from [4, 5, 6, 7, 8] who use the term IS standards for technical standards defined as an agreed-upon specification for a way of communicating or performing actions.

Performance Indicators (KPIs) along InduMaker's SMP. Section 8 provides an assessment of InduMaker's Standard Management Process, before section 9 concludes with some lessons learned, implications and limitations.

2. Research approach

This case study on globally standardizing business processes and procedures in the wide context of IS aims at meeting the research criteria of relevance, applicability, and specificity as proposed by Cheng and McKinley [16] in their work on integrating organization research and practice.

To illustrate, investigate, and assess InduMaker's *Standard Management Process (SMP)*, we conduct a single exploratory case study [17, 18, 19]. The study should allow us reflecting the practice reality of designing and diffusing a Standard Management Process (SMP) throughout a truly global company operating in more than 49 countries. With only limited quantitative data available, a single case study seems to be best suitable for an in-depth analysis of qualitative data focusing on the 'how' [19, 20].

We gathered mostly qualitative data from three major organizational sources:

- Firstly, between March 2012 and August 2013, we conducted seven informal, face-to-face in-depth interviews with top management, including IT management and further interviews with project managers via mail and telephone. We also used opportunities for statements and feedback from invited managers provided by a closed intranet discussion forum which held the SMP concept for reference. The choice of informal interview and feedback settings encouraged respondents to talk about their perceptions and impressions of InduMaker's future Standard Management Process and follow up on it in its various development stages. The informal style gave respondents the opportunity to speak out frankly without restrictions to specific issues. Interviewees could thereby more adequately reflect the proceedings of the project and emphasize points of perceived importance. Any vagueness resulting from the initial interviews was checked with the respective interviewee if available or with senior managers involved. Compared to objectified experimental or survey methods, the applied research method implies a certain subjectivity;
- Secondly, we evaluated four workshops, each with a group of 7 to 13 company managers from different company locations and external consultants;
- Thirdly, we complemented our data by evaluating an extensive set of internal documents. We had the opportunity to analyze numerous qualitative meeting minutes and project reports and we could look into internal repositories of data related to or resulting from the overall project related activities.

At the end, InduMaker's Chief Technology Officer (CTO) and several other InduMaker's officials reviewed the case paper to exclude factual errors.

3. InduMaker AG: company brief

InduMaker – a globally operating industry supplier – ranks among the top ten in its industry segment worldwide. With more than 150,000 employees at almost 200 locations, in 2014 the company achieved preliminary sales of approximately USD 48 billion. As a large multinational, InduMaker operates in global, competitive markets where IT services have been the backbone for most distributed business processes. Many of its IT services across business sectors and countries have reached commodity status, suggesting that the according standards are carefully managed. For instance, following a merger at the beginning of the millennium, InduMaker integrated thousands of users into one e-mail system as employees from the acquired company were familiar with Outlook Exchange whereas InduMaker had been using Lotus Notes Domino.

4. Value of IS standards – InduMaker's perspective

To InduMaker, a multinational with some 190 sites spread all over the world, the value of applying company-wide IS standards lies in cost, time to market (of IT services), operational efficiency and user satisfaction [see also 10, 21, 22]:

- Costs: Standardized IT products (hardware, software) and IS operations reduce coordination costs, allow for economies of scale in purchasing, and significantly reduce IT service cost. Running homogeneous IT environments and workplace computing allows for controlled centralization of resources and thus making effective use of internal and external IT providers' skill sets [23];
- Time to market: IS standards allow for accelerated setting up and provisioning a new of IT Service or of provisioning of homogenous services in the course of integration of new M&As [24];
- Operational efficiency: As standards apply to operating and managing IS operational resources – servers, storage, networks, distributed devices – 24x7 can be established on the same staff count in a follow-the-sun mode. A common end-to-end monitoring standard supports steady availability and performance [1, 3];
- User satisfaction: User Support can reach much deeper on a per case basis based on known standards as the knowledge base (documented and in support staff) is likely to be more comprehensive [25, 26].

On the other hand, InduMaker also faces the downside of enforcing adherence to centralized IS standards – especially the dependence on manufacturers, their strategies, and their economic well-being.

5. InduMaker's Standard Management Process (SMP): Overview

For many years, there has been agreement across InduMaker that standards help promoting sustainability as they allow for transferring problem solving and best practice across the company. Hence InduMaker aims at applying standards to all processes – in business and IT. Within IT, InduMaker sees standards – and their management – as essential and efficient for designing IT solutions in reply to business demands, for passing project and quality gates, for inter-company comparisons, and for fast integration following M&As.

In summary, InduMaker's SMP says that everybody within InduMaker can request a new standard or a change or disposal of an existing one. A request can be submitted formally or informally. For each requested standard, a *Standards Committee* nominates the *Standards Approval Authority* in accordance to the respective scope and object and the level of obligation. The *Standards Committee* evaluates the requested standard with respect to its future strategic and technological positioning and the possibility to fulfil its purpose. Once a standard is approved by the *Standards Approval Authority*, it must be documented and published, and later reviewed on a regular, defined basis. In any case, the requester will receive feedback about the status of the request in due time.

5.1 SMP-Terminology: Standards – and their Objects, Areas of use, and Types

As a first step, InduMaker promotes a company-wide terminology with respect to standards. With defining a 'standard' and using harmonized terms InduMaker aims at establishing clarity in communication, avoiding misunderstanding, and decreasing the risk of misinterpretation.

Standardization – within InduMaker – describes the process of defining and implementing a standard. A *standard* is an agreed and approved system of principles and rules for common and repeated use to serve a specific purpose. It is unambiguous, interchangeable, and compatible with its environment, as well as documented and published. With regards to a standard, InduMaker distinguishes (1) object (class), (2) area of use, and (3) type.

Objects come in different categories. Typically they are categorized into aspects of 'What', 'How', and 'By what means'. Table 1 shows the list of objects considered by InduMaker.

Table 1. Standard Objects

Objects		
Client SW	Service	Design
Location IT Setup	Architecture	Specification
Technology	Security	Data Model
Product	Process	Format
Sourcing	Workflow	Documentation
Operations Practice	Method	Role

The *Area of Use* relates to the area of Business or IT in InduMaker's enterprise specific ontology (see Table 2 for InduMaker's Areas of Use in Infrastructure Services). Obviously, the list of use areas gets adapted according to any changes in InduMaker's corporate IT².

Table 2. Areas of use – Infrastructure Services

Areas of Use – Infrastructure Services		
Managed DB	MAN	Resource Directory
Managed Server	DHCP / DNS	Patch Management
Managed User Workstation	Remote Access	Virus Protection
Managed PDA	Secure External Access	Messaging Operations
Managed PBX	Internet Guest Access	Online Collaboration
WAN	Internet Access Gateway	Real-Time Collaboration
WAN Acceleration	Internet Mail Gateway	Asset Management
LAN	Terminal Service	Monitoring
WLAN	Data Center Facility	Service Desk
RADIUS		

Finally, the standard *Type* determines the level of obligation that the standard implies. It depends on a particular Level of Obligation. InduMaker distinguishes three types of standards: (1) recommendations; (2) specifications; and (3) regulations (see Fig. 1).

² Originally, the SMP and its terms and definitions are generic with respect to the field of application within InduMaker. The SMP could be deployed in any area of business, business process or supporting function, like purchasing, finance, HR. However, to start with, the application of the SMP has been restricted to the field of Business IT and, for the learning curve initially, IT Infrastructure.

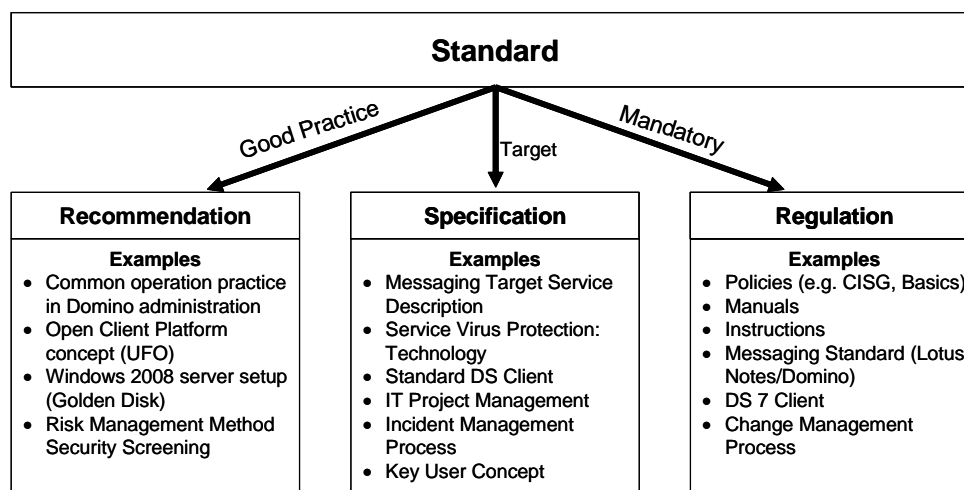


Fig. 1. InduMaker's Standard Types

A *Recommendation* relates to a well-proven method or technique to solve a specific IT question. Practice is based on the long-term experiences that are proven over time to fulfil a certain demand by many people. The Level of Obligation is 'Could/Good Practice'. A *Specification* sets out detailed requirements that are expected to fulfil a certain demand. It describes what should be done/used, how something should be done, and which criteria are expected. It also describes the procedures for checking conformity to these requirements. The Level of Obligation is 'Should/Target'. *Regulation* provides binding legislative rules. Documents types include policies, manuals, and instructions. A regulation can also be a technical specification, code of practice, or a technical guidance that outlines some means of compliance. The Level of Obligation is 'Shall/Mandatory'.

5.2 Roles and responsibilities in InduMaker's SMP

InduMaker's SMP builds on clearly defined roles throughout its six phases (see below). The roles involved in the SMP include *Standards Committee*, *Standards Approval Authority*, *Standards Owner*, *Experts Group*, *Standards Requester*, *Stakeholder*, *Process Owner*³, and *Process Manager*.

- Anyone within InduMaker can act as a *Standard Requester* and issue a request for standardization or propose a specific standard for approval;
- The *Standards Committee* is a central, or, at least, a virtually central team that is accountable for managing standards requests (acceptance, register, prioritization, providing an overview, and status of the existing and retired standards as well as of rejected standard requests). It is accountable for the nomination of the respective Standards Approval Authority and for arranging and nominating the experts group. The Standards Committee has to consider that authorities from all areas are represented so that Standards Approval Authority and Experts Group are able to fulfill their tasks. Finally, the Standards Committee holds the Key Performance Indicators (KPI) reports;
- The *Standard Approval Authority* is designed in accordance with the Change Management Process; their staffing varies dependent on obligation, standard type, area of use and scope. The authority is responsible for the drafting of a standard and its final approval. It issues the note of acceptance/rejection, approval/disapproval when appropriate and nominates the Standard Owner;

³ Defined and required by ITIL, the IT Infrastructure Library (www.axelos.com/itil).

- The *Standard Owner* reviews the standard with regard to the scope, to the decision, to the level of obligation and to the applicability of the standard. This may be based on feedback, e.g. from the stakeholders or KPI evaluation. He is accountable that the standard documentation is available, complete, and compliant to the standards documentation template. He organizes the publication and collection of acknowledge receipts of the IT management. The Standard Owner is also responsible for regular reviews of the standard and its documentation and drives its evaluations. Thereby, he ensures that the KPIs are implemented and reported as defined to evaluate the standard effectiveness and efficiency. He provides information to the Standards Approval Authority, the Experts Group, and to the Process Owner for improving process quality, and oversees that the IT organizations across InduMaker are aware of the standard and have the necessary support to apply the standard as designed (training material, awareness campaigns). He receives feedback from the stakeholders and manages the evaluation of the standard with respect to its future strategic and technological positioning;
- The *Experts Group* is responsible for validating the request and the feasibility of the requested standard. It makes sure that the requested standard is aligned with corporate policy, IT Strategy and IT Architecture. It has to identify the benefits for the standard and estimate the efforts for drafting it. Further, it is the Experts Group that designs and drafts a requested standard. It is in charge of requested standard documentation and a proposal for the standard rollout/implementation. The Experts Group consults with the IT Organization (stakeholder) to apply the standard and with the Standards Owner to evaluate it with respect to its future strategic and technological positioning. Finally, the groups is responsible for planning the disposal of an existing one;
- A *Stakeholder* is the person who has contact with a standard, e.g. the respective IT Organization, the Service Owner who have to implement a standard, the IT management and IT employees who have to use a specific regulation, wording, process, the process owners and process manager.

Finally, in line with the IT Infrastructure Library (ITIL), each standard request has a *Process Owner* and *Process Manager*, ideally one each per division:

- The *Process Owner* is accountable for the overall quality of the process and oversees the management of, and organizational compliance to, the process flows, procedures, data models, policies and technologies associated with the IT process. His responsibilities include the design, change management, and continuous improvement of the process and its metrics. In charge of for the process design, he documents and publishes the process and incorporates the relevant policy and standards into the process. He oversees the definition and review of the KPIs to evaluate the effectiveness and efficiency of the process. The process owner is responsible that all process managers are aware of their role in the process and have the required training. Further, he ensures that the process, roles, responsibilities and documentation are regularly reviewed and audited;
- The *Process Manager* is accountable for planning and coordinating all process management activities in his IT area. He is responsible for the quality of process realization based on KPIs and the reporting of process as well as the daily operation of his process. He cares that the defined procedure are followed. He controls the planning and coordination of the process management and the adherence to prescribed procedure. Analyzing the results of the KPI reporting, he ensures that corrective measures are taken. He answers process-related questions from the process performers, validates change requests from the process performers, and passes the qualified specification on to the process owner.

6. InduMaker's Standard Management Process (SMP): Phases

InduMaker has opted for a phased, lifecycle-type process that manages standards and thus drives standardization where reasonable from proposal to implementation including review and, if outdated, disposal/renewal of standards. The deliverables of each phase constitute milestones to be accomplished before entering the next phase. Those milestones at the end of each phase help maintaining overview and transparency about any standard throughout its life-cycle and throughout InduMaker. Fig. 2 depicts the six phases of InduMaker's newly designed SMP.

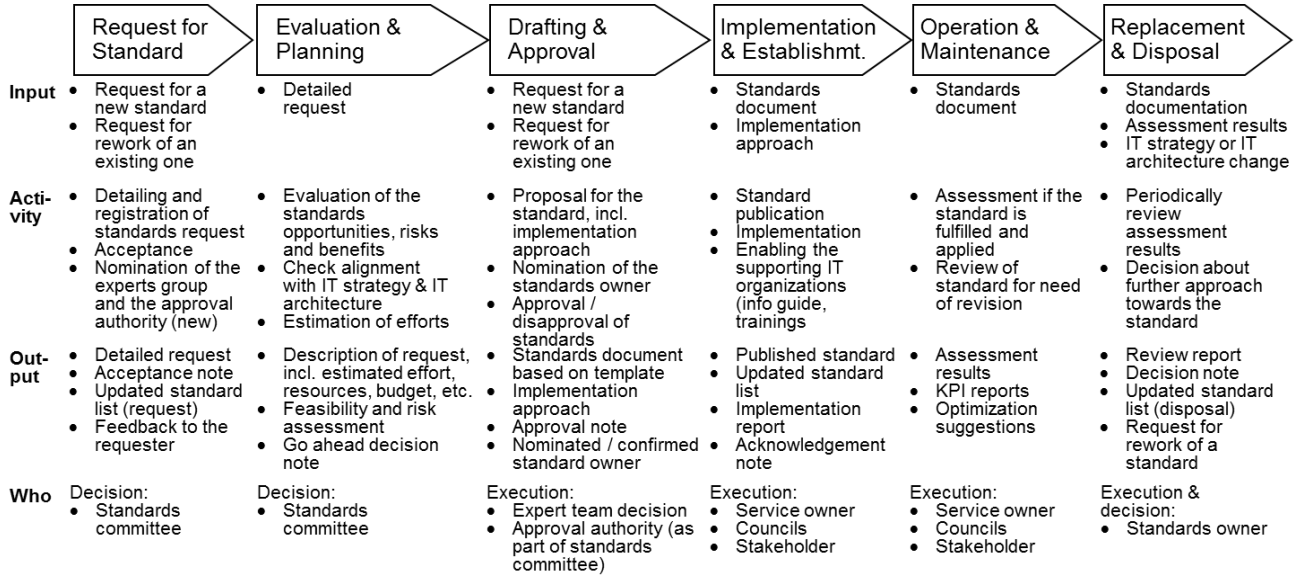


Fig. 2. InduMaker’s SMP – Overview of phases

6.1 Phase 1: Request for Standard (RfStd)

The purpose of this phase is to log the request concerning a new or existing standard or for disposal of an existing standard. The Standards Committee defines the Standards Approval Authority according to scope, object and level of obligation and it nominates a group of experts to whom it hands over the initiation of the standardization procedure. Minimum deliverables are a detailed description of the Standard Request (for abbreviated examples see Appendix 1a-c), an acceptance note, the identification and information of the respective Standards Approval Authority and the Experts Group and as well as an updated standard list where appropriate. Fig. 3 depicts the different steps of Phase 1.

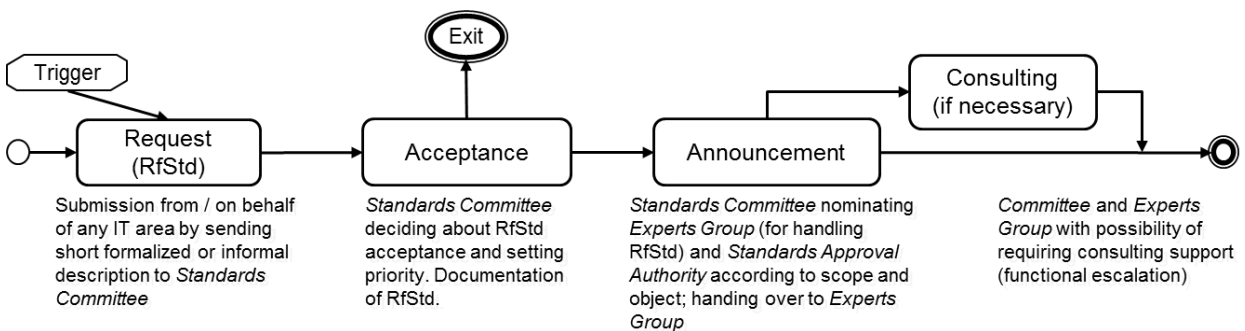


Fig. 3. SMP Phase 1 – Request for Standard

6.2 Phase 2: Evaluation & Planning

The purpose of the Evaluation & Planning phase is to firstly identify and validate opportunities arising from the requested standard and to point to dependencies with already existing solutions. This implies evaluating implementation benefits and costs and to align the proposed approach with the defined IT Strategy & Architecture in order to ensure standard feasibility in the respective area. This phase includes further planning of the time, effort, resources, budget for

the development and implementation of the proposed standard. According to those steps, the minimum deliverables of Phase 2 are a request description, the standard object, type, level of obligation, and scope, the prospective benefits including constraints and dependencies, a feasibility and risk assessment, and finally a 'Go Ahead' note for processing the request. The Requestor will be informed about the decision. Fig. 4 show the different steps of Phase 2.

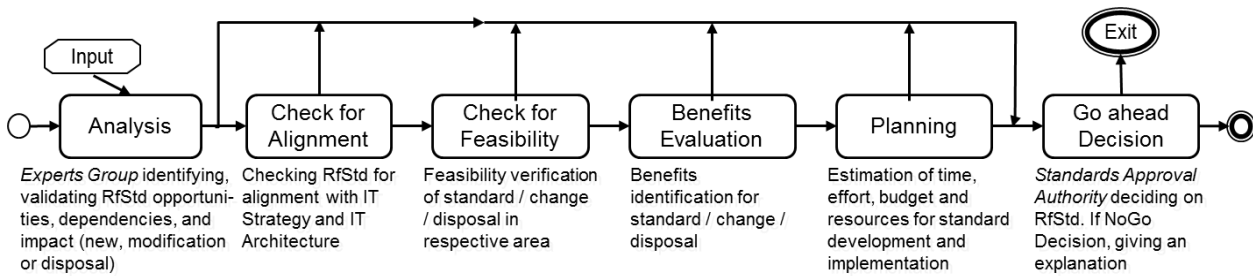


Fig. 4. SMP Phase 2 – Evaluation & Planning

6.3 Phase 3: Drafting & Approval

The purpose of the Drafting & Approval phase (see Fig. 5) is to plan, design, develop, and eventually test the standard solution and to identify and evaluate its impact on InduMaker's IT landscape. This should ensure compliance with corporate policies and with the company's IT Strategy and IT Architecture. Latest at the end of this phase, the Standards Approval Authority nominates the Standard Owner. The required deliverables of the Drafting & Approval Phase is an official documentation of the standard which is handed in for approval by the Standards Approval Authority. The standardized template (see Appendix 2 for an abbreviated template) serves for the documentation of the Standard. It includes the naming and description of the Standard, the implementation plan, the expected time frame, the expected roll-out costs, and the critical success factors for the standard to impact InduMaker's Business / IT Management, and – in case of procurement – a sourcing proposal, supplier (frame) contracts, as well as licensing agreements.

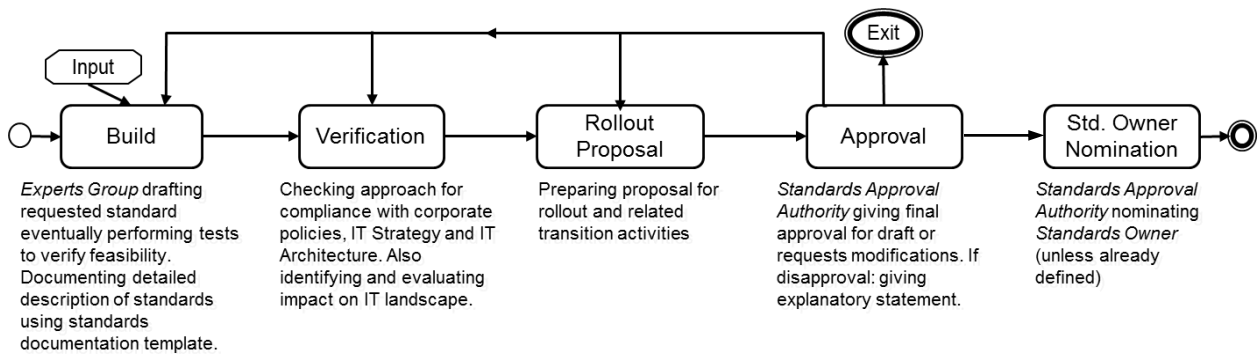


Fig. 5. SMP Phase 3 – Drafting & Approval

6.4 Phase 4: Implementation & Establishment

In this phase, the Standard Owner organizes the publication of the standards documents in the Corporate IT Homepage titled 'Standards and Methods'. He collects the acknowledged receipt by the IT management to ensure that everybody is aware of the new standard. The Standards List will be updated. These activities enable the supporting IT organizations to implement the standard as designed and to carry out awareness campaigns and trainings. In case of a standard disposal, all necessary clean-up activities are performed. Fig. 6 illustrates the steps of Phase 4.

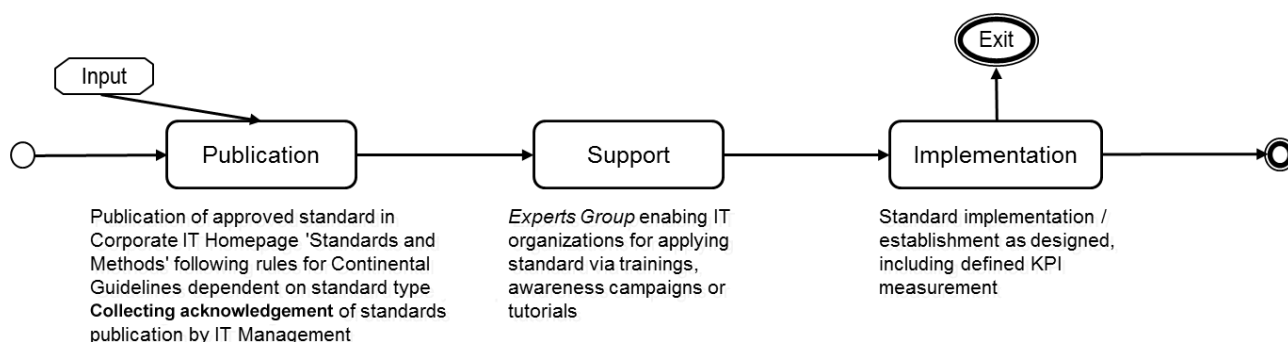


Fig. 6. SMP Phase 4 – Implementation & Establishment

6.5 Phase 5: Operation & Maintenance

The goal of Operation & Maintenance is to conduct a thorough review and assessment of the standard concluding with a clear assessment. Review results include reports on KPI measurements. This entails measuring standard compliance and implementation quality. The Standards Owner initiates assessments with regard to the scope, the level of obligation and the applicability of the standard – on request or as pre-defined for the standard. Thereby InduMaker can ensure firstly standard usage by measuring standard compliance and the degree of standard penetration and adherence and secondly the quality of its implementation. The Standards Owner collects the KPI reports from the IT organizations and prepares them for the Standards Committee. Fig. 7 summarizes Phase 5.

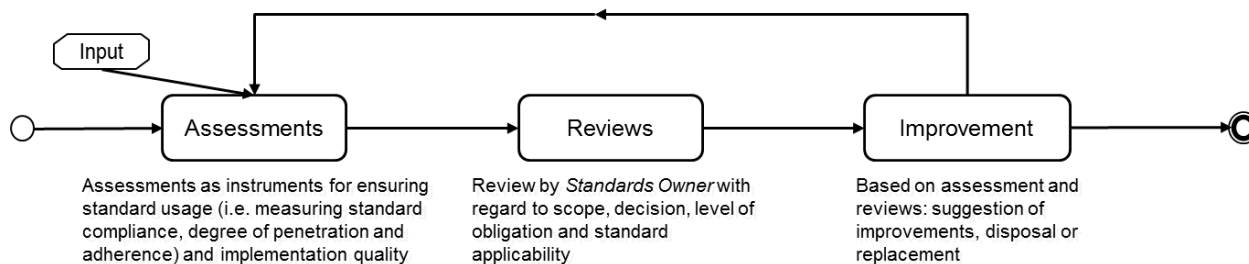


Fig. 7. SMP Phase 5 – Operation & Maintenance

6.6 Phase 6: Replacement & Disposal

During Replacement & Disposal (see Fig. 8), the Standards Owner – typically supported by the Experts Group – evaluates the implemented standard with respect to its future strategic and technological positioning. They also look into need for replacing or retiring the standard.

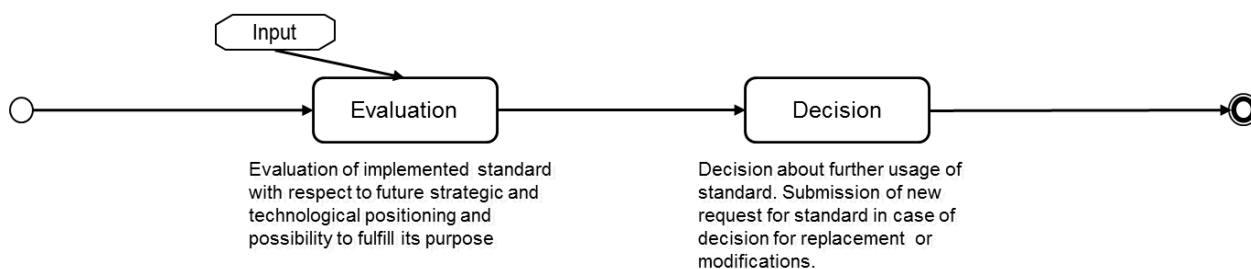


Fig. 8. SMP Phase 6 – Replacement & Disposal

7. Key Performance Indicators (KPIs) applied along InduMaker's SMP

Throughout the SMP, clearly defined and operationalized KPIs play an important role. This ensures customized and highly granular information about a particular standard in progress during any phase of the SMP. Many of those KPIs have to be collected manually and so bind relevant person-power resources. So it must be clearly communicated for what any particular piece of information is needed. Here, the Intranet Standards & Methods site serves as a commonly accessible source of information. Table 3 summarizes the KPIs calculated throughout InduMaker's SMP.

Table 3. Key Performance Indicators in InduMaker's Standard Management Process

No	Phase	KPI	Measurement Method
1	RfStd*	No. of requests for standard per year	Count standard requests in 'Standards Request Record'
1	RfStd	No. of change requests for existing standards	Count requests for existing standard in 'Standards Request Record' of request type: change
1	RfStd	No. of disposal request for existing standards	Count requests for existing standard in 'Standards Request Record' of change type: disposal
1	RfStd	Percentage of accepted requests	No. of accepted requests / Total No. of standard requests * 100
1	RfStd	Time to feedback on acceptance note	Count time between 'request date' and 'acceptance date' in 'Standards Request Record'
2	Evaluation & Planning	No. of evaluated standard requests	Count requests for standard having an acceptance date in 'Standards Request Record'
2	Evaluation & Planning	Percentage of accepted requests for implementation	No. of accepted requests / Total No. of standard requests * 100
3	Drafting & Approval	No. of approvals	Count all approved standards in 'Standards Request Record'
3	Drafting & Approval	No. of disapprovals	Count all rejected standards in 'Standards Request Record'
4	Implementation & Establishment	No. of Standards with implementation definition documented	Count all standards with a 'procedure to measure standards adherence' documented

4	Implementation & Establishment	No. of implemented / established standard solutions	Count all standards with the status 'implemented' in accordance with the 'procedure to measure standards adherence' documented
4	Implementation & Establishment	Result of implementation compared to planning efforts in previous phase	Restricted to cases with effort planning and effort tracking, e.g., effort planned vs. effort spent
5	Operation & Maintenance	Satisfaction level (goal: xx% – except for regulations)	Stakeholder survey, on demand
5	Operation & Maintenance	No. of standards violations per standards type	KPI not implemented initially
6	Replacement & Disposal	Percentage of reviewed standards	No. of standards with actual review date / total no. of standards to be reviewed *100
6	Replacement & Disposal	Percentage of disposed standards without replacing	Count standards with life cycle status 'disposed' not mentioned under Replaced Standard of another standard record / total no. of disposed standards *100

* Request for Standard

8. Assessing InduMaker's Standard Management Process

By analyzing of interview and workshop protocols and digging into first requests for standards going through the SMP, we found that with the SMP InduMaker has reached several main achievements, but also faced some critical issues causing quick process interferences. First and foremost, the development and the adoption of the SMP has led to remarkable awareness and has caused managers and employees to buy-in into an initiative which typically finds itself rather at the bottom of anybody's priority list – standard management. In particular, with introducing the SMP, InduMaker has achieved several project benefits:

- *Unified understanding and communication throughout InduMaker at its 190 locations.* Before having installed the SMP, InduMaker found considerable differences among managers and employees in views and expectations, knowledge, culture and habits between stakeholders and acting persons with regard to basically any topic that may be considered for standardization. Here, the SMP helps achieving company-wide unified understanding and communication as it clarifies the term 'standard' and related terms throughout the company. The SMP not only offers a precise definition of standard categories that appear to be useful in InduMaker's IT, it also streamlines the way in which InduMaker describes and documents a standard along the phases of its Life Cycle Process including details of the logical flow. Finally, in terms of unified understanding and communication throughout InduMaker, the SMP fosters adjustment with other repositories of IT-related documents at InduMaker;
- *Increased awareness of a Standard Life-Cycle.* Already after a year, the introduction of the SMP had achieved rising management attention within InduMaker concerning the importance of managing company-wide standards, which has been found to be 'mission-critical' [12]. Further, data show a traceable buy-in into the resource-binding effort from all continents, even though the adoption of the SMP follows common adoption patterns. It took InduMaker explicit initiative to generate a 'critical mass' of standard requests in order to attract staff to think of standards beyond gut feeling. After a slow start, InduMaker has provided individual support to understand the process and to get familiar with the formalized way of the documentation of the standard. At the beginning, the number of requests has risen slowly, after about a year, the SMP track record shows about 15 requests for Standard per quarter – more than one had hoped for;
- *Improving communication with external providers and seamless and interoperable systems integration.* For InduMaker, the SMP lays the foundation for seamless and interoperable systems integration and provides a reliable framework for designing future IT enterprise solutions – which confirms both findings from the related literature on business process modeling [13] and business process commoditization [1];

- *Enhanced cross-corporate support for approved standards.* In line with [27], the acceptance of and the subsequent adherence to approved standards has improved due to the 'democratically' involving case-specific Expert Groups and assigning an Approval Authority based on topical competence;
- *Focused demand orientation of standard settings.* InduMaker requires a specific demand to initiate a standardization request. Ideally, anybody who sees a potential need to establish a standard, process or product, can forward a Request for Standard. At least during the first years of deploying the SMP, this prevents pursuing top-down standard settings following a predefined programmatic list of issues to be covered – and thus saves resources and again increases support for and adherence to standards as suggested also by earlier works on business process deployment [1, 10].

However, deploying the SMP also brought about four main weaknesses – which in part have already been addressed by InduMaker with early on countermeasures:

- The 'bottom-up/democratic' approach to standard making risks flooding InduMaker's SMP with too many standardization requests of minor relevance [15, 22]. To accommodate this weakness as much as possible, the process was initially set active with restricted proposal sources;
- The large number of detailed rules and KPIs sometimes comes across as 'over-kill'. Concerns have come up especially regarding the large number of KPIs that have to be collected and analyzed manually. Some KPIs are to be tracked in the beginning and adopted during the phases; this applies for instance to 'Request Cycle Time', '# requests', '# requests rejected', '# approved standards'. Managers in the field often do not really 'know who needs to know or who wants to know'. The embedded problem of incompatible or intransparent goals and requirements across company units has already long been recognized in the literature on standard making [7, 13]. To eliminate the time consuming effort for manual evaluation, implement an SMP with a significantly reduced number of KPIs excluding all those which cannot be analyzed automatically;
- Different from the goal of clear and visible decision and responsibility structures embedded in SMP roles, ongoing discussions and different understanding of the role and the responsibility of the standards committee and the approval authority show that either the role profiles are not clear enough or they are not wanted away from the headquarters. InduMaker installed a Secretary General for SMP to handle the requests – registration, quality checks of requests and documents, tracking, etc. and to take over the coordination and help function for staff new to the process;
- The SMP, in its strictness, is not too easy to understand as a whole. It requires tutoring or at least the willingness of the stakeholders to spent some time and effort in practicing with first cases. The complexity of the SMP might be in conflict with particular company-internal values, such as technical purity [2, 7].

9. Lessons learned, implications and limitations

In the case of InduMaker, an explicit standards management with clearly defined phases, responsibilities and KPIs supports the process transparency, provides standardized documentation, and allows for corporate-wide accessibility and awareness. Such management of internal standards leads to traceable identification of exceptions and overall to shorter standard implementation cycles at new locations, transparent decision processes and criteria, and thus internal efficiency gains measured in numerous KPIs.

The study shows the case of grounding many IS decisions, e.g. the ones of choosing and deploying internal standards, on sometimes complex, but clearly defined methods and approaches. InduMaker takes the decisions based on pursuing some – in long management rounds – agreed-upon 'steps' with clear KPIs and then enforces those 'steps' company-wide in a standardized manner. Here we see similarities to multinationals who seem to apply complex detailed methods on a global scale, for instance for assessing cloud readiness [24], even when weighing local contextual differences against the benefits of procedurally sound, company-wide selection or management rules.

It is to be debated to what extent and based on which measures the advantages of a company-wide management of internal standards can be balanced against the resources required in the context of any company-wide SMP, which – by definition – implies the risk that a standard leads to an unwanted 'mono-culture' which is susceptible to crisis and binds extensive skills and resources barring other fast and agile IT developments processes.

Considering the implications of our research, we wish to point to two constraints, which we frequently face in practice-oriented research efforts: Firstly, it has required some confidentiality time period (of nine months) to secure the publication opportunity for the case study on a newly developed and implemented, company-internal standard management process. As InduMaker assesses some of our research findings as rather critical for the company and some of their employees have posed some constraints in terms of data release.

Secondly, as with any single case study, the current insights are highly preliminary. They may not be fully generalizable to other multinationals, business and IS processes or standard setting procedures with different motivations and contexts. Therefore, we prefer positioning our work as an investigative illustration of a company-wide IS standard management process and aim at creating awareness.

Harking back to Cheng and McKinley [16], we claim that our work meets the three main criteria for organization research: (1) *relevance*: the issue of managing company-wide IS procedures (here IS standards) is highly relevant to many multinationals, particularly in case of ongoing mergers and acquisitions of organizational units with historically different approaches; (2) *applicability*: insights and lessons learned are applicable to other (non-IT) multinationals which likely deploy comparable corporate IT infrastructures to run and support their core business, and (3) *specificity*: differentiating six phases, each with a number of specific steps, tasks and stakeholders within InduMaker show a degree of specificity which is rarely found in scientific research. Admittedly, at some point, such specificity supporting rigor in qualitative research [16], conflicts with the general research aim of generalizability. Here we invite other researchers to replicate in different settings and validate or expand the insights gained. Furthermore, we also call for more research attention to managing internal IS standards. Such work should take multiple viewpoints, including the company, internal and external stakeholder groups, and individuals.

We hope this case research can serve as an effective eye-opener and promote further investigations in a seemingly trivial, but barely solved IS management problem impacting corporate scope.

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Appendix 1a. Abbreviated Requests for Standard (RfStd) – Example**Standard Request: Internet Guest Access Planning Manual****Standards Request:**

Date: 19.02.2013

Internet Guest Access Planning Manual

Document No.: XXX

Request Description

Standardization of Guest Internet Access possibilities and definition as a Service (e.g. for Access Security and rights, Voucher classes, Sponsor portal, Internet access, tested Hardware, Management tool), independent of the InduMaker internal Internet Access (CIAS) and internal networks.

Motivation

Guest Access in InduMaker locations frequently demanded; security and legal regulation have to be ensured.

Standard Type

If 'Regulation – mandatory',
is this a candidate for
policy, manual or instruction?*

Regulation - mandatory

No

Object

Organizational Scope
Area of use
Benefits

Specification (WLAN hotspot in InduMaker locations)

Corporate

Internet Guest Access Service

Globally unique implementation set-up and quality, operational guideline, uniform Access rights and control on IEEE 802.1x standard, cost efficiency, internet access with no interconnection to the InduMaker network infrastructure.

Documents available

Request agreed

If Yes, by whom

No

Yes

IIC & ISC

Requester

Approval Authority

Experts Group

First Requestor

List of names of specific AA

List of names from Competence Group Network&Voice
(anonymous))

Standards Owner

One Owner

Date of Acceptance

* These are other, higher level categories of the InduMaker's repository of enterprise documents.

Appendix 1b. Abbreviated Requests for Standard (RfStd) –Example**Standard Request: Desktop Search****Standards Request:**

Date: 08.03.2012

Desktop Search

Document No.: S 10.000007

Request Description:

Standardizing Desktop Search tools in the context of DS7, DS, DE, CAT Products: WDS and EZ Notes Adapter.

Motivation

Improvement of desktop usability function (Search) part of the ConNext concept.

Standards Type

Regulation - mandatory

If 'Regulation – mandatory', is this a candidate for policy, manual or instruction?*

Yes

Object

Organizational Scope

Client Software

Area of Use

Corporate

Benefits

Managed User Workstation Services

Higher degree of automation of DS7 client rollout.

Documents available

Applicable for older clients (DE, DS, CAT)

Request agreed

Yes

If Yes, by whom:

Yes

CAC Voting members

Requester

First Requester, another Requester

Approval Authority:

List of CAC voting members, IIC

Experts Group:

List of names of global IT Client Support Team

Standards Owner:

Application Portfolio Manager (name)

Date of Acceptance:

* These are other, higher level categories of the InduMaker's repository of enterprise documents.

Appendix 1c. Abbreviated Requests for Standard (RfStd) –Example**Standard Request: Process Management Principles****Standards Request**

Date: 31.01.2012

Request Description

Process Management Principles

Document No.: XXX

Standardization of methods for process management in InduMaker IT including:

- The standards for documenting process information;
- The roles and responsibilities of process management;
- Boundaries, principles and rules in the definition of InduMaker's IT processes.

Motivation

Processes are currently described/documentated in many different ways.

Prerequisites for a common process management framework.

Standards Type

If 'Regulation – mandatory', is this a candidate for policy, manual or instruction?*

Regulation – mandatory

No

Object

Organizational Scope

Area of use

Benefits

Process Management

Corporate

All IT processes at InduMaker.

All process design follows a common systematic of description. Transparency and common understanding of process structures, flows, involved roles, processed objects, and interfaces between processes. Enabling clear and consistent visualization, modeling and management of all relevant processes.

Documents available

Request agreed

If Yes, by whom:

Yes

Yes

CCI SI

Requester

Approval Authority:

Experts Group:

Standards Owner:

One Requester, Another Requester

Corp CIO Team (names)

Corp IT Strategy and Competence Group Service Integration (names)

One Owner

Date of Acceptance:

* These are other, higher level categories of the InduMaker's repository of enterprise documents.

Appendix 2. Standard Documentation: Standard for File Compression

Objective of the Standard

A consolidated and useful application for the basic functionality 'File Compression'.

Who should use this document

Primarily intended for all service providers who are requested and affected in software request and installation (e.g. Service Desk, Local IT, Software and License Manager) as well IT Management, Service Owners, IT Architects, IT CCs.

Motivation for Standard

Due to Bug in current standard tool IZarch (Encrypted archives with AES256 and greater as 100 MiB which end's in corrupted Data's) the standard has to be reviewed.

Evaluation / Recommendation

Software Candidates

- WinZip Pro 16
- Winrar 4.11
- IZArc 4.1.6
- ZipGenius 6.3.2.3110
- Filzip 3.06
- 7Zip 9.20

Recommendation

The features for tools evaluated are found to be ranging from basic compression tool to an advanced one. Since Winzip Pro has already been offered as an optional package with the advanced features, 7Zip will be recommended as an alternate compression tool as it is free and fulfils all the basic needs of a compression tool.

7Zip is available in 79 languages, supports compression/decompression to 7Z, ZIP and many other formats, encrypts files in AES-256, supports spanning, create self-extracting archive for 7z format and integrates with the windows shell.

Standards Description

7Zip is defined as new corporate standard for File Compression functionality. It is mandatory for all standard clients and has to be included in the standard core image.

Terms and Clarification – n/a

Applicability

The standard is valid corporate wide.

Benefit of the Standard

Improvement and elimination of current bug for the File Compression functionality.

Dependencies to other Areas

Dependencies to other areas: not known.

KPIs and Standards Compliance

KPI = number of installations

Compliance: 100% of standard-clients updated or installed with 7Zip.

Rollout Proposal / Description

See COBA Request for Package: RfP000743

Packaging for LanDesk

Dependencies-Check, Pilot, Release

InduMaker Policies n/a

Other Resources n/a

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