

Company IT Standardization: Anticipated Agile Benefits¹

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ABSTRACT

Many companies have embarked on IT standardization initiatives with specific benefits in mind, but some projects fail dramatically whereas others are very successful. The research suggests that successful company standardization projects require good governance and management across distinct lifecycle phases: selection, implementation, and use and change. The authors present a case study from a financial services company to demonstrate effective practices that have led to significant financial benefits, to improved service delivery and support, and to a more stable IT environment. In addition, the authors discuss how an agile way of working could further improve standardization initiatives in organizations.

INTRODUCTION¹

Many companies try to converge on particular IT processes and/or IT products to gain business benefits such as quality improvements, cost reductions or obtaining strategic advantage (Swaminathan, 2001; Boh and Yellin, 2007; Mueller et al., 2015). These efforts can be described as standardization activities since the parties involved “... have the intention and expectation that the established solutions will be used within a certain period by a substantial number of the parties for which the solutions are meant.” (De Vries, 1999, p. 162). The result of such an initiative is called a company IT standard (Van Wessel, 2010). De Vries (1999) argues that a company standard may have the form of:

1. A reference to one or more external standards officially adopted by the company;

¹ Paper prepared for the book by Kai Jakobs (Ed.), 2019. *Corporate Standardization Management and Innovation*. Hershey, PA: IGI Global.

2. A company modification of an external standard;
3. A subset of an external standard (for instance, a description of the company's choice of competing possibilities offered in an external standard, or a subset of the topics covered in the external standard);
4. A standard reproduced from (parts of) other external documents, for instance, suppliers' documents;
5. A self-written standard.

We define a company IT standard as: “A *specification of an IT product or process to be repeatedly and consistently used in the company*” and the company IT standards in this chapter relate to category d. in the above list.

Typically, a company standardization process encompasses a number of sequential steps: selection, implementation, and use (including changes and withdrawals) of the standard, which together comprise the lifecycle of the company's IT standards. These internal IT standards are not necessarily restricted to formal standards created by official standard setting organizations, but may also include standards set by consortia or even specifications of propriety products and processes. Some of such standardization initiatives fail dramatically whereas others are very successful, and the reasons are not clear. Companies have to make choices among numerous IT products and processes to arrive at company standards, but how should they do so effectively and efficiently? Who should be involved? How should they plan and control? How should they measure their effects? What are the pros and cons, and the costs and benefits? This paper aims to find empirical evidence of the business impact of a company's IT standard and of the effective governance and management mechanisms for successful company standardization initiatives.

Since the 1980s, scholars have studied the economic aspects of standardization, such as network effects and switching costs (Van de Kaa et al., 2011). The majority of standardization studies focus on the effects of (IT) standards on a macro-economic scale (Blind, 2004; WTO, 2005), on the development of standards by industry, consortia, and international standards bodies (Backhouse, 2006; Nickerson and zur Muehlen, 2006; Teichmann, 2010; Jain, 2012), and on battles between competing standards (overview of studies in Van de Kaa et al., 2011). Others apply the diffusion of innovation theory (Rogers, 2003) to the field of standardization (Poba-Nzaou and Raymond, 2011), or a combination of diffusion of innovation and economic theories (West and Dedrick, 2006; Mendoza and Ravichandran, 2011). At the company level Wiegman (2019) investigated, among others, how firms managed standards for micro Combined Heat and Power (mCHP) technology while developing their mCHP products. Yet, the number of academic studies on standardization in companies remains limited and fragmented and this book forms an exception. The professional literature on IT standards seems to have adopted an almost exclusively technical point of view.

One of the classic problems facing standardization and standards usage in companies is demonstrating its contribution to the company's total success (Hesser and Inklaar, 1997). Typically, in standardization there are significant uncertainties about the factual costs and benefits and about adequate planning and control strategies (Weitzel, 2003). Kayworth and Sambamurthy (2000) show that the organizational context in which IT infrastructure standards are used is an important success factor with respect to the satisfaction of specific local needs and the degree to which the standards are integrated in the whole company. Swaminathan (2001) describes the issues that companies face when they consider mass customization to meet the needs of their businesses. He identifies four operational strategies for standardization employed by firms to minimize the increase of variability in the operating

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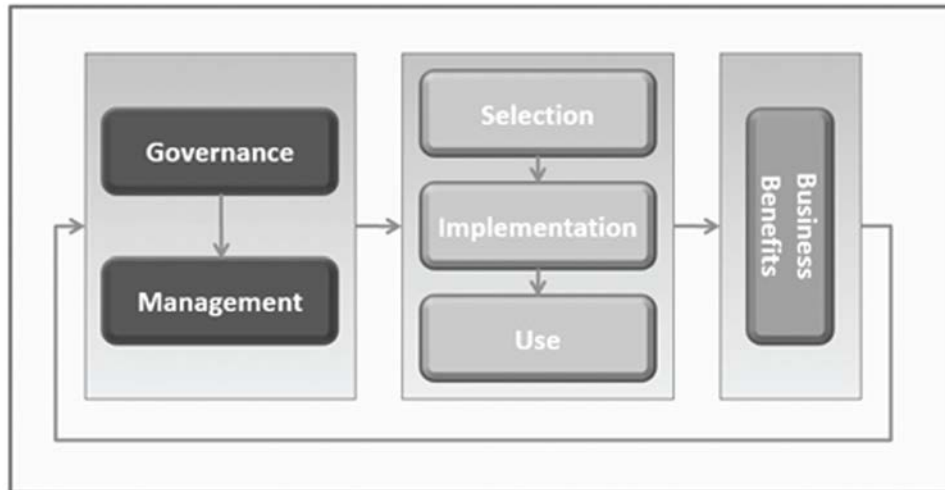
environment. These include part standardization, process standardization, product standardization, and procurement standardization.

De Vries and Slob (2006) investigate a ‘best practice’ for company standardization at six chemical and petrochemical industries in the Netherlands by comparing the standardization activities and, subsequently, by choosing the best way to execute them. They define success of the company standardization process as “a standard that is known to the users and that is used in practice” and identify factors that positively influence the use of such standards. Despite the difficulty of measuring the real usage of a standard, they identify a set of best practices for company standardization, grouped under the headings Standardization Policy (at strategic, tactical and operational level), Prioritization Process, Company Standard Development Process, Company Standard Introduction Process, Distribution Process, Facility Management, and Funding.

In a survey research on the use of such standards, Boh and Yellin (2007) investigate to what extent the use of IT infrastructure standards facilitates organizations to improve the sharing and integration of IT resources across the enterprise and how different mechanisms affect their usage. Their results show that the use of enterprise architecture standards is significant in helping organizations to effectively manage IT resources. Hesser (2010) presents the effects of company standardization on competitive and functional strategies in design and development, procurement, and production with direct relevance to industrial processes. Company standardization includes: numbering systems, size range systems, unit assembly systems, modularization, quality management systems, and environmental management. However, company standards are often only introduced after cost or complexity targets have been missed. He argues that company standardization must be part of corporate and competitive strategies. Li and Chen (2012) examine company standardization within corporations and its impact on sellers’ incentives to invest in IT compatibility. Their research suggests that exclusive purchase commitment by a company is dependent on the degree of horizontal differentiation among sellers, its product compatibility and the relative competitive advantages. Meuller et al. (2015) describe factors that influence the intention to accept and use company standards at an employee level, and Manders (2015) investigates the implementation and impact of ISO 9001 at the country, company, and employee level. Interestingly, despite the surge in agile practices (VersionOne, 2018), its application for company standardization remains fully unclear. To the best of our knowledge no attempts have been made so far to test agile approaches in company standardization initiatives.

Because the number of scholarly articles on company standardization is so limited, our paper investigates how organizations can achieve business benefits from company IT standardization. This research expands on this scarce theoretical base and uses insights from practice. For this purpose, case study research is an appropriate research method (Yin, 2009). We present a case study from a financial services company, ABN AMRO. Data were gathered from ABN AMRO’s headquarters, and included official company records such as project plans, project reports, presentations, policy documents, memoranda, and leaflets. We evaluated the financial, organizational, and technical objectives of the company and examined their effects on efficiency and effectiveness. We conducted semi-structured interviews, lasting an average of 90 minutes, aimed at discussing the selection, implementation, and usage of IT process and/or product standards. The interviewees ranged from senior executives to IT experts. Most interviews were taped and subsequently transcribed within 24 hours. Only a few interviewees did not give permission for the interview to be audio-taped. The interviews focused on how the bank could achieve the intended business performance from IT standardization, and in particular on the governance and management practices across the entire lifecycle of the company’s IT standards.

Figure 1. Company IT standardization management framework



The term *governance* (Weill and Ross, 2004) in relation to company IT standards refers to which decisions must be taken, who should take these decisions, and how they are taken and monitored to ensure the effective management of the standardized IT environment. *Management* (Boynton and Zmud, 1987) means actually taking decisions on planning, organizing, directing, and controlling the company IT standard. The results of the IT standardization project have led to significant financial benefits, but also better IT service delivery and support. For this study, we use a company IT standardization management framework, as depicted in Figure 1, which was successfully validated in a number of case studies (Van Wessel, 2010).

Governance and Management impact Selection, Implementation, and ultimately Use of company IT standards, which should result in Business Benefits. The arrow from Governance to Management indicates that adequate management presupposes effective governance. The feedback loop from Business Benefits to Governance and Management symbolizes the dynamic character of the framework. If Business Benefits are not achieved, changes to governance and/or management of company IT standards should be considered.

ESTABLISHING COMPANY IT STANDARDS AT ABN AMRO

Rationale for a New IT Architecture

Our case study was carried out at ABN AMRO, a Dutch financial service company with a presence in 21 countries worldwide. At one of ABN AMRO's business units, the IT environment consisted of a plethora of different hardware and software products. Managing this environment was difficult and resulted in high support costs and long resolution times. Upgrades were difficult to implement. A lack of standardization was a root cause of these problems. Therefore, a two-year IT standardization project affecting 10,000 users was carried out in this business unit. The business unit's management set project targets for cost savings and also set functional requirements, which made the project business-oriented rather than technology-focused. The scope of the project, which included the choice and implementation of hardware and software at both the front-end and the back-end of the business unit, ranged from desktop productivity tools to cost accounting applications.

The main objectives of the standardization project were to reduce the total cost of ownership or TCO² by 18% (calculated against industry benchmarks) and to increase flexibility by implementing a

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set of company standards. Cost reductions were particularly needed in the fields of procurement and support, and were expected to be achieved by reducing the complexity of the IT environment by limiting the variety at both the hardware and software levels. Greater flexibility was needed to allow for 'hot desking', and to roll out changes seamlessly. The project was completed successfully in time and with a marginal cost overrun.

The next sub-section provides a discussion of the successful accomplishment of this company IT standardization initiative.

SELECTING THE COMPANY IT STANDARDS

Governance

The business unit's senior management initiated the standardization project. It had two main reasons to do so: increasing flexibility and reducing costs. These two goals had to be reached by rationalizing the number of IT applications used by the business unit, and by simplifying their maintenance. These objectives, in turn, were to be achieved through standardizing the IT infrastructure. The business unit and its IT department worked in close cooperation to specify and select the IT products in the new set of company IT standards. However, this rationalization and standardization process was not easy. It required much effort, and it took time to convince all stakeholders of its added value. At the start of the initiative to standardize the IT environment, the IT department asked the business unit what kind of functionalities it required (not which applications it wanted). The answer was a 300-page document with requirements that would have cost a significant amount of money to implement. To deal with this issue, the business unit asked the IT department how the IT environment could be rationalized. The IT department suggested to script applications for browser-based access if technically possible and financially feasible, and to introduce terminal servers for applications that could not be ported.

Management

Management developed a three-tiered approach to devise the company's new IT standards: hardware standardization, system software standardization, and application software standardization. Alternatives were carefully considered for each IT product, and choices were based on a combination of functionality and costs. The selection process consisted of three steps: 1) request for proposal focusing on functional and non-functional requirements; 2) price negotiation by reversed auction; and 3) acceptance testing of two products, to determine the preferred one.

- **Hardware standardization:** To decrease complexity and allow flexible workplaces (with the aim of reducing the number of staff workplaces), an environment known as 'server-based computing' was chosen. It consisted of three main elements:
 - Thin clients (PCs with a minimum of local applications)
 - Web servers and terminal servers hosting applications
 - Back-end servers hosting all user data.

This set-up minimized dependencies among the system's hardware components. The new environment consisted of 10,000 thin client workstations, 1,000 laptops, 1,000 terminal servers, a dozen of web servers, and around 300 back-end servers. User and group data were stored on the terminal servers which were replicated daily to a central storage.

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- **System Software Standardization:** Managing the original desktop environment was difficult since it consisted of a large collection of locally installed applications on fat client desktops, and implementing changes could take as long as three to four months. Whenever technically possible, therefore, the new system software was not installed on desktops. Instead, users used browsers to access applications from their PCs. The browser-based applications ran on the web servers in a multi-application hosting environment on an AS/390 mainframe using products called Websphere, and Java Virtual Machine. Applications that were not browser-based were installed on terminal servers running on Wintel, also using Websphere. To minimize interdependencies between these logical nodes, no multi-application hosting was allowed on terminal servers.
- **Application Software Standardization:** The ‘server-based computing’ approach was stretched as far as technically possible, but some bandwidth issues were encountered, and it was decided to install a few applications on the workstations instead of on the servers to prevent network overload. Some of these applications were remaining legacy software, whereas some such as a word processor, spreadsheet, and presentation software and groupware were used daily by the majority of staff. After inventorying, the number of applications was reduced from more than 6,000 to 265 – more than twenty-two³ times less!

Interestingly, the biggest savings were achieved by a reduction of license fees. In the past, several hundreds of licenses had been purchased – some for very few users or even no users at all – simply because no-one could keep track of the installed software on thousands of locally run PCs. So the guiding principle in this standardization project phase was that only one type of software was allowed – preferably the latest version – unless it considerably degraded business functionality. In a tendering process, proposals were requested from several suppliers. The key criterion for selecting applications, and subsequently

Table 1. Set of standard IT products (from a user perspective)

IT products	Remarks
Desktops and Laptops	Multi-language MS Windows and Office; Web browser; PDF Reader; Winzip; Lotus Notes; Anti-Virus Software
Monitors	17" LCD
Printers	Network printers (no personal printers allowed)
Work-at-home facilities	Browser via Internet/SSL, replacing most company laptops
RSI prevention tools	Special computer mouses and software
Smartcard readers	Integrated with keyboard
Specials	On demand, like scanners, or Braille for the poorly sighted

listing that as preferred software, was the balance between functionality, support, and license costs. But other criteria, such as manufacturer or vendor strategy and track record, were also taken into account. The lists were drawn up per department, subject to approval of business management. The final set of specifications of IT products, the company IT standards, is listed in Table 1.

IMPLEMENTING THE COMPANY IT STANDARDS

Governance

A program organization carried out the implementation of the company standardization initiative (Figure 2). Project groups with a specific assignment reported to a program manager, who reported to a steering group that consisted of members from the business unit and the IT department. The steering group was accountable for managing project costs and progress, for approving project changes, monitoring the quality of the implementation through progress reports, deciding on organizational changes, and controlling the type and number of applications. The program manager was supported by a project office.

Management

To manage the complexity of the standardization initiative, the program involved many people, processes and technological changes, five separate projects were set up that each covered specific aspects of the program (Table 2). A total of 51 FTEs (Full Time Equivalent), including the program manager and the project office, were involved for 19 months.

Implementing the set of standards was vital to achieve the required flexibility of the new hardware and system software. Because of its modular structure, with only one hardware and software type allowed, the new IT environment had maximum flexibility at both client-end and server-end. Strict adherence to project management processes was another key element in the successful implementation. Moreover, the project was carried out as a joint effort by the business unit and its IT department, which increased the buy-in at both sides.

Figure 2. Program organization

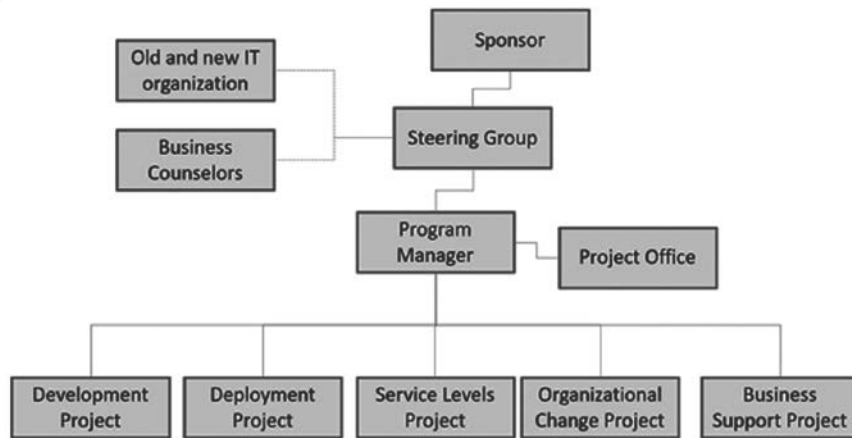


Table 2. Projects of the server-based computing program

Project	Objective	FTEs
Development	Preparing applications for terminal servers; scripting, conversion, testing	29
Deployment	Rolling out the new infrastructure in each department	8
Service Levels	Setting up service level agreements with the business unit	7
Organizational Change	Managing the IT department's organizational change caused by the project	3
Business Support	Counseling and liaising with the business departments	2

Table 3. Project risks, impact, and countermeasures

Risk	Possible impact	Countermeasure
Organizational change is carried out without any consideration to staff.	IT staff morale deteriorates, which is reflected in lower service quality.	Pay special attention to staff involvement and open and honest communication.
The business unit’s management shows no commitment to the project.	Business units do not commit to the new company IT standard. The costs reductions and flexibility required are not achieved.	Maintain close contact between the business unit’s managers and the company’s general management.
The reduction of the number of applications is not achieved.	Potential benefits of scale are not fully exploited. More licenses and terminal servers are needed. Support remains costly and complex.	Continuously monitor and enforce the maximum number of applications.

A number of potential risks were identified that could cause the project to fail in the implementation phase. These consisted of organizational and HR risks because the IT support organization had to be dismantled and its staff relocated in order to set up a new centralized IT support department. Also financial risks were taken because the estimates of operational revenues and expenditures were exactly that: estimates. The most important project risks are listed in Table 3, including the countermeasures taken to prevent these risks.

USE AND CHANGE OF THE COMPANY IT STANDARD

Governance

An IT review team, consisting of four IT staff with clear responsibilities in governing the use of the set of standards, was appointed (Table 4). The IT product coordinator was the primary point of contact for functional changes. Their core tasks were to assess requests for changes and deviations from the standards, and to make recommendations to an IT policy board.

This IT policy board approved changes and deviations to the set of IT standards. Approval was based on four policies:

1. The application level and the operating system level should be uncoupled to ensure minimum dependence between developments at these two levels.
2. Upgrades to the computing platform must be possible without large investments to update in-house developed applications.

Table 4. Staff responsible for managing the Company IT Standard

Function	Accountability
IT architect	Preserves IT infrastructure consistency and evaluates the overall impact of deviation requests.
IT product manager	Manages costs and charging the business departments, reduces expenses, and improves cost transparency. Calculates the financial impact of deviation requests. Accountable for all assets, budget-responsible for infrastructure depreciations, and owner of all support contracts.
IT product coordinator	Translates functional and technical requirements into specifications of IT products and assesses deviation requests from a technical point of view.
IT support coordinator	Plans and controls the IT operations and reviews change requests from an IT operations viewpoint.

3. Only COTS products (Commercial Of The Shelf) are allowed. This prevents legacy applications from remaining operational, which would cause security and stability problems, and high support and license costs.
4. No business-specific applications are allowed on workstations, and workstations must be completely de-personalized to ease maintenance and increase security.

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When a deviation request was granted, there were two options. The preferred one was to incorporate the specification of the requested product into the set of company IT standards. The alternative was to grant the deviation, but only on a temporary basis. After a year, the IT review team re-evaluated the deviation request.

Conformance testing of proposed IT products (e.g., by individual staff or by projects members) to the applicable IT standard by specific IT teams is a practice that was found in other companies as well (Rada and Craparo, 2000; Boh and Yellin, 2007). The review team also assessed any upgrades, replacements, or patching needed. A full review process was carried out every two years. This often resulted in a new product, the specification of which was then incorporated into the set of company standards, reflecting developments in technological and business environments.

Management

There are several ways in which company standards can be enforced once they are implemented (Cargill, 1989) and these can be classified into three categories: the regulatory style, the *laissez faire*, or a combination of these two. This business unit adopted the first style, which was expressed in their maxim 'each and every desktop must have the same configuration'. Consequently, the company IT standards were strictly applied. As discussed earlier, the business unit's objectives were to achieve cost reductions and increase flexibility. The business unit's IT department fully supported these goals but realized that the costs of IT delivery and support would sometimes not be a convincing argument for business staff. In some cases, business departments were willing to pay substantially more, rather than less, for products that did not conform to company IT standards. The deviation process, therefore, had to be very strict to ensure that only requests with a sound business rationale would be made. Any such requests were then assessed by the IT review team and approved by the IT policy board, taking both business and technological considerations into account. Very serious arguments were needed to convince this group to allow deviations, and these would then have to be reported to IT management on a monthly basis.

The choice was limited to the applications and hardware that were specified in the list of company IT standards. Changes to these standards were relatively easy to make because of the modular structure of the new IT environment. But anyone requesting modifications to functionality first had to try to realize those within the company's current standards. Failing that, the IT team would only make structural changes on the basis of a sound business rationale with indicators such as added value, the number of users affected, the possibility of charging someone for it, the vendor's track record, and the total costs involved. Planning and controlling the company IT standards was the task of staff as listed in Table 4. Strict adherence to "IT service management processes", such as those specified in ISO/IEC 20000, was another key element in using the company standard successfully.

BENEFITS ACHIEVED

The new standardized IT environment was assessed by analyzing the project's financial results and by evaluating operational aspects of IT service delivery and support obtained from the Finance unit.

Financial Results

With the introduction of the standardized IT environment, many costs were eliminated. The most important savings were achieved by reducing the number of licensed applications, by removing local installations resulting in an easier process of application support, and by eliminating hardware

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relocations (formerly approximately 25% of total desktop costs). As a result, the costs for IT support and development were considerably lower than before the standardization initiative. In addition, less specific staff expertise was needed, and re-use of IT processes and products was easier. The resulting economies of scale enabled the company to negotiate significant global purchase discounts from its suppliers. Staff used their web browsers to acquire any additional applications needed on their thin client. The extent to which they

Figure 3. Direct costs per desktop per year (before and after standardization)

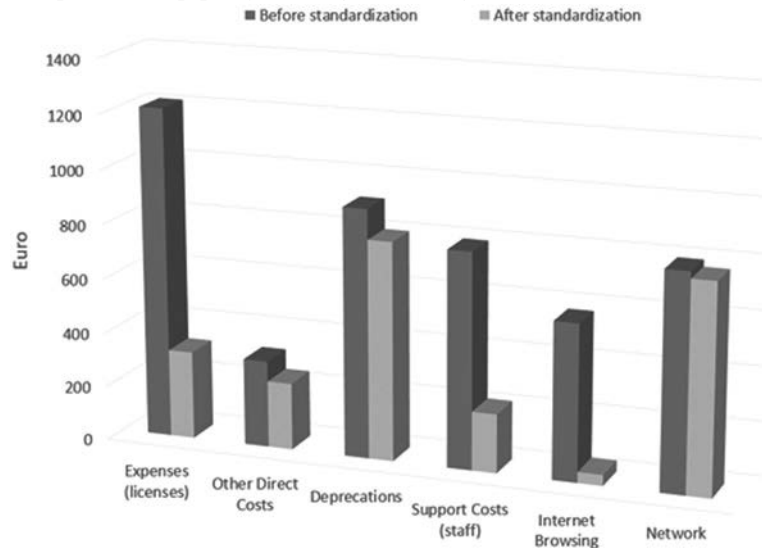
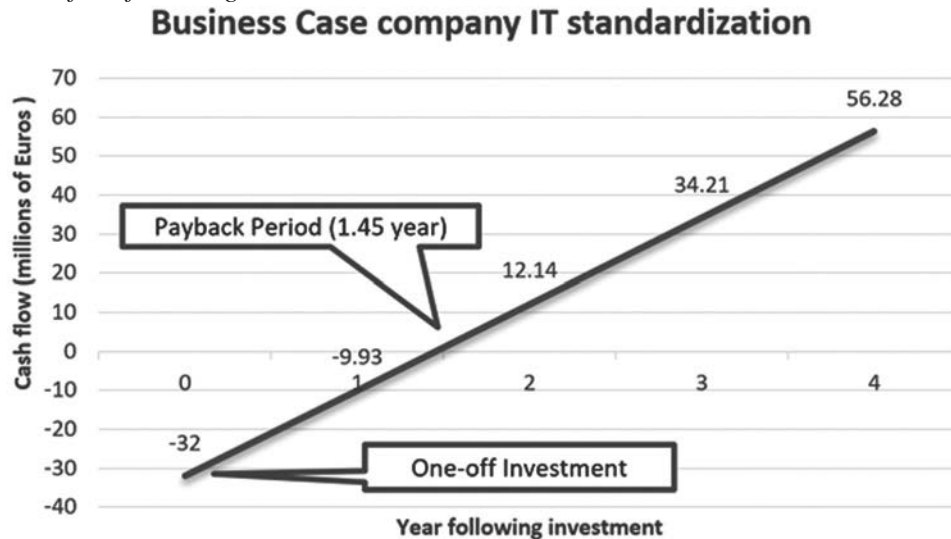


Figure 4. Cash flow following investment in the standardized IT environment



used them determined the variable costs of those workstations. Authorization was obtained through an application also used for license management, which gave the business unit maximum transparency and cost control.

The project's investments ran to a total of €32 million (€17M hardware and software transitions costs and €15M project staff outlays), which was 5% more than budgeted. The direct costs of the old and new IT environments, calculated as of January 1st of the year of the project and again exactly one year later, fell from €4,600 per desktop per year to €2,392 (Figure 3). Calculating on the basis of 10,000 desktops and a four-year life span, the payback period⁴ was 1.45 years. The return on investment

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rate⁵ was 176% and the internal rate of return⁶ 58%. Figure 4 shows the cash flow for four years. The initiative resulted in a positive cash flow of + €56M in the fourth year. The bottom line was that the new IT environment costs were reduced by about 50%.

IT Service and Support Benefits

Significant organizational improvements were achieved, from decreased time to process service requests to the implementation of the standardized IT environment for a whole department. New projects showed lead time decreases of up to 75%. New applications were made operational within a few weeks and deploying the standardized IT environment typically took no more than a month. So service performance increased from both the development and the support point of view. The area in which no significant improvements were achieved related to error and rework rates, as the former organization was already responsive in this respect.

In addition, the information security was improved through automated anti-virus updates and the uniform patching of the applications and operating system. Smartcards were used for application single sign-on. Desktop downtime became negligible since instability was predominantly application-related, not hardware-related. Moreover, the impact of IT failures dropped because of the modular setup of server-based computing with one application per terminal server. Altogether, the new IT environment proved to be very robust.

The standardized IT environment facilitated improved technical, organizational, and financial flexibility. Technical flexibility was achieved in terms of adaptability, scalability, and robustness. The ATMs used by customers of ABN AMRO, for example, were incorporated in this environment as essentially just another peripheral. Furthermore, the IT environment allowed several versions of an application such as Lotus Notes 6 and 8 to run simultaneously on a single desktop, because the software was installed on separate and independent terminal servers. Organizational flexibility was exemplified by a department using a dedicated Local Area Network. The new IT environment allowed the department's staff to work anywhere, irrespective of their physical location. This meant its business functionality could be spread over several locations. Financial flexibility was achieved because application and hardware usage were charged based on the actual number of subscriptions. Users were charged for access to the system's web and terminal servers, so when a department reduced or increased its staff, the IT costs changed automatically. Of course, this kind of flexibility caused some financial uncertainty for the IT organization, but flexibility was considered necessary to achieve a more effective environment for users.

How the Users Perceived the Changes

The business unit staff needed some time to become familiar with the new IT environment. Initially, there were some negative reactions such as 'We will lose all flexibility...' but this changed for the better and most of the staff perceived the new environment as quite acceptable. The interviewees reported that the majority of business unit staff considered the change an improvement, 30% were indifferent, and some 10% were less satisfied with IT delivery and support than before – and those, interestingly, were predominantly IT staff. Generally speaking, the users were satisfied. With just a few clicks they could select from more than 250 applications that were made available within quarter of an hour. Staff could use more applications more easily, and since almost all of the applications conformed to a standard look and feel, staff training costs were only marginal. Incidents and requests for new hardware and software were logged using a web-application. The hot desking concept allowed staff to use workstations with exactly the same features at other locations. The fact that all workstations were the same also made the business unit less dependent on delivery and support. For the business unit as a

whole, this meant decreased costs. For its staff, it meant less hassle and therefore an improved working environment.

Other Benefits

The organization learned that a strict way of dealing with deviations from IT standards proved to be worthwhile. First and foremost, it provided signs of changing business needs from users, and secondly, only genuine requests entered the process. In this case, the business unit chose *de facto* standard software products from Microsoft. It was aware of the danger of potential lock-in effects by being bound to a single supplier of hardware or software. But this presented no real problems, although adaptability and interoperability became more difficult when applications that deviated from Microsoft's products had to be integrated. However, these lock-in effects were considered far less important than the benefits. Hardware seemed to present almost no such risks at all. And it was considered even less important for system software, since the modular set-up of the environment allowed changing front-end or back-end software relatively easily.

LESSONS LEARNED

Governance and Management Arrangements

This case study showed us that the standardized IT environment resulted in several advantages:

- An up-to-date set of IT products, aligned with business requirements and technical developments
- Significant cost reductions and improved transparency and control
- Satisfied customers through improved service delivery and support
- Deliverables of projects in conformance to the set of IT standards
- A stable and fully modular IT environment with better reusability and change flexibility

The following governance and management mechanisms facilitated these changes.

Governance

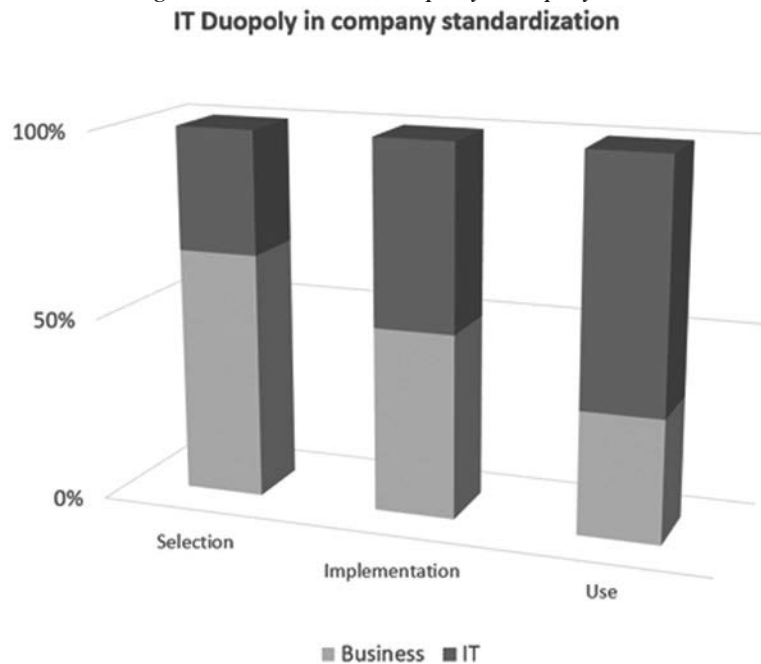
- **Selection:** The business decision to standardize the IT environment was taken in collaboration with IT, with business departments taking the lead. Key objectives were cost reductions and increased flexibility. This resulted in a formalized organizational setting: an IT policy board with senior representatives from the business unit and from IT.
- **Implementation:** A program management organization was established. Key players included a program manager and a steering group with members from both the business unit and the IT department.
- **Use:** In the operational phase, an IT review team carries out refinement and updates of the standard with input from business and IT. This team assesses specified IT products and processes for projects, and evaluates changes and deviation requests to the set of IT standards. Decisions concerning the standardized IT environment are taken on the basis of functionality, not on specific software packages. Four key players were appointed to ensure the effective management of the standardized IT environment: an IT architect, an IT product manager, an IT product coordinator, and an IT support coordinator. In addition, an IT policy board approves or rejects changes and deviations by taking business and technological considerations into account. Ratification is based

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on infrastructure consistency policies. Approved requests are expected to be incorporated in the standardized IT environment.

In terms of archetypal IT governance decision-making (Weill and Ross, 2004), the arrangement described above is an 'IT Duopoly': "two party decision-making involving IT executives and one group of business leaders". This governance mechanism is in contrast to an 'IT monarchy' in which an individual or a group of IT executives are the decision makers. Our case company uses a duopoly arrangement between business units (involved mostly in the selection and implementation phase) and the IT department (involved mostly in the implementation and use phase) as shown in Figure 5.

Figure 5. IT governance arrangement in the case company: duopoly



Management

- **Selection:** The primary selection criterion was based on finding a balance between functionality and support/license costs. The selection of products was simplified by subdividing the IT infrastructure into three architectural layers (hardware, system software, and application software).
- **Implementation:** Formalized project management was essential for the successful implementation of the standardized IT environment. This included managing progress and costs, approving project changes, and monitoring the quality of implementation. In addition, risk management was carried out, notably deciding on organizational changes, and controlling the number and type of applications.
- **Use:** Once implemented, the company's IT standards are updated according to requests for changes and deviations from the business department (e.g., from projects) and technical considerations from the IT department. There is strict control on usage and enforcement of the IT standards via the slogan 'comply or explain', and the process of making exceptions to policy and standards is restrictive. Formalized processes for IT service management are also essential for the success of the standardized IT environment. User impact and number of users involved, the

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possibility to charge costs, the contribution to a reduction of expenses, and the vendor's track record are the main considerations when allowing changes to company IT standards. Table 5 summarizes the governance and management of this set of company IT standards.

The concepts of governance and management have been successfully applied in this case study. These proved to be essential in realizing the anticipated Business Benefits from company IT standardization as suggested by Weill and Ross (2004) and later investigated in detail by Van Wessel (2010). The project resulted in a low-cost and fully standardized IT environment that was successfully selected, implemented, and used.

Table 5. Effective governance and management of company IT standards – key elements

Phase	Governance	Management
Selection	<ul style="list-style-type: none">• Business and IT (evolved into IT Policy Board)	<ul style="list-style-type: none">• Selection criteria• Consider three IT architectural layers (hardware, system, and application software)
Implementation	<ul style="list-style-type: none">• Steering group (evolved into IT Policy Board)• Program Manager	<ul style="list-style-type: none">• Project Management• Risk Management
Use (incl. changes)	<ul style="list-style-type: none">• IT Policy Board• IT Review Team	<ul style="list-style-type: none">• 'Comply or explain' slogan• Service management• Change criteria

CONCLUSION AND DISCUSSION

This study adds empirical evidence to the scarce academic literature on the effects of company IT standards on organizational performance and the influence of its governance and management arrangements. Furthermore, it provides practical insights for companies how to effectively set up governance and management in company standardization initiatives.

Contribution to Theory

The number of studies related to company standardization and standards is still very limited. Some key success factors such as standard enforcement, institutionalized mechanisms to involve key stakeholders, commitment from top management and ensuring that company standardization is part of corporate strategy (Kayworth and Sambamurthy, 2000; De Vries and Slob, 2006; Boh and Yellin, 2007, Dey et al., 2009; Hesser, 2010) have been acknowledged in this study on product standardization. However, we have added some specific aspects to the body of knowledge which relate to the way the benefits have been assessed, and the involvement of stakeholders during the lifecycle of the company standards. Due to the explicit distinction between governance and management, as part of the company IT standardization Management Framework (Figure 1), we were able to elaborate on specific governance arrangements between Business and IT stakeholders. In addition, we have described financial, service-and-support, and user-related benefits, whereas others (such as Boh and Yellin, 2007) have not addressed these benefits from a business point of view, or have related the success of company standards only to the actual "use of the standards" (De Vries and Slob, 2006). Because of our explicit distinction between governance and management, we were able to describe an efficient and effective company standardization initiative. Although this study deals with a single case, this chapter can be used as a basis of further academic studies.

Company IT Standardization Contribution to Practice

Companies carry out numerous standardization initiatives aimed at creating value by converging on particular software, hardware, or processes, but often with mixed success. The company studied here has shown that two practices in particular have contributed to the achievement of the intended benefits of the IT product standardization project. *First*, it is important to recognize the life cycle of a company standard and its phases of selection, implementation, and use. *Second*, it is essential to set up good governance and management mechanisms throughout each of these distinct phases.

Key to the success of company standardization, as far as governance is concerned, is the manner in which both business and IT stakeholders are involved in the selection, implementation, and use phases. These business stakeholders are the internal end-users of the standards, and ultimately well-functioning company processes are beneficial for the company's customers. During the lifecycle of a company standard, involvement of stakeholders may vary depending on the type. In our case, business stakeholders took the lead. Typically, representatives from (Business and IT) management, subject matter experts and the end-user community should be involved. Furthermore, decisions regarding deviations, changes, withdrawals, and renewals of company IT standards must be dealt with seriously to ensure standards reflect up-to-date requirements, and to prevent users from bypassing these standards. Senior business and IT representatives make and monitor such decisions through program management during the implementation phase, and policy boards are involved in the use phase.

In the selection phase, each decision should be based on preserving a balance between functionality, user impact, and the costs of implementation and maintenance. To minimize costs, the chosen IT standards have to be aligned with the IT architecture of the company. During the implementation phase, adequate project management must be in place to mitigate risk, and to track that the selected company standard is implemented as intended. In the use phase, proper IT service management processes and change management procedures must be in place. This includes enforcing the use of company standards and effectively managing changes in case of changed business requirements. It is more important for an organization to repeatedly and consistently use a company standard, than to aim for the "perfect" one, but not use it consequently. The described governance and management arrangements of company IT standardization may inspire IT executives and others to successfully adopt company standards in their enterprise.

An Agile Company Standardization Approach?

With the maturing of agile methodologies, based on the "*The Manifesto for Agile Software Development*" (Beck et al., 2001), working agile has gained much traction in many organizations around the globe. The Agile Manifesto was originally intended to reinvent traditional, waterfall-oriented software development methods. Agile is an umbrella term that covers frameworks adhering to the Agile manifesto. Meanwhile, the concept of working agile has been adopted in more and more settings. Therefore, the question arises what would be the impact if one applies an agile approach to a company standardization process? Are all process steps described in this chapter consisting of 'selection', 'implementation', and 'use' equally suited? Or is this an old-fashioned waterfall approach? Will the efficiency and effectiveness of the process be significantly impacted by an agile approach? And will governance and management mechanisms for successful company standardization initiatives, such as which stakeholders should be involved, be different when using an agile approach?

Agile Manifesto

To seek answers to these questions, we will first look into the Agile Manifesto's four Values and twelve Principles. The Agile Manifesto was triggered as part of iterative software development, to provide an alternative for the documentation driven, heavy-weight and waterfall-based software development processes (Beck et al., 2001). To investigate the potential applicability of this approach to a company standardization process, the wording of the Agile Manifesto's four values and twelve principles has not been changed, *except for the replacement of "software" in "company standards"*.

The Agile Manifesto's Four Values

1. Individuals and interactions over processes and tools.
2. Working *company standards* over comprehensive documentation.
3. Customer collaboration over contract negotiation.
4. Responding to change over following a plan.

De Vries (1999, p. 156) argues developing a standard and creating standard software resemble each other to a large extent: 'The manufacturer of the standard software may have the intention and expectation that its software will be "the standard" in the market. It depends on the market situation whether or not this expectation is realistic and the software becomes "the standard". But then, what is the standard? In fact the product is not the standard, but its specifications are the standard. They are the "solutions for general use" from the definition. (...) Standardization is not the professional process of creating software, but it is the determination and recording of the software specifications.'

What would these four values mean for a potential agile company standardization approach? Of the Agile Manifesto's four values, one can argue whether value 2 holds true for company standards as standards are typically "documented" specifications (ISO/IEC (2004)). It feels out of touch given this context as company standards are "*specifications*" pur sang. The other three values seem to be fitting as these relate to interactive and responsive collaborations with stakeholders of company standards.

The Agile Manifesto's 12 Principles

1. Our highest priority is to satisfy the customer through early and continuous delivery of valuable *company standards*.
2. Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.
3. Deliver working *company standards* frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.
4. Business people and developers work together daily throughout the project.
5. Build projects around motivated individuals. Give them the environment and support they need and trust them to get the job done.
6. The most efficient and effective method of conveying information to and within a development team is face-to-face conversation
7. Working *company standards* is the primary measure of progress
8. Agile processes promote sustainable development. The sponsors, developers and users should be able to maintain a constant pace indefinitely.
9. Continuous attention to technical excellence and good design enhances agility.
10. Simplicity--the art of maximizing the amount of work not done--is essential
11. The best architectures, requirements and designs emerge from self-organizing teams.

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12. At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly.

Regarding these twelve Agile Manifesto's principles numbers 1, 3 and 7 now directly reference company standards. Whereas no. s 1 and 7 seem quite appropriate given the context of company standards as it refers to customer satisfaction, no. 3 is not applicable as company standards are "*to be repeatedly and consistently used*". Other agile principles also hold in the company standardization context, since they include a focus on change even late in development (no. 2), involving a broad range of motivated stakeholders in face-to-face sessions (nos. 4, 5, 6), considerations regarding simplicity, technical excellence and architectures and self-organizing teams that regularly reflect on its performance (nos. 11 and 12).

Based on the Agile Manifesto, various agile methods and practises have been developed. By far the most commonly adopted method is SCRUM, developed by Schwaber and Sutherland⁷. SCRUM is an agile framework for developing, delivering, and sustaining complex products. It was originally designed for small software development teams (Schwaber, 1996; Schwaber and Beedle, 2002), who break-up their work into actions that can be completed within timeboxed iterations (so called sprints). SCRUM has been adapted for multiple SCRUM teams in larger organizations in and in various contexts. To date, 56% of organisations worldwide that have adopted agile practices are using SCRUM-like methods with the Scaled Agile Framework (*SAFe*⁸) the most popular scaling method (VersionOne, 2018).

Anticipated Application of Agile Principles

The remainder of this sections reflects on the ABN AMRO case study with regard to possible application of these agile principles. For the three process steps, the observed governance and management arrangements and its potential adjustments will be considered.

Selection Phase

Governance (This Case Study)

In the selection phase, senior management initiated the standardization project in close collaboration with the IT department. However, it took time to convince all business stakeholders of its added value.

Governance (Agile Approach)

With an agile approach, business stakeholders could be convinced earlier of the added value of valuable company standards as they are typically more motivated (no. 5) and have face-to-face discussions (no.6).

Management (This Case Study)

Each decision should be based on preserving a balance between functionality, user impact, and the costs of implementation and maintenance (support/license costs). *Management (agile approach)*

Decision making in the selection phase could be made more efficient as the stakeholders work closely together (no. 4) and focus on simplicity, good design and technical excellence (no. 10, 9).

Implementation Phase

Governance (This Case Study)

Key stakeholders during the implementation of the company standard included a program manager and a steering group with members from both the business unit and the IT department. Project groups reported to a program manager as part of this hierarchical program structure.

Governance (Agile Approach)

In an agile context, SCRUM-like methods have been developed to coordinate the work of multiple scrum teams in larger organizations with the Scaled Agile Framework (*SAFe*) as the most popular scaling method using. In such settings project members work in self-organizing teams (no. 11) allowing fast, decentralized decision-making in the implementation phase.

Management (This Case Study)

Strict adherence to project management processes was instrumental to manage progress and costs, approving project changes, mitigate risks (e.g. controlling the number and type of applications) and to track that the selected company standard was implemented as intended.

Management (Agile Approach)

Alternatively, agile project management methods can be applied with allow changing requirements late in development (no. 2) and let project members reflect on performance and risks and act accordingly (no. 12).

Examples of such agile project delivery frameworks include the DSDM Agile Project Framework⁹ and PRINCE2® Agile¹⁰.

Use Phase

Governance (This Case Study)

Requests regarding deviations, changes, withdrawals, and renewals of company IT standards were assessed by the IT review team and approved by the IT policy board, taking both business and technological considerations into account.

Governance (Agile Approach)

In an agile context sustainable development is promoted (no. 8). Requests regarding deviations, changes, withdrawals, and renewals of company standards will be jointly processed by IT and Business representatives (no. 4) instead of IT staff only. This should result in better functional suitability and technical feasibility.

Management (This Case Study)

A full review process was carried out every two years and is based on provided functionality of the set of company standards.

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Formalized processes for IT service management are also essential for the success of the standardized IT environment. This includes enforcing the use of company standards and effectively managing changes in case of changed business requirements.

Management (Agile Approach)

Reviews will occur more frequently to tune and adjust the set of company standards (no. 12) since working company standards are the primary measure of progress (no. 7).

Enforcing the use of company standards and effectively managing changed business requirements by means of IT service management processes, are dealt with on the premise of customer satisfaction through early and continuous delivery of valuable company standards (no.1).

Based on this anticipated application of agile principles the following picture emerges. In all phases of the IT company standardization process the added value of an agile approach is projected. This is true for the section phase as close collaboration of Business and IT departments, which is key to the success of company standardization, is an integral aspect of working agile. Therefore, an agile approach provides added value in the development/selection of the standard as well the decisions making about it. Also, in the implementation and use phase the agile approach could add value, such as short reporting lines, effective decision making and prompt follow-up on proposed changes to the company standards. However, replacing a company standard too quickly with a new version or even something completely different could lead to problems. At least backwards compatibility and good version management is required. This is not different from the traditional approach as described in this case study.

As a rule, one could argue that the more business involvement is required in a company standardization process, the more agile practices seem to make sense. However, no predictions can be made, nor can one say something on the results from such an agile approach compared to the result in this case study. Therefore, we intend to carry out action research to learn how an agile way of working impacts company standardization in practice. This should add to the current literature on 'standard dynamics'

(Egyedi & Blind, 2008)

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KEY TERMS AND DEFINITIONS

Agility: Ability to act quickly and easily on changing circumstances.

Business Benefits: An outcome of an action or decision that contributes towards meeting one or more business objectives.

Business IT Alignment: The continuous, mutual coordination of business departments and the IT department to optimize the value that information technology contributes to an enterprise.

Business Performance: The efficiency and effectiveness of an organization reflected in the business objectives set by management.

Company Standard: A specification of a product or process to be repeatedly and consistently used in the company.

Company Standardization: The activity of establishing and recording a limited set of solutions to actual or potential matching problems, directed at benefits for the party or parties involved, balancing their needs, and intending and expecting that these solutions will be repeatedly or continuously used, during a certain period, by a substantial number of the parties for whom they are meant.

Company Standardization Process: A set of sequential process steps, a) selection, b) implementation, c) use (including changes and withdrawals) that comprise the lifecycle of a company standard.

Governance of Company Standards: Specifying the decision rights and accountability framework to encourage desirable behavior in the selection, implementation and use of standards within an organization.

Management of Company Standards: The decision-making efforts associated with planning, organizing, controlling, and directing the selection, implementation and use of standards within an organization.

ENDNOTES

¹ An earlier version of this book chapter appeared in Van Wessel et al. (2016). The main difference is in the addition of a discussion on agility.

² Total cost of ownership is an indicator of IT efficiency, introduced by Gartner in 1987

³ Calculated on the basis of functional equivalents

⁴ Payback period = 32,000,000 / {(4,600-2,392) x 10,000} = 1.45 year

⁵ ROI = {(4,600-2,392) x 10,000 – 32,000,000} / 32,000,000 = 176%

⁶ $32,000,000 = \sum_{i=1}^4 (4,600 - (12 + 392i)) \times 10,000 \Rightarrow \neq 0.5759$

⁷ <https://www.scrum.org/resources/scrum-guide>

⁸ <https://www.scaledagileframework.com/>

⁹ https://www.dsdm.org/sites/default/files/essentializing_the_dsdm_agile_project_framework.pdf

¹ <https://www.axelos.com/best-practice-solutions/prince2-agile>