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| IU |
| IT Strategy |
| DLMITITS01 |

# Learning Objectives

An **IT strategy** is a plan of how to reach defined business and IT goals. It is closely connected to topics such as governance, strategy, and management in both business and IT terms. An IT strategy must be developed in accordance with external factors, it must be put into action, results must be measured, and the strategy must continuously be adapted to a changing environment and the experiences made. The IT strategy is an important tool in aligning corporate IT to business requirements. Important elements of an IT strategy include the contribution of IT to business value generation, applications, IT infrastructure, portfolio management and sourcing.

In this course you will gain an understanding of the role of the IT strategy for a company, diving into its elements, i.e., demands the IT must meet, its organization, related processes and underlying technologies. Specifically, you will learn how an IT strategy is developed and will experience how the strategy lifecycle is built.

Starting off, the IT strategy needs to be developed. Based on business goals and external factors, the IT goals need to be derived. Subsequently, dedicated methods can be applied to support the strategy development. Once the strategy concept is finalized, it needs to be implemented. As every strategy is just as good as its implementation, aspects such as communication and change management appear to be of crucial importance here. After being put into action, the IT strategy must be measured. Here, the current IT performance is mapped against original goals and key metrics. Depending on the results, smaller or bigger adaptations may be necessary, which may lead to a new goal setting. At this point, the IT strategy lifecycle starts off again. Besides this dynamic perspective, this course includes specific aspects of an IT strategy, for example, typical business demands and important building blocks such as governance, risk management, enterprise architecture management, and sourcing.

# Unit 1 – The Role of the IT Strategy for a Company

**Study Goals**

On completion of this unit, you will be able to …

… classify the key elements of IT.

…discuss the role of IT strategy within an organization.

…discuss the interrelation of IT with governance and management.

…apply the idea of the strategy lifecycle to corporate IT.

# 1. The Role of the IT Strategy for a Company

## Introduction

Internet of Things, cloud computing, big data—these phrases are on everyone’s lips in today’s era of digital transformation. The consequences and changes of these trends are often disruptive, presenting new challenges for organizations. In order to not get lost in the shuffle of these challenges, trends and changes must be anticipated and leveraged, which requires a mindset of courage, creativity and innovation. This specifically holds true for IT management, as IT may deliver a significant contribution to master the upcoming challenges.

In this situation, executives and other employees who oversee organizational IT aspects are increasingly riddled with ambiguity, being caught between two agonizing poles: stability and agility. On the one hand, existing IT systems that are necessary for smooth business operations must kept running, emphasizing safety and accuracy. On the other hand, IT must support the above-mentioned trends, emphasizing speed and agility. In this vein, the IT organization is changing from a department that is spurned as “costs which would be incurred anyway” towards one recognized as absolutely necessary in this rapidly changing business world.

In order to have clear decision bases for IT investments and transparency about use of resources and to secure IT performance, an IT strategy is required. It formalizes the objectives and priorities of the IT and secures a proper alignment with the business strategy.

## Elements of IT in a Company: Demands, Organization, Processes, Technology

In today’s era of **digital transformation,** information technology (IT) as business function is more important than ever, playing a key role in driving innovation (Gerster, 2017). In 2018, organizations invested more than $3.65 trillion dollars on IT, because they anticipate these investments will increase business value (Carter et al., 2020). Generally speaking, IT includes all technical resources that are used to generate, store, archive and use digital information. In order to better understand IT and its role for and within a company, it is useful to dissect its elements. Therefore, we differentiate the demands IT must meet, its organization, related processes and underlying technologies.

**Digital transformation** The term describes an ongoing process of change based on digital technologies.

Key Elements of the IT in an Organization



### Demands

In a company, the IT is not an end in itself, but has to majorly support business objectives and meet related requirements. Thus, business demands, and their management is the first important element of IT. Basically, a demand is a desire to purchase goods and services at given prices. In the context of IT, a demand is a desire of business employees to get IT support for their business. IT demands can be examined from two perspectives, namely the operational, and the development perspective (McKeen & Smith, 2015). Coming from the operational viewpoint, organizations must keep their operations and business running, which yields baseline demands for IT, focusing on the maintenance of IT assets. From the development viewpoint, IT is demanded to deliver and support new capabilities, which enable the organization to maintain and extend its competitive position within the market, making IT a more strategic asset.

More precisely, one can differentiate three basic categories of business demands.

First, IT can be requested to provide innovative solutions for value-generating processes across the various business units, making IT a competition-relevant factor. As an example for an IT-enabled innovation, IT may introduce a data lake to the organization in order to enable big data analytics operations, which in turn supports business in process improvement, or product and service enhancement.

Second, IT can be requested to automate standardized processes in order to decrease costs, which probably can be seen as the most important area of IT application. There are plenty of application areas for simple process automations, for example, repetitive activities such as updating master data, maintaining customer data, dunning procedures, bookings, filing documents, checking procedures, processing e-mails or transferring data.

**Commodities**

The term refers to interchangeable standard products. In the IT context, examples are hardware or help desk services.

Third, IT can be requested to ease and standardize technological **commodities** and to streamline internal IT processes and governance structures. Here, the major goal is to decrease costs. As an example, IT can be requested to decrease costs for data storage, i.e., by switching from on premise storage to cloud solutions.

One can image that business has many demands IT must meet, as some activities or processes are either impossible, or at least “painful” to execute without IT support. Taking marketing operations as an example, the benefit of IT to support standard processes becomes obvious. Whereas the management of customer relations, that is for example, to send a welcome E-Mail after the first purchase, to send a birthday voucher, and to provide tailored offerings based on prior purchases, can become quite time-consuming when done manually, a software can automate all this.

In this context, a demand or requirement management is needed to collect, understand, and prioritize the incoming demands form the various business units. This way, business requirements can be processed in quality, time, and budget, and with the given IT resources. The proactive management of IT demands is of major importance in order to keep business requests within the frame. Otherwise, organizations are confronted with a dilemma. That is, the need for process automation and improvement from a technical perspective is remorseless and requires ongoing support of newly automated processes. Having this increasing IT demand on the hand, IT resources within an organization are comparably fixed. Consequently, IT operations are often outsourced to third-party providers. To put an end to this spiral, organizations must proactively manage demands and make use of demand management tools, for example, by offering a service catalogue which entails prices for IT services, allowing business managers to make informed demands.

### Organization

The organization of the IT is another important element of IT and refers to mid to long-term, stable structuring of the IT , considering the IT employees and their competencies. There is no first-best-organization of the IT, but it requires a targeted set up that best meets individual organizational demands. There are different ways to organize the IT within a company. The scope for action ranges from an almost completely outsourced IT to an external provider, via the model of a subsidiary, to an internal IT department that performs all its tasks itself. The decision for a specific organizational model depends on the characteristics of the individual organization. However, every model has its advantages and disadvantages. In the following, the most important ways to organize the IT shall be outlined and briefly evaluated (Johanning, 2019)

* The IT as part of a business unit: The IT is assigned to a specific business unit, for example, finance. It is not steered by the management, but by the area manager of the business unit.
* The IT as own unit: The IT is anchored on the same level as other business units and reports directly to the management.
* The IT as staff position: As staff position, the IT is directly connected to the management. In this role, they only provide services and consulting, and do not have any authority.
* The IT as matrix organization: This organizational model combines a central and decentral approach. One part of the IT is directly subordinated to the management, being responsible for general IT guidelines. The other part of the IT is attached to the business units, being responsible for the execution of the general guidelines according to the respective business needs.

It is not seldom that the organizational model of the IT has grown historically, requiring a re-organization when external or internal factors change. As there is no first-best-solution for every company, executives can use the following evaluation as orientation guide (Johanning, 2019):

|  |  |  |
| --- | --- | --- |
| Evaluation of different forms of IT organizations | | |
|  | **Strengths** | **Weaknesses** |
| **IT as part of a business unit** | * IT can support the respective business unitswhich is of strategic priority or needs most support | * Neglect of other business units * IT is coordinated according to unit objectives, not overall company objectives |
| **IT as own unit** | * Business and customer orientation * Flexibility and speed * Autonomy and independency | * Several interfaces to diverse business units increase complexity * Threat of unit egoism |
| **IT as staff position** | * Clear focus of expert position * Limited conflicts with business units | * Limited acceptance, as due to management proximity decisions might be done by IT which should have been done by business |
| **IT as matrix organization** | * High acceptance, as business needs can be addressed properly * Collaboration with business units is nurtured | * High complexity and high coordination effort * Complicated decision-making * Costly, if no central standards are in place |

The question of how to organize the IT must been seen also in the light of current trends. In today’s era of digital transformation, the IT is increasingly demanded to support agility, innovation, and exploration. Thus, organizations make increasingly use of the so-called bimodal IT concept (Haffke et al., 2017), which decomposes the IT into two coherent modes. The first mode, which may stand for the “older” understanding of IT, focusses on exploitation and stability (“keeping the lights on”). The other mode, which may be seen as newer understanding of IT, focusses on exploration, innovation, agility, and speed. These “two ITs in one” pose specific challenges to the IT organization and may require a structural separation between the traditional and agile mode. In their research, Haffke et al. (2017) examined 19 organizations and how they organize for their bimodal IT. They identified four archetypes. For example, they found that organizations establish an agile mode division completely outside the traditional IT , often labelled as “digital” division, led by the chief digital officer. This organization of IT imposes a high level of disruption and may reduce the (strategic) power of the CIO and the traditional IT , as major digital ambitions are allocated to the new division (Haffke et al., 2017)Against this background, it becomes obvious that organizing for IT is a continues process that is connected to the overall transformation journey of the organization.

### Processes

Generally, a process is a sequence of activities to complete certain tasks. There is a multitude of processes within an organization, presenting themselves as either cross-functional processes (e.g., recruitment processes), or processes that are unique to specific business units (e.g., after-sales processes). As the IT is closely connected to the business, it is involved in many of these functional processes. Beyond that, the IT itself has several central processes that need to be managed. The most important ones are:

* Project management: These processes relate to the execution of IT projects which are unique endeavors, and which can be differentiated from the daily operating business. They range from small projects to complex programs, such as SAP introduction.
* Demand management: These processes address the aspects of a smooth collaboration between the IT and the business departments, and how this is organizationally underpinned and lived (for example, the prioritization of incoming business requests).

**ITIL**

The acronym stands for Information Technology Infrastructure Library and is the best-practice guide and de-facto standard for IT service management

* Supply management: These processes are related to the technical core of the IT and refer to how the IT organization is built, how the interfaces between supply and demand are designed, and how the business units are served (for example, the process of IT resource provision).
* Service management: These processes relate to the most important **ITIL**-processes (for example, the ticket handling at the service desk).
* Quality management: These processes relate to the quality assurance of the IT. They include, for example, the reporting and monitoring of IT processes, methodological frameworks for process improvement, and quality standards in general.

Like every other organizational process, these IT processes require a solid process management which deals with the identification, design, documentation, implementation, and optimization of the IT processes.

### Technology

When talking about IT, one might think of technological aspects at first place, as they are already embedded in the abbreviation “IT” = information technology. Generally, a technology is the application of scientific knowledge for practical purposes. Specifically, information technologies cover electronic data processing and the hardware and software infrastructure used for this. There are several approaches how to cluster technologies that are at the core of IT management. Johanning (2019) suggest to differentiatethe following areas:

Areas of Information Technology (IT)



#### Architecture

The IT architecture describes the technical components of the IT, i.e., IT systems, hardware, software applications, integration interfaces, data structures and infrastructure components, and their interaction with one another. A common analogy to understand the meaning of the IT architecture is the comparison with a land-use plan in the context of urban development. This plan ensures that the development of a city takes place in an orderly manner, and that the available resources are considered. Analogous to the land-use plan, the IT architecture provides a guideline for everyone involved in the planning and operation of IT systems and IT infrastructures. It is typically visualized by means of a diagram that depicts the individual components of the IT architecture. This is often a two-dimensional visualization of an application landscape (see Hagel & Brown (2001) for an example of a web services architecture). A typical architecture diagram can, for example, be based on business processes and organizational units, and illustrates which applications support which process and units. Frequently, the IT architecture reflects complex historically grown systems and interfaces of the organization. Frequently, the landscape entails several hundred more or less matching applications. Aligning these landscapes with current business requirements poses massive strategic challenges.

#### IT security

IT security refers to the protection of IT systems against damages and threats. Securing corporate IT processes has become a major concern today, as the IT is increasingly hosted on demand within the cloud, instead of on premise within the safe corporate boundaries. Thus, data is always and everywhere accessible which poses additional risks for IT security. In this context, disaster recovery management plays a key role, ensuring that data is always available, even in emergency cases (e.g., during hacker attacks). A proper IT security management requires the solid target definition of IT security on executive level, as well as designated processes and responsibilities.

#### Master data management

Master data management (MDM) is a comprehensive method that enables an organization to link all business-critical data with a common reference point. Master data are status-oriented data points that describe the core entities of a company, for example, customers, suppliers, products, assets, and employees. In contrast to transaction data (e.g., sales data), master data remains relatively constant in volume over time and has a low frequency of change. If master data management is done correctly, it improves data quality, reduces costs and time effort, and optimizes the exchange of data between employees and departments.

#### Software development and customizing

The IT within an organization may be also assigned to develop software that is specifically targeted to serve the organizational needs. However, depending on the business purpose, not every organization develops software on its own. However, the IT organization needs to be capable to execute customizing activities of software in use. It needs to be able to deal with source-codes of core applications and provide documentations.

#### IT infrastructure and IT operations

The management of the IT infrastructure belongs to the “bread-and butter” business of every IT organization. The IT infrastructure includes, for example, the provision and operation of hardware, such as notebooks, telephones etc. Being a commodity service, this part of the IT is often outsourced to specialized providers.

### Self-Check Questions

1. Please complete the following sentence: If the IT is organized as own unit, it is anchored on the *same* level as other business units and reports directly to the management.
2. Please list three technology areas that are at the core of IT management.

*Architecture*

*IT security*

*Master data management*

#### *Software development and customizing*

#### *IT infrastructure and IT operations*

## What is an IT Strategy?

Before diving into the details of strategic IT aspects, a proper definition of the term IT strategy and its characteristics is necessary. The academic literature provides various conceptual perspectives on the IT strategy, i.e., referring to its function to deliver business value, IT strategy as the use of IT “to support the business strategy on the IT strategy, referring to its planning function of the IT organization,, and referring to how the IT is perceived within the organization (Chen et al., 2010, p. 238). Following the global leading IT analyst and research firm Gartner, we understand IT strategy is “the discipline that defines how IT will be used to help businesses win in their chosen business context” (Gartner 2021, n.p.).

This definition indicates two things:

First, there is a close connection of IT and business, with the IT strategy being one part of the business strategy. However, only with clear specifications from the business, a stable and tailor-made IT system landscape can be built and operated. For example, the introduction of an **ERP** system may take at least two years. In order to amortize costs, the system must run stably for five years without major changes. However, if the business strategy is changed within this time frame and different business model comes into play, the IT strategy can still be so promising, it will not pay off and instead lead to frustration in management and throughout the whole organization. Connecting business and IT is also known as business IT alignment, keeping practitioners and scholars in suspense since decades.

**ERP**

The acronym stands for enterprise- resource-planning which supports all business processes running in a company, e.g. procurement, production, and human resources.

Second, the definition of IT strategy indicates that IT is supposed to deliver value to the business. While organizations often define value broadly, it is originally understood as the worth that individuals attribute to an object (Cronk & Fitzgerald, 1999). Although value may suggest being of quantifiable nature, it is a rather subjective assessment. Thus, business managers may see value in the IT in terms of strategic positioning, increased productivity, or improved products and service, among others. This fuzziness requires that everybody involved in IT strategizing has the same understanding of the term IT value and how this is supposed to be achieved. In order to approach a common understanding, organizations may answer the following questions (McKeen & Smith, 2015, p. 26):

* What value will be delivered by the IT – for example, “strategic positioning, increased productivity, improved decision making, cost savings, or improved service” (McKeen & Smith, 2015, p. 25)
* Where will the IT value be delivered – for example, at the individual level, group level, or organizational level
* Who will deliver the IT value – generally, IT value can be seen as the interaction between technology and people
* When will the IT value be delivered – for example, the full payback of an IT investment can take between three to five years
* How will the IT value be delivered – precisely, realizing IT value requires a solid IT strategy with distinct measures

### Application areas, target groups and benefits of an IT strategy

The need to develop or to adopt the IT strategy may arise in the following situations (Johanning, 2019):

* Before or after mergers and acquisitions (M&A) activities
* When the company and the IT organization are growing very fast
* After a reorganization or restructuring
* When the complexity of the processes and technology is too great
* When the IT landscape is out of date and no longer meets today's requirements
* When a new company is built

During the IT strategy work, it is important to bear the recipients of the IT strategy in mind. Presentation and communication of the IT strategy may differ in terms of depth and focus depending on the respective target group. Common target groups of IT strategies and their stakes in IT strategy development are (Johanning, 2019):

* The board of directors, in order to enable them to optimally link the IT goals with corporate goals

**CIO**

The acronym stands for chief information officer. This executive role is responsible for IT strategy and operations within an organization.

* The supervisory board, in order to have full transparency
* **CIO**s and IT managers in order to control the goals derived from the IT strategy for the IT organization
* Interested employees in order to understand how their functional priorities are derived
* External consultants, for example, in case they have a mandate to review and improve the strategy with their external expertise

Once an IT strategy is in place and properly executed, several benefits arise. Among the most important benefits are (Johanning, 2019):

* Targeted roadmap and implementation planning
* Clear decision bases for IT investments and transparency about use of resources
* Improvement of IT performance due to improved effectiveness and efficiency
* Improved business IT alignment due to joint communication base

### Why do IT strategies fail?

Apparently, organizations are well advised to have a solid IT strategy in place, as it provides numerous benefits. However, there are several reasons why IT strategies may fail, which should be anticipated beforehand in order to avoid costly and time-consuming pitfalls (Johanning, 2019). One reason why IT strategies may not unfold their potential is a lacking corporate strategy. In this case, there is no guiding framework for the IT, and assumptions and priorities are set more or less out of the blue. In turn, a proper business IT alignment cannot take place. Second, organizations run into danger of labeling a single strategic decision as holistic strategy, leaving other important aspects out of sight. For example, the decision to prefer SAP over Microsoft products has a long-term impact on the organization, but cannot be seen as a comprehensive IT strategy, as other aspects such as the required IT infrastructure are not specified automatically. Third, it can be observed that IT strategies become outdated quickly and cannot keep pace with continuously changing business demands. Lastly – and this reason holds true not only for IT strategies, but strategies in general – strategies tend to lack proper implementation. Especially when developed by external strategy consultants, the IT strategy main remain in the “ivory tower” as high-shine PowerPoint concept, but the organization is not willing or capable to act accordingly.

### IT strategy versus digital strategy

In order to understand the characteristics of an IT strategy, it is beneficial to also understand what an IT strategy is not. Specifically, in todays digitized world, a delimitation from the digital strategy is necessary. According to Chanias et al. (2019), a digital strategy combines business and technological aspects at equal shares. Stated differently, the digital strategy is part of the business strategy, and the IT strategy. In this vein, the IT strategy is not a substitute for the digital strategy but entails core elements that are important for the digital strategy. The following example may illustrate this interrelation:

The brick-and-mortar retailer RetailCo experiences significant threats due to online activities of new market entrants, requesting a shift in the business strategy. RetailCo decides to engage in a digital transformation program that foresees the establishment and seamless integration of a web shop, and the digitization of in-store processes (digital strategy). As RetailCo’s IT department is delighted that things move forward, they suggest **RFID** technology to support tracking of goods, which was not yet considered in the digital strategy. Finally, RetailCo decides to incorporate RFID into its processes. Thus, the IT organization reprioritizes some of its initiatives and integrates RFID implementation as strategic initiative into its IT strategy. After successful implementation, RFID significantly contributes to product availability in-store and thus to business value via increased sales.

**RFID**

The acronym stands for radio-frequency identification and refers to a technology whereby digital data encoded in RFID tags are captured by a reader via radio waves.

This example shows that the digitalization has the potential to modify the unilateral relationship “business drives IT” towards “business drives IT and IT drives business”.

### Self-Check Questions

1. Please complete the following sentence: IT value can be delivered on individual, *group*, and *organizational* level.

2. Please list three reasons why IT strategies may fail.

*lacking corporate strategy*

*single strategic decision labeled as holistic strategy*

*IT strategies become outdated quickly*

## IT Strategy in the Context of Governance and Management

One could assume that developing an IT strategy primarily requires action from employees responsible for the IT in an organization, as it is related to discipline-specific topics. However, this understanding would fall short, because the IT strategy has significant components that go beyond the technological aspects as such. In this vein, the IT governance is an essential part of the corporate management. IT governance ensures that IT optimally supports organizational goals and business strategy. Components of IT governance are, i.e., processes and organizational and management structures for the entire IT infrastructure in the organization. As part of the overall corporate governance, IT governance falls in the sphere of the management’s responsibility and is not primarily assigned to IT representatives. Essential tasks of IT governance are the definition of the role of IT in the organization, as well as the clarification of the decision-making powers of the IT managers. Besides, IT governance guarantees the security of all IT systems in terms of integrity, availability, confidentiality, and reliability. Moreover, it provides cost transparency, fulfills legal requirements and structures the IT organization audit-safe according to established standards. **COBIT,** for example, is a well-known reference model that supports the implementation of IT governance in organizations. Usually, the CIO is responsible for the implementation of the IT governance.

**COBIT**

The acronym stands for Control Objectives for Information and related Technology and is an integrative framework for comprehensive governance and effective management of corporate IT.

As indicated above, defining the role of the IT is a central aspect of IT governance. According to Hanschke (2009), one of four ideal-typical roles can be attributed to the IT, which reflect different levels of significance and influence. Thus, IT may be seen as

* pure cost factor, providing primarily commodities to the organization
* an asset, whereas “IT solutions are regarded as integral to core business processes and essential for enacting security and compliance requirements mandated by law” (Hanschke, 2009, p. 12)
* a business partner, whereas the IT is seen as contributor to business value and corporate strategy
* an enabler, having an active part in business model innovation

These roles can be either assigned actively, especially when it comes to the more strategic ones, or the corporate IT can have “acquired” this role passively during history. In today`s era of digital transformation, the IT is increasingly assuming more strategic and thus valuable roles, playing a key part in driving innovation (Gerster, 2017). Thus, the IT is experiencing a general role shift. Taking the “traditional” role, the IT was primarily responsible for efficient, reliable, scalable and secure delivery of IT infrastructure and operation of IT applications, aiming at minimizing costs, optimizing processes, and incrementally advancing hard and software. Today, the IT department is often (also) expected to enable or even drive digital transformation and innovation, aiming at innovating and transforming the organization, integrating new digital products and services to the IT landscape, and building up required digital capabilities. Thus, during IT strategy development, managers should answer the question which part their IT plays within their organization.

### Self-Check Questions

1. Please list three tasks of IT governance.

*To define the role of IT in the organization*

*To clarify decision-making powers of the IT managers*

*To guarantee the security of all IT systems in terms of integrity, availability, confidentiality, and reliability*

*To provide cost transparency, fulfill legal requirements and structure the IT organization audit-safe according to established standards*

## Strategy Lifecycle

As IT becomes increasingly important for business value, much more attention needs to be paid to IT strategy development than it has been paid in the past. The development of an IT strategy basically follows the same steps as the development of any other strategy, such as the overall business strategy, or specific business unit strategies. However, the individual design elements of course refer to the specific contents related to IT within an organization. In this context, it is important to note that strategy development is not a one-time effort but requires continuous work. Based on specific goals that are supposed to be reached, the strategy is designed and finally implemented. In order to monitor the performance of the strategy execution, a sophisticated measurement concept is needed, which may result in strategy adoption and possibly in a reengineering of objectives. Here, the lifecycle starts all over again. In addition, external or internal factors may generate new insights that may necessitate changes of previous steps. Overall, the whole strategy lifecycle needs to be passed through in close alignment with the business strategy. The individual components of the IT strategy lifecycle will be explained afterwards.

IT strategy lifecycle



### Goals of the IT strategy

The (re-)positioning of the IT requires goal setting at first instance, which yields a vision for the IT for a given time frame. The IT vision answers the question “Where does the IT want to go?”, whereas the subsequent IT strategy answers the question “How does the IT get there?”. As a rule of thumb, the IT vision covers a mid-term time frame of about five years, whereas the derived IT strategy contains measures for about three to five years. This way, the strategy offers sufficient guidance, yet opens enough flexibility to react to changes.

The IT vision should answer the following questions:

* What is role of the IT within the organization?
* What is it that drives the IT?
* Where does the IT want to be in four or five years?

The following table provides an example for a strong and rather weak IT vision:

|  |  |
| --- | --- |
| Examples of IT visions |  |
| Strong IT vision | Weak IT vision |
| “In 2025, the IT is an integral part of the organization. We support business in developing products for our customers by providing innovative artificial intelligence solutions, thus making our contribution to maintain our market leadership in retail banking.” | “We ensure satisfaction by delivering state-of-the-art IT solutions.” |

The IT vision may serve as reference to derive concrete goals for the IT. They can be understood as breakdowns of the vision that guide employees in their work. IT goals are binding, both on executive and operational level, and they provide the measures to evaluate the implementation success. Like other objective in business, these goals should be formulated according to the **SMART** method (Rubin, 2002). In addition, a strong connection with business goals must be given. In order to derive goals that improve that status quo of the IT, a solid understanding of the initial situation is required at first place (“Where is the IT now?”). Thus, in order to develop valuable IT goals, an initial as-is analysis should be conducted, that may be refined even more in the subsequent design phase of the IT strategy.

**SMART**

The acronym used in goal development stands for specific, measurable, achievable, relevant, time-bound.

### Design of the IT strategy

Based on the IT vision and goals and aligned with the corporate strategy and business requirements, the IT strategy can be designed. The conceptual design requires a solid analysis of all areas involved, in order to establish a sophisticated understanding about the status quo as well as related strengths and weaknesses. Useful documents for the as-is analysis are, for example, process handbooks, IT organization charts, IT architecture plans, and requirement specifications. After all relevant information are collected and consolidated, the current status quo can be described and evaluated, serving as basis for the design of the to-be status of the IT. This target status incorporates, for example, the to-be application landscape, the planning of operating infrastructure, and decisions about insourcing- and outsourcing preferences (Hanschke, 2009). By comparing the as-is and the to-be state, strategic fields of action can be derived and underpinned with concrete measures, which are then brought together in a strategy implementation roadmap. This roadmap outlines the strategic priorities and serves as schedule for which IT projects needs to be realized by whom in what time. Moreover, the strategy development phase also incorporates the conception of a measurement toolkit, which entails metrics for all strategic objectives. These metrics serve to measure implementation success. Depending on the scope and significance of the IT strategy, this phase also covers the design of necessary changes in the IT organization and processes. Lastly, as every strategy needs a price tag, investment planning also belongs to the design phase.

### Implementation of the IT strategy

Once the IT strategy is conceptualized, properly documented and released, the implementation can start according to the implementation roadmap. The implementation phase is the action stage of the IT strategy lifecycle, where plans and concepts are executed in practice. This can be as complex as the design and is at least as important for the success. Besides the functional components of this phase (i.e., the execution of the strategic projects), change management is of major importance. As every change in strategy also means changes in requirements, expectations and probably qualifications of the employees involved, a benefit-oriented communication and targeted stakeholder management is necessary. Thus, resistance to change-inherent requirements can be minimized, and the willingness among the employees to support the strategy can be increased. Whereas there is a potpourri of literature and explicit knowledge on strategy development, insights regarding how to properly execute a strategy remain rather scarce. However, there are some key characteristics successful organizations share during their implementation (Limited, 2020):

* A clear and consistent communication of the IT vision to give employees a context behind the strategic decisions
* The transfer of decision-making to team-level in order to decrease bureaucracy and to increase empowerment
* A focus on selected initiatives, as teams can better succeed when being allowed to focus on priorities
* The provision of a change-friendly environment, for example, by offering collaboration tools

### Measurement of the IT strategy

As IT strategy management is continual practice, it requires constant reviewing and updating of the strategy. The measurement of the IT strategy centers around the question “Did we get there?” and may influence behavior, validate decisions, or justify changes (Limited, 2020). Commonly, the categories of measurements are

* the performance (degree of target attainment)
* the maturity (capability equipment of the organization to pursue the objectives)
* the compliance (agreement with internal and / or external requirements)

The metrics that are monitored can indicate the effectiveness or efficiency of the implementation, or they can reflect productivity or conformance issues. There are different ways to measure the progress and effectiveness of a strategy. One exemplary approach of the plethora of methods is the **OKR** method (Limited, 2020), which does not only assist in defining goals, but also to track their achievements.

**OKR**

The acronym stands for objectives key results and is an agile leadership framework, which is applied by Google, amongst others.

### Adaption of the IT strategy

Any measurement of a strategy can only be successful if insights yield respective actions. That is, depending on the measurement results, the IT strategy needs to be adapted. Frequent deviations from original plans result from the following sources:

* The time frame to achieve certain milestones was calculated too tight. Here, possible adaptions may be a postponement of the respective due dates, or a scope reduction. In both cases, the influence on other measures must be taken into consideration, as for example, subsequent activities may be dependent on the results of the postponed or suspended milestone. Here, a “domino-effect” may have unintended spill-over effects that need to be balanced.
* The strategy execution exceeds the originally planned budget, for example, due to higher use of diverse resources (e.g., financial, human). Also, it may be that unexpected technological complexities arise, because the IT strategy may put assumptions that were taken for granted to the test. Furthermore, unexpected difficulties may occur during implementation that could not be foreseen in the design phase. Possible adaptions may be, for example, a subsequent budget increase, the hiring of external consultants to bridge lacking human resources, or a scope shift or reduction.
* External factors force the management to adopt its business strategy, which may also require an adaptation of the IT strategy. This may happen, for example, due to shareholder pressure, or during M&A activities. In this case, new IT goals need to be defined depending on the new business strategy, and the IT strategy must be developed accordingly.

### Self-Check Questions

1. Please list three reasons why organizations may need to (re-)design their IT strategy.

*Before or after mergers and acquisitions activities*

*When the company and the IT organization are growing very fast*

*After a reorganization or restructuring*

*When the complexity of the processes and technology is too great*

*When the IT landscape is out of date and no longer meets today's requirements*

1. Please complete the following sentence:

Within the IT strategy lifecycle, it is important to note that after the goals are set and the strategy is designed, the implementation of the strategy needs to be *measured and* *adapted* accordingly.

Summary

An IT strategy is a plan of how to reach defined business and IT goals. It is closely connected to topics such as governance, strategy and management in both business and IT terms. In today’s era of digital transformation, aligning business and IT is more important than ever, as IT significantly contributes to innovation. In this vein, IT strategizing is a continuous practice, aiming at improving the performance around the key elements of IT in an organization, namely business demands, the IT organization, related processes, and technology.

One could assume that developing an IT strategy primarily requires action from employees responsible for the IT in an organization, as it is related to discipline-specific topics. However, this understanding would fall short, as the IT strategy has significant components that go beyond the technological aspects as such. Thus, IT-governance is an essential part of the corporate management and ensures that IT optimally supports organizational goals and business strategy. Components of IT governance are, i.e., processes, and organizational and management structures for the entire IT infrastructure in the organization.

There are different occasions that necessitate the (re-)design of the IT strategy, e.g., when the company and the IT organization are growing very fast, or when the IT landscape is out of date and does no longer meets today's requirements. Here, the development of an IT strategy basically follows the same steps as the development of any other strategy, which can be understood as a lifecycle: Based on specific goals that are supposed to be reached, the strategy is designed and finally implemented. In order to monitor the performance of the strategy execution, a sophisticated measurement is needed, which may result in strategy adoption and possible reengineering of objectives. Here, the lifecycle starts all over again.

# Unit 2 – Developing an IT Strategy

**Study Goals**

On completion of this unit, you will be able to …

…discuss general corporate strategies

…identify strategy-relevant external factors

…develop IT goals

…execute various IT strategy development methods

# 2. Developing an IT Strategy

## Introduction

Developing an IT strategy only works in close conjunction with the corporate strategy. Thus, the examination of the business strategy and related business goals is of crucial importance before the IT strategy is developed. Depending on whether the organization strives for differentiation, cost leadership, or tries to serve a niche market, the IT must take different roles and must set up its strategy differently. As if this would not be difficult enough, the corporate and IT strategy must be developed in close alignment with external factors, such as the legal environment, which is not in the focus of the organization’s control.

After a thorough analysis of the external and internal circumstances, the IT vision and respective goals can be derived. This is an iterative process again in close alignment with business requirements. The IT vision roughly defines where the IT wants to go, and supports orientation, motivation, and teaming. The IT goals, in turn, provide details that guide action and serve as basis to define metrics for further strategy measurement.

In order to not lose track of all information available, there are different tools that help executives design their strategy. These tools can either be applied on corporate strategy level, yielding implications for the IT strategy, or they can be applied directly to IT-related decision. In this vein, the portfolio matrix, for example, helps executives on the one hand to map products and services and to plan future strategies. On the other hand, it is useful in the context of the IT application strategy and supports the strategic planning of the IT application landscape.

## 2.1 Business Goals and External Factors

As the IT strategy must be derived from the corporate strategy, business goals are a major reference point for IT executives and must be examined carefully before IT goals are set. As a result, possible innovation potentials for the IT are identified together with the corporate management. This leads to the formulation of an IT vision, which roughly defines where the IT wants to go in the next few years. Given this strong dependency, it becomes obvious that there is the need for a good corporate strategy that will be still valid in a few years' time, as this is necessary for IT investments to be optimally coordinated and the IT system landscape to be profitable. Moreover, the connection between corporate strategy and IT strategy shows the path the IT must take: from a more technical delivery unit towards a modern organization, that, together with the business units, analyzes the bottlenecks and problems of customers and identifies IT innovations to solve customer problems. Only then, a sustainable IT strategy will be possible and implementable (Johanning, 2019).

According to the Harvard professor Michael E. Porter, companies can choose three general strategies, namely differentiation, cost leadership, and focus (Porter, 1998):

* Differentiation strategy: The differentiation strategy is based on the consideration of the overall market. The distinction from competitors takes place through the differentiation in the form of a special product or a unique service (e.g., Tupperware).
* Cost leadership strategy: The cost leadership also considers the overall market. The distinction from competitors does not come from the product or

the special service but lies in the internal optimization of all processes and structures. As a result, the costs can be kept so low that the market prices can withstand the competition (e.g., Primark).

* Focus strategy: In contrast to the two strategies above, the focus strategy is based on a positioning in the market via the target group. The overall market is not considered, but the company is looking for a strategically favorable submarket and takes the lead there by filling a market niche (e.g., Tesla).

Given the specific corporate strategy, the implications for the IT strategy can be derived. Assuming the organization follows the differentiation strategy, the product characteristics are crucial. IT executive must figure out how to support the product (or service) with IT solutions. In this case, an innovative IT is of major importance for the organization. Taking the cost leadership strategy, the role of the IT is different, as an efficient IT is key. Thus, innovation is of less importance and standardization of high importance, as costs must be minimized. Only those processes get automated which are necessary to support the objectives of the cost leadership strategy. Lastly, the focus strategy implies lots of customizing effort for the IT, as the organization approaches the market as a niche provider. This may require IT solutions that are not offered as standard solutions in the market.

It becomes obvious that, in accordance to the chosen corporate strategy, the role of the IT swings like a pendulum between two extremes. One perspective sees the IT as strategic weapon (Weill & Ross, 2004), the other perspective sees IT as a commodity (Carr, 2003). Both contradicting hypotheses find supporters in organizations. There is no “one size fits all solution”. Rather, a company-specific assessment is required, in which the opportunities and risks of each perspective (and in-between manifestations) are systematically recorded and evaluated, considering various influencing factors such as business model, current market situation or future industry development.

Concluding, there are various internal factors that need to be considered prior to IT strategy development. However, organizations do not operate in an empty space, but are embedded in a broad environment. Thus, external factors must be considered early in the (IT) strategy development process as well, besides internal business goals. To analyze external factors, the PESTEL framework (Ward & Peppard, 2002) helps separating concerns. These factors can be classified into political, economic, social, technological, environmental, and legal factors, which are described afterwards.

**External factors (based on Ward & Peppard, 2002)**



* Political factors: These factors include all interventions of the government in the economy or a certain industry. This can include, for example, government policy, tax policy, labor law, and trade restrictions, but also overarching developments such as political stability or instability. Furthermore, the government may impact regulations regarding (technological) infrastructures in a market.
* Economic factors: The economic evaluation of a market is necessary to obtain information about its financial development. for example, it is useful to track current and target customers’ purchasing power, as a sufficient disposable income is necessary to purchase products, especially those that are not necessary. Key figures such as economic growth, exchange rates, inflation rates, disposable income of consumers, interest rates and unemployment rates can be monitored. These figures and can be understood as indicators affecting the purchasing power of consumers. This, in turn, may also impact the willingness and capability to invest in IT, for example.
* Social factors: To evaluate the social environment, the population structure and the associated demographic change can be considered (e.g., in case the population is characterized by majorly elderly people, organizations may want to target respective needs). In addition, organizations may want to monitor customer, employee and supplier behavior as well as underlying needs and values, as they provide clues about, for example, specific product properties. A trend towards individualization, for example, may directly influence business and thus IT requirements.
* Technological factors: This class of factors obviously has a very strong impact on IT strategies. New technologies provide new innovative technical solutions and thus, in conjunction with business acumen, digital innovation (Yoo et al., 2010). Considering the major changes in IT during the last decades, we see massive changes in communications, improvement of computing power, and increasing portability of technology. Today, technological advances in artificial intelligence, machine learning and other data-related applications open new possibilities that may influence the IT strategy of an organization significantly.
* Environmental factors: This category of factors gained particular importance in the last years due to the increasing awareness of climate change and resource scarcity. These factors include aspects such as weather, climate, and topography, but also the impact of environmental developments on consumer behavior. In reaction to this trend, many organizations engage in corporate social responsibility (CSR), which entails the voluntary engagement in social and environmental aspects.
* Legal factors: Facing the high impact of IT, there are several legal regulations for the use of IT in organizations. Currently, data privacy issues are at the core of the legal debate, which resulted in a new EU law for the processing of personal data (**GDPR**). During the legal transition in the year 2018, organizations of all types made tremendous efforts to be compliant with these new legal requirements. Also, organizations must secure to be GDPR-compliant in their future strategic initiatives, which must be considered during IT strategy development.

GDPR

This acronym stands for General Data Protection Regulation. It is a regulation of the European Union with which the rules for the processing of personal data are standardized across the EU.

Organizations must monitor the above-mentioned external factors continually in order to anticipate future developments as far as possible. Here, the challenge is to find the right data for individual purposes, instead of not seeing the wood for the trees. However, the monitoring as such does not deliver value, but action-guiding insights must be generated that, in turn, influence the corporate and the IT strategy. In most cases, the organizations are the “recipients” of their environment and cannot shape or control it themselves. Against this backdrop, organizations tend to ally with other organizations in the same industry or with a common interest to increase their power. For example, they may establish industry standards and protocols, or engage in lobbying.

### Self-Check Questions

1. Which three generic strategies can companies choose?

*differentiation*

*cost leadership*

*focus*

1. Please complete the following sentence:

The PESTEL framework divides external factors into the categories political, economic, social, *technological, environmental, and legal.*

## IT Goals

The development of an IT strategy is guided by IT goals, which describe the future state the IT is aiming for (Hanschke, 2009). These goals are derived from the overall corporate strategy and are developed in accordance with the overall IT vision. The IT vision covers a mid-term time frame of about five years (Johanning, 2019) ￼serves as overarching guiding principle. Specifically, the IT vision has the following functions (Johanning, 2019, p. 116):

* Orientation: With the help of the IT vision, all involved employees get an idea of ​​where the journey should go. This ensures that all parties involved get the feeling of being involved in the same cause.
* Motivation: For the IT employees, an IT vision can generate a positive mood, which releases motivating forces. The strategic guidelines become clearer and thus the personal contribution in the context of the big picture becomes evident.
* Teaming: A "we- feeling” develops among all the employees involved, which makes it clear that everyone must pull together and that something great can be achieved jointly.
* Creativity: The IT vision releases the creativity of the IT employees, which yields new impulses and approaches to the tasks.

Bevor the organization kicks-off the strategy development, everybody involved must understand what the IT goals are. The following list entails exemplary strategic directions for the IT that can serve as reference for further goal development (Johanning, 2019, p. 43):

* Restructuring of the IT organization and its preparation for future requirements
* Improved collaboration and more effective demand management (business IT alignment)
* Faster time to market, i.e., more efficient provision of new IT services
* Improved positioning of the IT in the corporate management (possibly new role of CIO, new role of IT in the company)
* Increasing IT responsibilities in the direction of demand or process organization
* Cost-optimized outsourcing of IT commodities and thus more concentration on value-adding applications
* Adjustment or reorganization of IT as part of a post-merger integration

In this context, the question arises of how large the range and scope of the IT strategy project is. Is the IT strategy valid for the entire organization, or only certain divisions or business units? International organizations must answer the question of whether all foreign branches or regions are involved or whether the IT strategy is initially only for the headquarters. In large organizations it may make sense to not to design one, but several IT strategies that pay tribute to the local requirements.

Deriving IT goals from the organizational goals is the starting point of every IT strategy development process. The following graphic depicts the goal derivation process (Hanschke, 2009, p.23).

IT goals derivation process (based on Hanschke, 2009)

A screenshot of a computer

Description automatically generated with medium confidence

Deriving IT goals

The IT goal derivation process can be split into three parts, namely the input, throughput, and output part, which are described in the following.

#### Input

First, the goal development is informed by several input sources, namely the developments in the external environment (e.g., there may be a new competitor on the rise who is challenging the organization’s market position), the overall business strategy (e.g., the CEO has announced that defending current market leadership against this new competitor is the top priority), and internal circumstances (e.g., the organization has hired a new innovative and business-oriented CIO). These input sources must be consolidated in order to get an understanding of what is driving the business. Based on this understanding, the business requirements for the IT must be put together. These must be operationalized in detail so that IT goals may be defined.

#### Throughput

The throughput part of the process is very iterative. After all business requirements are documented (e.g., the organization wants to provide a self-service solution for its customers to enhance customer service), the requirements are mapped against the IT assets and their potential to support the business. These IT assets include “the IT service and product portfolio, the application landscape, current technical standards, operating infrastructure, external and internal resources” (Hanschke, 2009, p. 24). IT requirements may then be refined, yielding, for example, the concrete requirement that the IT must provide the technology for a self-service portal. These requirements are then used to define IT goals, whereas the cost-benefit ratio should be a major criterion to evaluate the usefulness of the goals.

#### Output

IT goals are the ultimate output of the process and determine the future action of the employees. They should be formulated according to the SMART rule (Rubin, 2002). SMART stands for specific, measurable, achievable, relevant, and time-bound goals. The rule shall be presented by the example of the overall marching route “restructuring of the IT organization and preparing it for future requirements”, which is not yet “smart enough”. This formulation leaves open, for example, what the new organizational form shall be, and what future requirements are, as an organization cannot foresee all possible future developments that can arise. The following table depicts a possible SMART formulation of the goal related to this general marching route (the order of the letters was changed in order to have a valid sentence):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Example of a SMART IT goal | | |  |  |
|  |  | By 2026, | T | time-bound |
|  |  | based on the insights of our first organizational pilots, | A | achievable |
|  |  | every business department of our organization | M | measurable |
|  |  | is associated to a dedicated team of IT experts (matrix organization) | S | specific |
|  |  | being responsible for the execution of the general guidelines according to the respective business needs. | R | relevant |

During the goal derivation process, three important factors should be kept in mind (Hanschke, 2009, p. 24 f.):

* Making assumptions: Depending on the degree of the written documentation of the corporate strategy, IT-relevant assumptions must be made. To ensure business fit, these assumptions should be challenged and validated in a dialogue with business representatives.
* Maintaining clarity about the derivation process: To make the IT contribution to business even more transparent, the process of the goal derivation and the connection of IT with business goals must be documented transparently.
* Ensuring enough refinement: IT goals must be defined detailed enough to allow the definition of metrics with distinct values that serve as further input for the subsequent measurement phase during the IT strategy development lifecycle.

However, executives should not be mistaken that the business IT relation and influence is a one-way street. In fact, research has shown that organizations can profit from an increasing IT power(Reichstein, 2018). Thus, an IT department with a high influence on the organizational decision-making has the potential to positively influence financial and non-financial organizational performance. In order to strengthen the influence of the IT organization, managers should consider the following findings: (Reichstein, 2018, p. 264):

* Size of the IT department: The larger the IT department in relation to the organization, the higher its influence. However, this relation is not limitless, as with bigger size comes bigger inertia.
* Value assessment of the IT department: The larger the appreciation of the IT department, the higher its influence. This requires a general acceptance of IT related topics among the employees, which necessitates openness to technology and the willingness to develop individual IT related skills, even when employees do not belong to the IT organization.
* Experience of IT managers: The higher the degree of IT experience among the top management (i.e., managing directors and board chairmen), the higher its influence. Thus, organizations can benefit from continuous IT training and corresponding recruiting regarding their top management.
* Degree of digitization: The higher the degree of digitization within an organization, the higher the influence of the IT department, as it increases their strategic capabilities (albeit this effect is not as strong as the three above).

In order to ensure focus against the backdrop of given resources, it may be useful to not only define what is in scope of the IT strategy, but also what is out of scope (Johanning, 2019). That is, related fields that are near the IT goals are explicitly excluded from the strategy process. Besides resource optimization, out scoping has another benefit, as it increases the likelihood that no important aspects are overseen.

### Self-Check Questions

1. Which three input sources should be considered during IT goal development?

*External development*

*Business strategy*

*Internal circumstances*

1. Please complete the following sentence:

The larger the appreciation of the IT department, the higher its *influence*.

## 2.3 Methods for Strategy Development

Once the IT goals are defined and the question “Where does the IT want to go?” is answered, the IT strategy can be developed, answering the question “How does the IT get there?” There are different tools that help executives design their strategy. In this section, a selection of common methods is presented, and the implications for the IT strategy are outlined. The methods for strategy development that are presented first are taken from diverse IT frameworks (i.e., COBIT, TOGAF, ITIL). The methods presented afterwards are part of classic corporate strategy toolboxes and have been adapted to the IT context ((i.e., business process analysis, product portfolio matrix, and SWOT analysis)

## IT strategy development according to COBIT

The COBIT framework, short for Control Objectives for Information and Related Technology (ISACA, 2019), is “an IT governance and management framework designed to help organizations create value from their IT initiatives, better manage their risk and optimize resources” (Edmead, 2020, n.p.). The governance and management objectives in COBIT 2019, the current version, are grouped into five domains, namely 1) Evaluate, Direct and Monitor (EDM), 2) Align, Plan and Organize (APO), 3) Build, Acquire and Implement (BAI), 4) Deliver, Service and Support (DSS), 5) and Monitor, Evaluate and Assess (MEA). For those employees dealing with IT strategy development, the part APO02 Managed Strategy within the APO domain is of major importance. Here, six management practices and respective **RACIs** are outlined that should be conducted in order to develop an IT strategy. Each practice contains at least one activity and their desired capability level. To assess this capability level, COBIT also contains a number of example metrics to measure the achievement of the practice. These practices are:

**RACI**

RACI is a technique for analyzing and displaying responsibilities. The name is derived from the first letters of the English terms Responsible, Accountable, Consulted, Informed.

1. “Understand enterprise context and direction
2. Assess current capabilities, performance and digital maturity of the enterprise
3. Define target digital capabilities
4. Conduct a gap analysis
5. Define the strategic plan and road map
6. Communicate the I&T strategy and direction” (ISACA, 2019, p. 58)

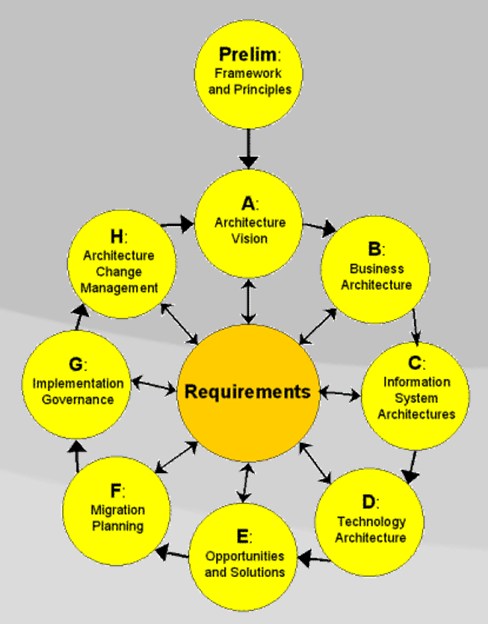
To answer the question how these practices can help during IT strategy work, COBIT provides guidance: Practice 1 urges IT responsibles to understand “the organizational context (i.e., industry drivers, relevant regulations, basis for competition), its current way of working and its ambition level in terms of digitization” (Edmead, 2019, n.p.). Practice 2 recommends that the performance of the current IT services should be assessed as next steps, and an understanding of current business and IT capabilities should be developed. Also, getting an overview of “current digital maturity of the enterprise and its appetite for change” (Edmead, 2019, n.p.) is content of this step. Based on the understanding of the organizational environment and strategy, practice 3 suggests to define the target IT products and services, and to identify the necessary capabilities by considering established standards, best practices and technologies. Subsequently, IT executives shall conduct a gap analysis and derive high-level changes in the enterprise architecture (practice 4). Based on this “pre-work”, a holistic digital strategy can be developed in close collaboration with relevant stakeholders (business and IT), and a roadmap that defines the steps required to achieve the IT vision can be designed. Lastly, practice 6 suggests to prepare the ground for understanding of the business and IT objectives and the strategy with change management.

## Developing technical architectures according to TOGAF

The Open Group Architecture Framework (TOGAF) (The open group, 2009) is a tool-independent framework for developing technical architectures (Masak, 2010), which are an important building block of the IT strategy. TOGAF was created by members of The Open Group Architecture Forum. This forum is an IT consortium made up of end users, service providers, consulting firms, educational institutions and others. Those responsible for the IT strategy may refer to TOGAF, amongst other aspects, when it comes to decision-making in the context of IT architectures.

The TOGAF document is divided into seven main parts, including the main component Architecture Development Method (ADM) as well as the Enterprise Continuum (EC). The ADM defines a recommended sequence of nine phases (shown below) for architecture development (for more information regarding the content of the phases, refer to (Matthes, 2011).

TOGAF: Architecture Development Method



The Enterprise Continuum is a framework within the TOGAF framework. It includes a collection of architectural descriptions, reference models and samples for reuse that can be helpful during IT strategy work.

## Designing IT services according to ITIL

The so called IT Infrastructure Library (ITIL), published by the British Office of Government Commerce (OGC), is a comprehensive framework that contains all essential processes of IT service providers and service organizations (Kesten et al., 2012). ITIL comprises the so called ITIL service value system (SVS) and the so called four dimensions model (Limited, 2019). The SVS contains an operating model for service providers, practices and principles, among others. The four dimensions model underlines the necessity to regard every IT service strategy through the lenses of 1) organizations and people, 2) information and technology, 3) partners and suppliers, and 4) value streams and processes. Thus, when it comes to service management as part of the IT strategy, those who are in charge of the IT strategy are well advised to have a look into ITIL as an indispensable standard for service management.

## Business process analysis

The corporate strategy defines business processes, which are the basis for IT architecture decisions. Therefore, IT people should have a basic understanding about the business processes, which can be achieved by understanding the results from prior business process analysis work done by the respective business units. However, reading the documentations of all organizational processes can take months. For this reason, it is useful to focus on the most relevant processes. Therefore, we differentiate three types of processes, namely value-adding processes, standardized processes, and commodity services, which have different strategic consequences (Johanning, 2019):

* Value-adding processes: The automation and constant optimization of value-adding processes in the organization through IT solutions is strategically challenging. It forms the essential pillar of sustainable business support, where business IT alignment is of major importance. Only through the efficient collaboration with the departments, the value-adding or business-critical processes can be continuously optimized. Since this task is very company-specific, it usually does not get outsourced, but must be executed internally by very capable employees.
* Standardized processes: Processes that can be standardized include all administrative processes, for example, in the areas of finance and accounting or human resources. These processes are not directly competition-relevant and should therefore be standardized as much as possible and without great effort. The strategic goal of IT management in such processes is, hence, the automation and harmonization. Finance and HR processes, for example, are relatively simple to outsource to external providers.
* Commodity services: These are not business processes in the strict sense, but all service management processes and tasks in the area of ​​IT infrastructure, such as the operation of a data center, the help desk, the supply of hardware and software etc. The aim is the optimal and most cost-efficient supply of the company with these services. These are tasks that can be organized very efficiently via a secured service management according to ITIL. They can also be outsourced to external service providers as part of a sourcing strategy.

In order to focus on the most important processes, it is useful to first analyze the company's top three core processes. According to Johanning (2019), the following questions can additionally help here:

* How are the core processes supported by IT today and is there potential for improvement?
* What are the value-adding business processes and is there potential for innovation through improved IT systems?
* Are there processes in the administrative areas (finance, HR) that can be standardized?
* Are there any external laws or frameworks that make changes to certain processes and IT systems?
* Which processes are operated locally, and are there alternatives?
* In which value-adding processes are innovations to be expected in the future,

where not?

* Which information is special in which processes?
* To what extent are the commodity services based on ITIL service management processes already standardized? Where are still weak points?

**Product portfolio matrix**

The product portfolio matrix (also known as BCG matrix) was created in 1970 by the former CEO of the famous strategy consulting firm the Boston Consulting Group (BSC). It can be used for the strategic planning of various product lines, but also for IT applications (Johanning, 2019). An IT application denotes software programs that are used to support a useful or desired non-system functionality. Many organizations own a four- to five-digit number of applications. Thus, the application strategy is at the core of every IT strategy. It entails the application landscape of an organization, which is developed in conjunction with the business units based on the business processes. All applications of the portfolio are evaluated, and specific courses of action are derived. For the evaluation, the applications are mapped on a 2x2 matrix. In its original version, this matrix is given by a combination of the relative market share (x-axis) and the market growth rate (y-axis). In order to map the IT application portfolio, Hofmann & Schmidt (2010) recommend renaming the axes. Thus, in order to develop the IT application strategy, the x-axis indicates the degree of dependency from the IT application, and the y-axis the business value contribution. Like in the original version, the matrix contains the four fields question marks, stars, poor dogs, and cash cows, which are described in the following:

(IT) portfolio matrix



* Question marks: This quadrant contains the so called “high potential applications” (Johanning, 2019, p 130). For these applications it is uncertain to what extent they contribute to the success of the company. They are therefore to be classified as risky. Such applications are often started in the form of prototypes or as pilot projects, with the aim of checking whether there is a corresponding benefit for the organization. Such applications should not be integrated directly into the existing application landscape, as dependencies could arise too quickly. Clear time and budget limits are important for these high potential applications, as well as the constant control of these prototypes or pilot projects. This can guarantee that only those application who can demonstrate the expected benefit become a strategic application (next quadrant) for the organization.
* Stars: This quadrant contains the so called “strategic applications” (Johanning, 2019, p 130). The strategic applications are the most important applications in an organization. The most significant principle in the context of these strategic applications is their constant development. This is to ensure that these applications will continue to have the strategic benefits in form of highly automated core processes and innovative innovations. In order to secure their high contribution to business value, a very close, cooperative coordination and collaboration between business and IT is needed. Market changes, new or slightly changed business models or product changes must be quickly adapted by the business and must be converted. However, these constant value enhancement activities can become very expensive in the long run.
* Poor dogs: This quadrant contains the so called “support applications” (Johanning, 2019, p 131). This type of application is used to support less important processes. They are therefore not to be classified as critical and not as decisive for the future of the organization. It often makes sense to use these applications as commodities to hand over to an external service provider who can operate these support applications more cheaply due to economies of scale. Running these applications internally is usually only economical if largely standard software without major extensions or customization is used.
* Cash cows: This quadrant contains the so called “key operational applications” (Johanning, 2019, p 130). These applications are very important for the organization and support the core processes, but also the management and support processes with great reliability, often over longer periods of time. Adjustments to these cash cow applications should, however, carried out cost-effectively, and major expansions should only be made if this results in serious competitive advantages. Because of the long lifetime of these applications, attention must be paid to the best possible integration into the entire application landscape. However, the cash cows should not consume as many resources as the strategic applications. Therefore, organizations should aim for the highest possible quality with resource-saving maintenance and resource-saving operations. This poses a challenge for the IT organization, as especially older applications are expensive in maintenance and often expensive to operate. It is therefore important to keep the value contribution of the cash cows high as long as possible with as few resources as possible.

Besides using the portfolio matrix directly for IT-related purposes, the tool is also applicable to corporate strategy. On this level, further requirements can arise that have to be incorporated in the IT strategy.

### SWOT analysis

The SWOT analysis enables a thorough and systematic analysis of the strengths (S), weaknesses (W), opportunities (O) and threats (T) of internal and external business and IT environments (Ward & Peppard, 2002). The SWOT analysis can be executed on corporate level, but also applied directly in the context of IT decisions. The following example illustrates the application of the SWOT analysis in the context of a make-or-buy decision as part of the IT sourcing strategy. Here, the question is which IT services should the organization provide itself, and which services should the organization purchase from third party-providers. Precisely, the SWOT analysis is used here to evaluate a possible buy-alternative, which includes the outsourcing of specific IT solutions (Johanning, 2002, p. 156):

Strengths:

* Reduction of the vertical range of manufacture
* Improved access to know-how, competencies, procedures and methods that are not available in-house
* Improved quality of IT services
* Flexible adaptation to the actual the need for IT services
* Concentration on core competencies
* Access to the IT provider's know-how

Weaknesses:

* Possible loss of control and competence
* A lot of time spent coordinating with the providers or suppliers
* Quality problems and defects can occur that are harder to control as if they were internal

Opportunities:

* Reduced costs
* Enabling of flexible business processes
* Improved speed / time-to-market
* Improved IT security

Threats:

* Dependency on the provider
* Problems with reintegration or the insourcing
* Risk of revealing secrets
* Loss of internal know-how

The multitude of methods for IT strategy development (and the selection outlined above is not definite) may evoke the impression that once a method is executed, the respective IT strategy part is done. However, appearances are deceiving. In fact, IT strategy work is a continuous, iterative process. Over time, many changes within the internal and external environment can urge the organization to adapt its strategy. To better evaluate the necessary adaptions, the aforementioned tools and framework can provide guidance and stability, as the wheel does not need to be reinvented every time.

### Self-Check Questions

1. Which type of applications should be mapped in the “question mark” quadrant of the portfolio matrix?

*High-potential applications*

1. Please complete the following sentence:

Factors such as the bargaining power of suppliers and buyers, and threats resulting from *substitutes* and *new entrants* drive the competition within an industry.

Summary

As the IT strategy must be derived from the corporate strategy, business goals are a major reference point for IT executives and must be examined carefully before IT goals are set. However, it is not only the business goals that need to be considered, but also several external factors that evoke from the political, economic, social, technological, environmental, and legal environment. Once the internal and external circumstances are clear, the IT vision and the IT goals can be derived in close alignment with the business requirements. The IT vision roughly defines the storyline for the IT, and supports orientation, motivation, and teaming. The IT goals, in turn, provide details that guide action and serve as basis to define metrics for further strategy measurement. During their work, executives can rely on several tools that support the strategy development. These are, amongst others, insights from IT frameworks such as COBIT and TOGAF, and adaption from general strategy frameworks such as business process analysis, the mapping of the IT landscape with the portfolio matrix, and the SWOT analysis to evaluate IT-related decisions.

# Unit 3 – Implementing an IT Strategy

**Study Goals**

On completion of this unit, you will be able to …

… sketch an IT strategy communication document

…understand the impact of an IT strategy on the organization and its processes

…apply IT roadmaps and project portfolio templates

…analyze the emotional states of employees during IT change processes

…understand the necessity of leadership and change management

# 3. Implementing an IT Strategy

## Introduction

IT consultants and managers often argue that every strategy is just as good as its implementation . And they are right. Unless the implementation of the IT strategy concept is not properly prepared in terms of communication, organization, processes, and change management, even the smartest IT strategy will not deliver business value. Thus, the implementation phase is of crucial importance for the success of any IT strategy.

IT executives must also make up their mind regarding “non-technical issues”, especially considering the organizational, procedural, and people implications of their strategy. As IT strategies naturally come with innovations, they often cannot be delivered within the same organizational and procedural circumstances as before. Necessary changes to organizational structures, roles and responsibilities must be evaluated and they must be adapted to the new strategic requirements. Current processes must be made transparent, analyzed, improved and changes must finally be implemented.

All these activities have a massive impact on the employees involved, as changes of any kind always question the safe status quo. Against this backdrop, all IT strategy projects can also be seen as change management programs, that have to address all needs and concerns of the employees that are involved in the project and that are affected of the changes after the implementation. Therefore, every IT strategy also requires change management interventions in the field of communication, participation and enabling. To convey transparency, the communication of central IT strategy aspects to the organization is of major importance, which is why we kick off this lesson with this topic.

## 3.1 Communicating a Strategy

After the IT goals are set and the IT strategy is developed, it must be communicated to the relevant stakeholders in the organization. It is important that IT executives do not hide their strategy from the rest of the organization, as stakeholders must know the intended strategic course of action when facing decisions in their daily operations, and incentive systems must be set up according to the strategic objectives. However, “a surprising number of organizations maintain their strategies as closely guarded executive-confidential secrets” (Limited, 2020, p. 130). Instead, IT executives who aim for organizational commitment and strategy success may adhere to the following principles (Limited, 2020, p. 131-132):

* Engage stakeholders early in the strategy development lifecycle in order to prevent the “not-invented-here” syndrome (refers to the rejection of innovations that come from outside)
* Strengthen the strategic course frequently in various meetings
* Communicate strategy execution progress in internal communication tools (e.g., intranet)
* Include strategic aspects into the onboarding processes of new employees, but also external partners
* Include strategic aspects into the target agreements of employees and vendor contracts
* Actively collect feedbacks throughout the whole IT strategy lifecycle
* Pay attention to possible concerns and fears

Clear and easily understandable communication is important. A detailed PowerPoint presentation can be discussed in a small group of project participants, but must not necessarily be shown to everyone affected. Filtering of information is key so that the essential information is compressed and easily transmitted.

It is advisable to collect the most important information about the IT strategy in a central written communication document. As a general blueprint for this IT strategy document, Hanschke (2009) suggests a scope of about 20 pages, that contain crucial information about the IT strategy in a clear and unambiguous manner. The document can be split into seven distinct parts (Hanschke, 2009, p. 45-47):

* Management summary: This summary (also called executive summary) targets the top management of the organization and comprises a high-level overview of the content. The language should be rather simple and easy to understand for people outside the IT field. Moreover, the relevance of the IT strategy in the context of the overall corporate strategy should be underlined.
* Corporate strategy and role of the IT: This part contains statements regarding the general corporate strategy (i.e., business model, revenue streams, target customers etc.), results from the internal and external analysis, and the role of the IT in the organization. Here, it should become clear what business expects from IT, including compliance statements and security requirements.
* IT goals: This part outlines the strategic IT objectives, divided into the mid-term goals (roughly 2 years) and long-term goals (roughly 3-5 years, in some cases up to 10 years). Moreover, it contains a reflection of the current IT capabilities and the internal and external constraints.
* As-is status and strategic fields of action: This part documents the status quo of products, services, and applications, as well internal and external resources (i.e., employees and suppliers). It also contains the strategic fields of actions, derived from the strategic IT goals and related IT requirements.
* To-be status and IT roadmap: This part provides an outline of the targeted future status of the IT, and a roadmap for the implementation of the IT strategy. This roadmap depicts concrete strategic projects that have been derived based on an as-is/to-be comparison. Here, it is also legit to outline possible alternative scenarios.
* Measurement toolkit: This part documents which control tools are selected to monitor the implementation of the IT strategy, as well as related performance indicators. Moreover, it provides information about the data sources used to measure the IT strategy.
* Organization and processes: This part contains information regarding the organizational and procedural implications of the IT strategy, displaying, for example, the IT strategy project team, decision flows, process changes and budgeting information.

### What makes the communication between business and IT employees special?

During joint activities, the communication between business and IT has special characteristics that pose specific challenges. The following statement of a senior IT manager in a global retail organization illustrates the special setting that occurred between an IT architect and business executives during an IT governance meeting. The IT architect was asked to elaborate on ways to improve IT security. “The architect proceeded to bombard the executives with […] low-level details— an oversaturation of information, which they did not understand— and he lost their attention […]. What he did not do was deliver information in a positive manner geared to his audience.” (McKeen & Smith, 2015, p. 74). As a result, the executives lost their interest in the topics and decreased budgets for needed upgrades.

As this example illustrates, the relationship between business and IT employees is not necessarily a sure-fire success. Indeed, scholars found that the relationship between business and IT professionals is troubled due to several challenges that result from different work domains, knowledge regimes and different understandings of the situation (van den Hooff & de Winter, 2011). Amongst other factors, the relationship suffers from weak communication (Willcoxson & Chatham 2004), and lacking business knowledge of the IT staff (Luftman et al. 1999).

Against this backdrop, the question arises how IT managers can improve communication between business and IT. As McKeen & Smith (2015) state, “there is no magic formula for defining and teaching “good” communication” (McKeen & Smith, 2015, p. 76). However, it is known that shared knowledge between business and IT can improve communication. That is, IT employees must learn the basics about the business they support, but also the other way around. The following graphics depicts the effect of mutual understanding on the communication between business and IT.

IT strategy communication (based on McKeen & Smith, 2015)



Besides ensuring a mutual understanding between both groups, the following recommendations may improve the communication (McKeen & Smith, 2015, p. 82-83):

* Incorporate respective communication skills in the role descriptions
* Underline the importance of effective communication, for example, by incorporating respective requirements into the target agreements
* Provide communication training (for example, via workshops, or rather implicit via mentoring)
* Support informal communication and social interaction
* Provide an environment that enables communication, for example, via collaboration tools

### Self-Check Questions

1. Please list three reasons why the communication between business and IT employees may be impaired.

*different work domains*

*different knowledge regimes*

*different understandings of the situation*

1. Please complete the following sentence:

What can executives do during IT strategy development to prevent the “not-invented-here” syndrome?

*engage stakeholders early in the strategy development lifecycle*

## 3.2 Adapting the organization and its processes

As IT strategies naturally come with innovations, they often cannot be delivered within the same organizational and procedural circumstances but require an adaption. The organizational structure is defined as “relatively stable arrangement of responsibilities, tasks, and people within an organization” (Carpenter & Sanders, 2021, p. 329). The organizational structure has two major functions, namely ensuring control, and coordinating information, decisions, and activities. During IT strategy work, the question arises to what extend the current structure is capable to facilitate the strategy implementation, and, in case of a weak fit, how it needs to be adopted. In this vein, it is not only the organization, but also its processes (i.e., sequences of activities to complete certain tasks) that need a renewal. In order to secure supporting organizational structures and processes, both elements must be analyzed in regard of their strategy fit, resulting gaps must be identified and respective changes must be designed and finally implemented. It is important to note that this is not a one-time effort, but the IT organization and its processes must be regularly adapted to evolving internal and external conditions.

### Adapting the organization

When organizing the IT, a special focus lies on the collaboration between business and IT departments. To facilitate this collaboration, the organizational structure must provide sufficient touchpoints that support a continuous dialogue between the groups. In addition to the structural arrangement, distinct translator roles must be established both in business and IT. In this context, Hanschke (2009, p. 265) states that “by introducing IT coordinators with an adequate IT background into business departments, and IT consultants with business knowledge on the IT side, an enterprise can bridge the distance between IT and business”. In today’s era of agile software development, the product owner would be such a bridgehead role, for example. However, it must be noted that not every IT strategy necessitates a substantial reorganization, but may only require smaller adaptions of roles and responsibilities, for example. For the sake of completeness, we will briefly discuss general organizational models that may be part of an IT strategy project.

There are various ways to organize the IT which are located on a continuum between a central and decentral pole, illustrated below. The discussion around the question which manifestation is superior keeps scholars and practitioners in suspense since decades.

Centralized versus decentralized IT organization



In a strictly central setting, IT services and employees are bundled in a single unit, often called IT shared service center (Hanschke, 2009). As resources and activities are combined and managed in one place, IT systems and processes are standardized, and economies of scale and scope can be realized, which ultimately results in lower overall costs (King, 1983). Centralized structures concentrate the decision-making authority in a single person or a small group, and most decisions including budgeting, pricing and personnel are made at the top of the hierarchy. This structure can be appropriate, for example, when the organization follows a cost leadership strategy (Porter, 1998).

In a strictly decentral setting, IT services and employees are spread across the whole organization. Being part of a business unit enables close business proximity, but results in a lack of standardization which drives costs (Hanschke, 2009). Generally, decentralized arrangements are linked to a bottom-up approach (King, 1983). Decentralization of control implies that power is dispersed among many individuals at various levels in the organizational hierarchy, giving lower managers the chance to take responsibility (Olson & Chervany, 1980). A decentralized IT is of advantage when business units require close cooperation with the IT and less centralized guidance. Furthermore, it enables companies to respond much faster to local conditions (Mintzberg 1989). Thus, this structure can be appropriate, for example, when the organization has a diversiﬁed product offering.

Hybrid structures (e.g., matrix organization) seek to balance centralization with decentralization in order to reap the benefits of both options. It is a mixture between decentralized and centralized structures of activities, human and technical resources and decision-making authority (Hanschke, 2009). More precisely, a central unit is often responsible for overarching planning and control of IT. Supplementary, decentral competence units “have stewardship of matters relating directly to business, owing to their proximity to processes and markets” (Hanschke, 2009, p. 267).

Eventually, there is no first-best-solution, but the choice of the organizational structure depends on various factors, for example, the business model and the organizational culture. Centralized organizations often experience a “mismatch between their generic infrastructures and the needs of new and smaller business units” (Hanschke, 2009, p. 267), and migrate to a hybrid or even decentral setting. Similarly, decentralized organizations experience a lack of standardization and are migrating towards centralized solutions. In many cases, the IT organization “swings like a pendulum between central and decentral forms, with each swing of the pendulum aiming to use the strengths of the new form of organization while avoiding its drawbacks” (Hanschke, 2009, p. 267). Not surprisingly, these organizational change processes are exhausting for all employees, and benefits and drawbacks can only be identified once the respective new organizational form is established.

### Adapting the processes

Besides organizational implications, IT strategies can also imply a re-design or optimization of IT-related processes. Processes “describe an organized set of practices and activities to achieve certain objectives and produce a set of outputs that support achievement of overall IT-related goals” (ISACA, 2019, p. 12). In the IT area, there are various frameworks that can provide inspiration and guidance for those involved in IT strategy work. In the following, we briefly introduce process models and methods for Governance and Management (TOGAF, COBIT), software development (RUP, CMMI-DEV) and IT Service Management (ITIL, fitSM).

#### Processes in COBIT

The COBIT framework (ISACA, 2019), short for Control Objectives for Information and Related Technology, is “an IT governance and management framework designed to help organizations create value from their IT initiatives, better manage their risk and optimize resources” (Edmead, 2020, n.p.). COBIT contains, amongst other aspects, a Process Reference Model (PRM) which identifies five sets of processes and outlines who should be responsible for the process and in which role (RACI = responsible, accountable, consulted, informed). Those responsible for the IT strategy are well advised to identify where the change is located, look up the corresponding COBIT process and seek guidance for their process (re-)design. The processes are defined as follows:

* COBIT Process 1: Evaluate, Direct and Monitor (exemplary process topics: Governance framework setting and maintenance, benefits delivery, risk optimization, resource optimization, transparency) (ISACA, 2012, p. 29 ff.)
* COBIT Process 2: Align, Plan and Organize (exemplary process topics: IT strategy, enterprise architecture, innovation, budgets, relationships, service agreements, suppliers, quality, risk) (ISACA, 2012, p. 49 ff.)
* COBIT Process 3: Build, Acquire and Implement (exemplary process topics: demand management, capacity management, change management, knowledge, assets, configuration) (ISACA, 2012, p. 117 ff.)

**ISO 15504**

ISO / IEC 15504-5 or SPICE (Software Process Improvement and Capability Determination) is an international ISO standard for carrying out assessments of business processes, originally with the focus on software development.

* COBIT Process 4: Deliver, Service and Support (exemplary process topics: operations, problems, continuity, business process controls) (ISACA, 2012, p. 171 ff.)
* COBIT Process 5: Monitor, Evaluate and Assess (exemplary process topics: performance and conformance, internal control, compliance (ISACA, 2012, p. 201 ff.)

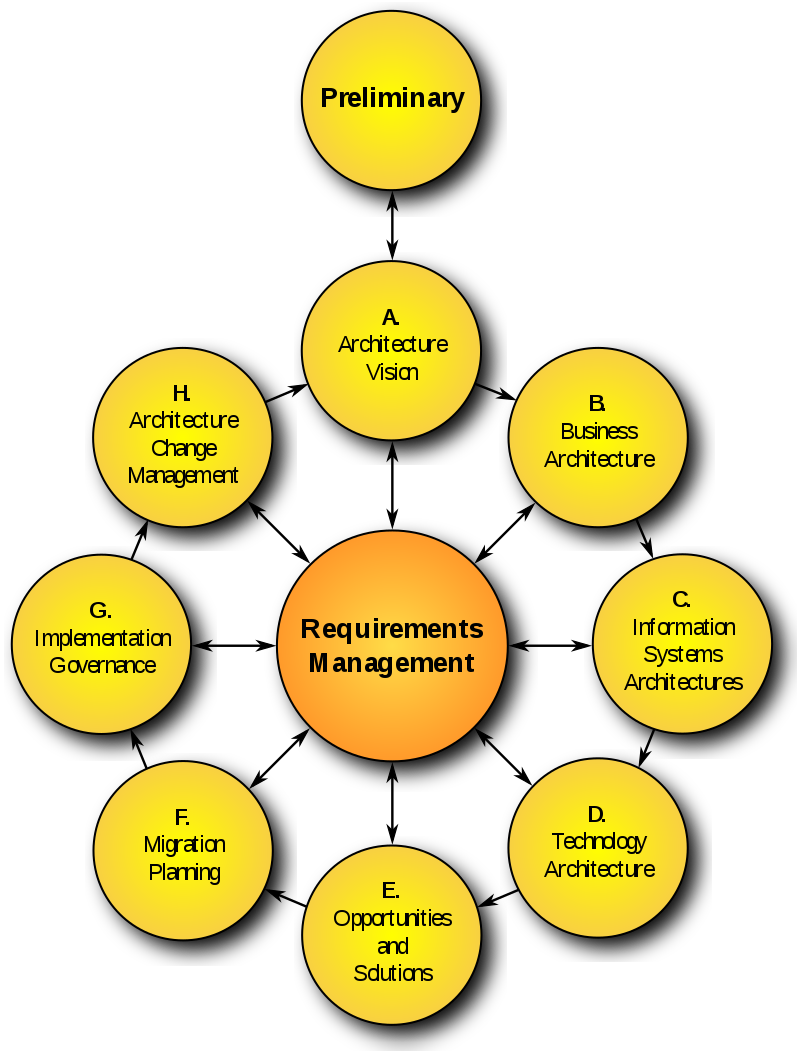
COBIT contains 37 processes in total: five for governance and 32 for management. Moreover, a Process Assessment Model (PAM) is used that is designed in accordance with the set of technical standards **ISO 15504.**

#### Processes in TOGAF

The TOGAF framework (The Open Group, 2011) is a tool-independent framework for developing technical architectures (Masak, 2010) and can provide guidance for the adaption of process within an IT strategy project. It is a wide-spread framework for various industries and especially used in large organizations (Keller, 2017). Like other frameworks for IT management and IT architecture, TOGAF cannot be used without further adjustments. The TOGAF documentation is approximately 750 pages long; secondary literature should be used to filter out the essential parts. The rest can be used as a reference book (Keller, 2017).

TOGAF has in common with other IT management frameworks, e.g., ITIL, that one can find more information about “what” to do, rather than detailed regulations about “how” something is to be done. The focus of TOGAF is on the development of concrete architectures, either for a system or for a cluster of systems and also for a company-wide target architecture. Thus, the so-called Architecture Development Method (ADM) continues to be the core of TOGAF in its current ninth version. Here, TOGAF recommends a cyclical process for developing architectures:

TOGAF Architecture Development Method (Marley, 2002, public domain)



The individual steps can be seen as a kind of checklist. For example, if minor adjustments to an existing system are required as outcome of the IT strategy, the responsible employees will not have to change the business architecture. Behind each point in the cycle shown above, there is another level which is also shown as a cycle. This level contains an extensive checklist for each phase of the model.

The older versions of TOGAF do not define the corporate strategy and thus also the IT strategy as a focus of interest of TOGAF. However, in the current ninth version of TOGAF one can find instructions on these topics. This change underlines the importance of a solid IT strategy and its interrelation with IT architectures. That is, in phase A: architecture vision of the ADM (The Open Group, 2011, chapter 7) one finds the note that an IT architect should inform him- or herself about the business drivers (and thus the IT and corporate strategy) before building an architecture. Moreover, TOGAF also recommends analyzing capabilities.

#### Rational Unified Process

The Rational Unified Process (RUP) is a commercial product from Rational Software, which has been part of the IBM group since 2003. It contains both a process model for software development and the associated software development programs. The RUP foresees nine process steps (so-called disciplines) for software development (Ludewig & Lichter, 2013, p. 207):

1. Business modelling: Understand the structures and processes in the organization, establish a common language
2. Requirements: Collect and process the requirements for the system to be developed
3. Analysis and design: Obtain a design model and the system architecture from the requirements
4. Implementation: Code and integrate the architecture
5. Test: Carry out tests of various types, check whether the developed system meets the requirements
6. Deployment: Put the system together, hand it over to the business units in an orderly manner and put it into operation
7. Configuration and change management: Systematically manage the work results created and make changes to them in an orderly manner
8. Project management: Plan and control the project and its iterations (including risk management)
9. Environment: Support the development project (e.g., through the selection of development tools, the administration of computers or the creation of backups)

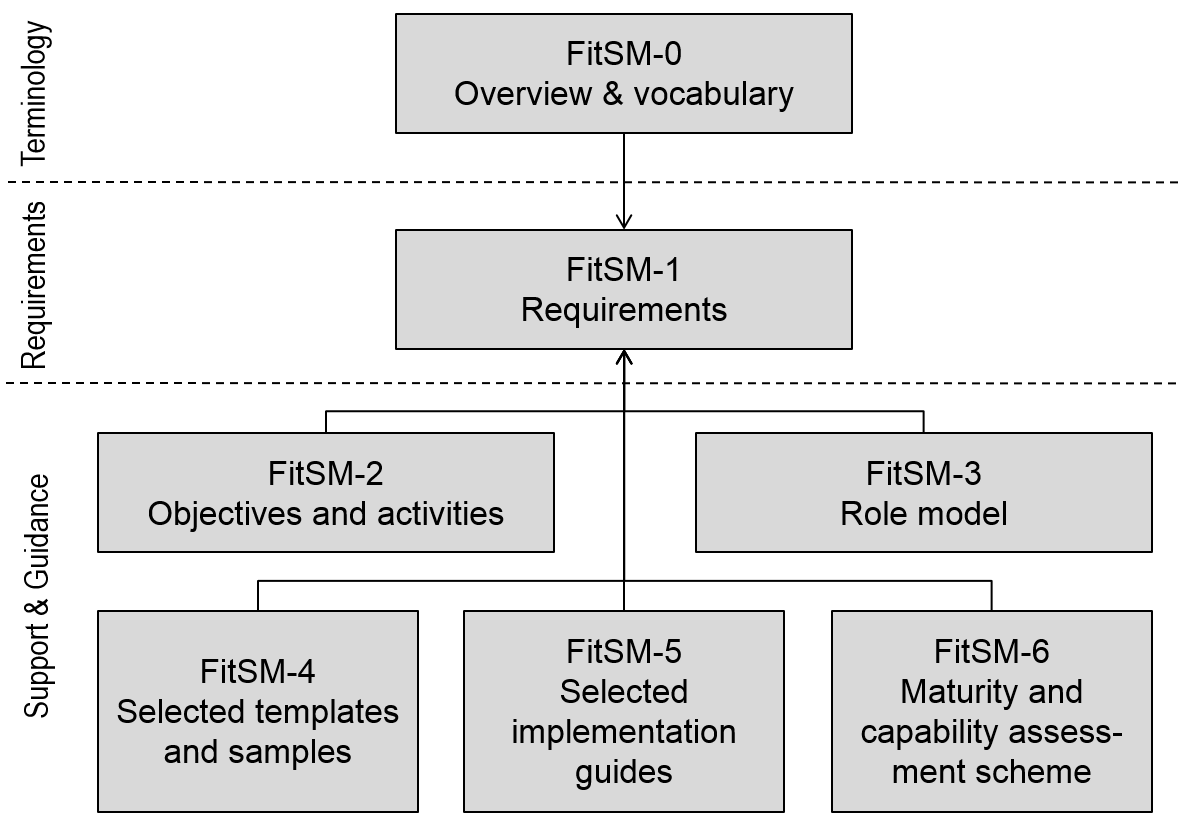
#### Processes in ITIL

The so called IT Infrastructure Library (ITIL), published by the British Office of Government Commerce (OGC), is a comprehensive framework that contains all essential processes of IT service providers and service organizations (Kesten et al., 2012). Amongst other elements, ITIL includes 14 general management practices, 17 service management practices, and three technical management practice. In ITIL, a management practice “is a set of organizational resources designed for performing work or accomplishing an objective” (Limited, 2019, p. 81). The 14 general management practices include topics such as architecture management, information security management, portfolio and project management, risk management, supplier and workforce management. The service management practices include topics such as availability management, incident management, release management, service design, service level management, and validation and testing. The technical management practices include topics such as deployment management, infrastructure and platform management, and software development (for the whole set of principles, please refer to Limited, 2019, p. 81).

#### Processes in FitSM

FitSM is the name of a standard family for lightweight IT service management. FitSM is a pragmatic standard for professional IT service management. It offers the ideal entry point IT service process management, especially for small and medium-sized organizations, and can either stand alone or be combined with ITIL. The documents of this standard are divided into different numerated parts, outlined hereinafter (Rohrer & Söllner, 2017).

Structure of FitSM (CC-BY 4.0)



* FitSM-0 - Overview and vocabulary: 70 definitions of IT service management terms
* FitSM-1 - Requirements: Approx. 85 auditable requirements for an effective service management system, divided into seven categories of general requirements and requirements for 14 service management processes (see below)
* FitSM-2 - Goals and activities: Activities for process introduction and process operation that are recommended to meet the requirements described in FitSM-1
* FitSM-3 - Role model: Description of general and process-specific roles in a service management system
* FitSM-4 - Templates and examples: Collection of templates and examples for SMS documents
* FitSM-5 - Advisor: Collection of documents with advisor character for various IT service management topics
* FitSM-6 - Maturity assessment: An Excel-based tool for assessing the skill levels in the various requirement areas or the maturity level of a service-management-system

The FitSM process model provides guidance for the following 14 processes, which are already known from ITIL (Rohrer & Söllner, 2017. p.13-14):

* Service portfolio management (SPM)
* Service Level Management (SLM)
* Service Reporting Management (SRM)
* Service Availability & Continuity Management (SACM)
* Capacity Management (CAPM)
* Information Security Management (ISM)
* Customer Relationship Management (CRM)
* Supplier Relationship Management (SUPPM)
* Incident & Service Request Management (ISRM)
* Problem Management (PM)
* Configuration Management (CM)
* Change Management (CHM)
* Release & Deployment Management (RDM)
* Continual Service Improvement Management (CSI)

Compared to ITIL, FitSM has fewer processes. A number of more strategically oriented processes are not available in FitSM. Furthermore, some processes have been summarized.

### Self-Check Questions

1. Please list three ideal types of IT organizations

*Central organization*

*Decentral organization*

*Hybrid organization*

## 3.3 Roadmaps and Portfolio Management

To prepare the strategy implementation and to track the progress during implementation, roadmaps and project portfolios are helpful tools. For both tools it should be noted that they play a role in the IT strategy design phase as well as the implementation phase. One could say that they act as bridgehead between the phases and come into play in various depth. During the IT strategy design phase, the roadmap, for example, is outlined on a high-level, and is further developed in the implementation phase. As both tools play an important role for the implementation, we will discuss them here.

The IT **roadmap** displays the measures and projects that resulted from the previous phases of the IT strategy lifecycle for the IT organization in the next three to five years. For this purpose, the measures are explicitly documented, clustered over time, and presented in a clear roadmap. Thus, the roadmap secures appropriate priorities. There are different ways to visualize a roadmap, for example, by means of a simple timeline, as a Gant chart, or as a system of coordinates as shown below. In this example, the roadmap displays several strategic fields of action (e.g., applications, people), and associated strategic projects or measures that all contribute to the overarching vision that shall be achieved after all projects (=the strategy) are executed.

**Roadmap**

A roadmap serves as a visual communication medium and provides an overview of how an object, in our case the IT strategy, develops over a time period.

IT strategy roadmap template



The concrete strategic projects are derived based on an as-is/to-be comparison. That is, the current state of the IT is assessed regarding its maturity to support the IT vision, and necessary improvement measures that fill the gap towards the IT vision are conceptualized. Objects of investigation are, for example, the IT organization, its processes, the technology, etc. As an example, let us assume that the organization has realized that their prior standardization and streamlining strategy has led to the fact that many IT services have been outsourced, and that there is little IT knowledge within the organization. However, the organization acknowledges that own IT competencies are key within the digital transformation and wants to insource distinct IT services. This would open a strategic field called “internal IT competencies”, that could entail projects such as training programs, new recruiting standards etc.

During the roadmap development, several business units and employees are involved. For this reason, the project lead needs to make sure that all measures are **MECE**, and that there are no redundancies among the projects. Also, for every project a dedicated project lead and project team must be assigned, which does not necessarily have to be the IT strategy lead, but also other employees, even from other business functions.

**MECE**

The acronym stands for mutually exclusive, collectively exhaustive.

### Budgeting of IT strategy projects

Having a price tag on the IT strategy is a necessary criterion to get the IT strategy released. Thus, calculating budgets for strategic projects is of specific relevance besides the technical content. Similar to the roadmap and the portfolio, IT strategy budgets come into play within the design phase (on a higher level) and in the implementation phase (on a more specified level, enriched with information that could be collected interim). We will discuss budgeting here, as the approval of the necessary investments by the management is another important element of the implementation of the IT strategy is. For this reason, the next step after the roadmap development is to figure out what the implementation of the roadmap will cost. So far, all measures have been designed on the drawing board, but whether all measures are realistic and affordable has still to be examined. Thus, the costs per measure must be roughly calculated. As a result, the cost/benefit ratio of all measures becomes transparent, revealing which measure makes sense and what savings potential per measure is possible. Only if the management has transparency about the costs resulting from the strategic initiatives, they can approve the strategy and budgets can be released. In order to prepare the approval of the investments for the implementation, the following documents may be helpful (Johanning, 2019, p. 251):

* IT investment overview (determination of the costs for the necessary IT projects)
* IT cost development for the next five years (possibly based on scenarios)
* Potential savings through the projects from the IT strategy

In order to even better classify the strategic projects and to derive prioritizations, the approved projects can be mapped in a project portfolio (Johanning, 2019, p. 284). Depending on the characteristics of the organization, the portfolio can include various classification categories, for example, whether the projects are focused on internal process improvement, of whether they contribute to the external market offering. The following graphic depicts a template for such a project portfolio.

IT project portfolio template (based on Johanning, 2019)



The resulting IT portfolio must be systematically administrated and developed. These activities are often taken over by an organizational discipline called IT portfolio management. Depending on the size of the organization, the IT portfolio can include other elements besides the strategic projects, for example, IT applications and people skills. Portfolio management is an important element of project controlling and thus of the IT governance. IT governance sets the "rules of the game", for example, the project selection, the prioritization and budget allocation. The portfolio managers are responsible for the project selection and ongoing adaption of the portfolio, and the project management takes over the task of planning and controlling individual projects and ensures that the project goals are achieved. (Gadatsch, 2020). The continuous IT portfolio management is strongly intertwined with IT strategy development, as illustrated by the following graphic.

Lifecycle of IT portfolio management (based on Gadatsch, 2020)



### Self-Check Questions

1. Please complete the following sentence:

The IT strategy roadmap depicts *strategic projects* that contribute to the overall *IT vision*.

1. Please list two responsibilities of IT portfolio managers distinct from IT project managers.

*project selection*

*ongoing adaption of the IT portfolio*

## 3.4 Leading People and Change Management

So far, it should have become clear that the implementation of an IT strategy is a multifacet task that deals with technology, processes, and organizational matters. However, there is another variable in the equation, namely the people that are supposed to carry out the strategy. As these people are an important implementation lever (Carpenter & Sanders, 2021), IT leaders have to soroughly lead those people and orchestrate an explicit change process to drive the continuous optimization through the organization, which goes beyond delivering the strategic project in quality, time, and budget.

Before evaluating how the people part of the IT strategy can be best managed, we will first have a short look on who is even needed in an IT strategy project. Johanning (2019) suggests an IT strategy project team of 2-3 people for organizations with 100 employees, and teams of up to 10 people for organizations with more than 500 employees. The project teams should be built from both the IT organization as well as from the business units. It is important to note that, of course, many additional colleagues are included in the process. Moreover, these kind of projects are often accompanied by external consultants who have a neutral view.

Furthermore, the question of responsibilities and the management of the IT strategy project is crucial for the results and the success of the strategy implementation. Therefore, this question should be carefully answered. In practice there are different roles that may lead an IT strategy project (Johanning, 2019):

**CIO**

The acronym stands for chief information officer. This role is responsible for IT strategy and operations within an organization.

* The IT manager or CIO
* An internal IT strategy expert, IT controller or IT governance advisor
* An external, neutral consultant

The project lead should be on account of the entire IT organization. An IT manager or the CIO certainly has this overview, but may sometimes not be the right candidate for political reasons, since taking a neutral position as an IT executive or IT manager towards the own organization can be rather difficult. Moreover, these people are often tied to their daily operations. In these cases, it is useful to hire an external consultancy, who can secure a neutral moderation of the whole strategy lifecycle.

Eventually, the IT project lead has to guide his or her project team and the extended stakeholder circle that is affected by the IT strategy. Any IT strategy can be considered as a form of organizational change that breaks up existing routines and leads to insecurity due to new requirements (Dawson, 2002). Those responsible for the IT strategy should therefore anticipate what the change may mean for the employees involved and how they may react. Doubtlessly, the reactions will differ depending on the individual change readiness of the employees, and the scope of the change. To understand what IT strategy related change may cause, the following change curve illustrates the different phases employees may go through during the IT strategy process. However, it must be noted that not every employee must go through every phase, and that the amplitudes may be different depending on the individual. Moreover, the more targeted the change management, the less serious the reactions and the higher the positive attitude towards the change.

Change curve(Timpo, 2017, CC BY-SA 4.0)

A screenshot of a computer

Description automatically generated with medium confidence

The dynamics on the individual level can be described as follows (Johanning, 2019):

Phase 1: Shock

For those employees with a low change readingess, or in a situation with a high amount of change, the IT strategy project may begin with a kind of "shock". The question arises why an IT strategy is needed and if there are possible (negative) implications for the individual employee (i.e., cuts in salary, terminations).

Phase 2: Denial

Following the shock, the next step may be the "denial". The employees involved do not believe their stake in this project and often tend to overestimate their skills. It often happens in this phase that the employees simply continue as if nothing had happened. Thoughts like “This is just another typical project; I just keep me out of that!” are characteristic. This phase is characterized by excuses and repressions of facts and mere trivializing.

Phase 3: Anger

As the IT strategy project is proceeding, suppressing and belittling is getting harder. Initially, this can cause anger, frustration, or despair. However, this resistance is not sustainable and there is an insight that the imminent change must be accepted if one would like to stay with the company. This resistance phase is crucial for the executives and initiators of the IT strategy project, because it decides about the later success or failure of the IT strategy. It has to be conveyed that there is no going back without the IT strategy and that there are many advantages for the organization and thus the employees. In case of success, the change curve takes a positive trend (we assume this development in the following). In case of failure, the change curve takes a negative trend.

Phase 4: Bargaining (also known as experimentation phase)

After the employees have recognized that further resistance is pointless, the fourth phase follows, namely adapting to the impending change. However, those involved notice that they are still on uncharted territory. The IT strategy changes a lot: IT services that were previously internally provided and supervised, are outsourced, and there are changes and adjustments in the organization. New roles and responsibilities arise, and everyone tries to find his or her way into it. This means a lot of effort under uncertainty for all involved employees.

Phase 5: Acceptance

The more the new structures establish themselves and the old patterns of action disappear, the stronger the realization that one is quite comfortable in the new environment. Routines are formed in the new everyday life and the change has reached everyone involved. That is the phase in which employees show a first clear commitment to the new structures, procedures and roles and responsibilities. Confidence and satisfaction rise. At this point, the change is done, and the new IT strategy has been established.

To accompany and positively influence the above-mentioned process, a dedicated change management is needed. As there are various definitions for the term change management, we follow Chies (2015) who examined change management in the context of technology adoption and understand change management as the management of far-reaching, planned changes in organizations that primarily relate to the people in the organization, while the technical aspect is covered by project management. Against this backdrop, change management in the context of IT strategy projects has four objectives (Chies, 2015, p. 11):

* Acceptance of the technical content of the change
* Acceptance of the necessity and correctness of the change
* Willingness to support the change
* Willingness to support the concrete implementation

### Four areas of change management

To reach these goals, there is an extensive toolbox change managers can utilize. However, explaining the whole change management approach and related tools would go beyond the scope of this module. Thus, the most important areas and exemplary approaches shall be briefly outlined in the following. According to Stolzenberg & Heberle (2009), one can differentiate four key areas of change management that are connected to the phases of technical changes:

**Vision**

The first area of change management is the vision, which should have been developed at the beginning of the IT strategy as overarching guideline anyhow. Besides its technical content, a vision provides motivation, orientation and a team-feeling, which is an important basis for successful change. The aim is to show images of the future that are short and clear and that suit the needs of the employees affected in the future.

**Communication**

Communication is a term for processes in which certain information are sent and received (Chies, 2015). Communication is successful when the information arrives at the recipient in the way the sender intended. Leadership, also in change processes, consists to a large extent of communication. Once the vision, goals, project organization and roadmap have been defined, they must be communicated to the employees. In this context, an easy-to-understand language is recommended. Moreover, it is important with which stakeholders the communication takes place. Stakeholders are people who are affected by or involved in a change project or people who have any other interest in its success (e.g., suppliers, customers, employees, management, owners, authorities, competitors, etc.). Stakeholders can be categorized regarding their power (Who has a lot of influence on the planned change?), attitude towards the project (Who supports or blocks the change?), and level of affection (Who will be particularly hit by the change? Who will need a lot of support?).

All relevant stakeholders must be systematically analyzed, and their needs and concerns must be taken into account. A change project triggers a lot of movement and dynamics among the stakeholders, making it necessary to update the stakeholder analysis regularly (Chies, 2015). Based on the stakeholder analysis, it is helpful to create a communication plan to optimally take various target groups into account. This communication plan compiles what will be communicated to whom, why, when, and how. As such a plan is always a snapshot, a continuous adaption to the respective situation is necessary.

**Participation**

Participation refers to involvement and contribution of employees. The overall aim is to meet the needs of the employees as far as possible. However, this requires a certain room for maneuver, because the more customized an IT solution, the more expensive it becomes. Seldom, there is space to consider all individual requests. If new processes are defined and later implemented, employees of an organization have few real opportunities to participate. Opportunities to help shape the new processes and system solutions, however, promote acceptance and reduce resistance during later implementation. At the same time, those affected in change situations have numerous fears, desires and avoidance goals. Oftentimes, they know what they do not want instead of being able to clearly articulate their wishes. Yet, the few opportunities to participate exist, opening a small leeway within the given standards. To ensure participation throughout the whole IT strategy lifecycle, the following measures should be considered (Chies, 2015):

* Project organigram with distinct roles and responsibilities
* Teambuilding
* Kick-off meeting
* Regular meetings
* Milestone “parties”
* (Interim) result presentations
* Systematic problem solving
* Systematic conflict management

**Enabling**

Enabling means expanding knowledge, learning and gaining practical skills that qualify employees and future end users to take on a new role after the change, or to maintain it despite the change. This includes knowledge of new processes and the use of new templates as well as knowledge of new roles. Qualification generally takes place during all phases of the IT strategy lifecycle. In order to develop purposeful trainings, the qualification needs must be assessed individually for every target group. (e.g., key users, business representatives). Central questions that need to be answered are, for example (Chies, 2015):

* Which people assume special tasks during which project phases?
* Which people will take on new tasks after the end of the project?
* Which people will need further training until the end of the project in order to be able to maintain their existing task?
* Do these people know their new roles?
* Are they prepared for these tasks?
* What training or knowledge do they need?
* Who will convey this knowledge to them?
* Are these knowledge conveyors professionally and methodically and didactically prepared to convey this knowledge?
* Who has experience in organizing a suitably comprehensive training course? Can this person be involved?

### Self-Check Questions

1. Please complete the following sentence: The different phases (the five stages of grief) employees may go through during the IT strategy process are *shock*, *denial*, bargaining, anger, *acceptance*
2. Please list three measures to ensure participation throughout the whole IT strategy lifecycle.

*Project organigram with distinct roles and responsibilities*

*Teambuilding*

*Kick-off meeting*

*Regular meetings*

*Milestone “parties”*

*(Interim) result presentations*

*Systematic problem solving*

*Systematic conflict management*

Summary

After the IT goals are set and the IT strategy is developed, it must be communicated to the relevant stakeholders in the organization. It is advisable to collect the most important information about the IT strategy in a central written communication material. This IT strategy document may contain a management summary, a summary of the corporate strategy and role of the IT, derived IT goals, an as-is analysis and the derived fields of action to achieve the to-be status, a concrete roadmap, an outline of the measurement approach, as well as organizational and procedural implications. As IT strategies naturally come with innovations, they often cannot be delivered within the same organizational and procedural circumstances, but require an adaption here. There are various ways to organize the IT which are located on a continuum between a central and decentral pole. In every case, the organizational structure must provide sufficient touchpoints that support a continuous dialogue between business and IT, whose relationship is impaired due to several challenges that result from different work domains, knowledge regimes and different understandings of the situation. Besides organizational implications, IT strategies also imply a re-design or optimization of IT-related processes. Here, those responsible for the IT strategy may refer to standards such as TOGAF or COBIT. To prepare the strategy implementation and to track the progress during implementation, roadmaps and project portfolios are helpful tools. Lastly, people are an important implementation lever. Thus, IT leaders have to soroughly orchestrate an explicit change process to drive the continuous optimization through the organization, which goes beyond delivering the strategic project in quality, time, and budget.

# Unit 4 – Measuring the Impact of an IT Strategy

**Study Goals**

On completion of this unit, you will be able to …

… understand why measurement is key to success of any IT strategy.

…discuss several tools to measure the impact of an IT strategy.

…differentiate diverse types of indicators.

…select relevant reporting metrics for different stakeholder groups.

# Unit 4 – Measuring the Impact of an IT Strategy

## Introduction

To make sure that defined strategic objectives are reached, , the impact of the IT strategy must be measured. Indeed, the holistic control of the IT project portfolio using the methods of multi-project management and, in connection with this, the monetary evaluation of the profitability and the cost allocation have gained importance in practice. However, IT departments usually only have very limited resources available for IT controlling tasks. Therefore, a set of methods is necessary to reduce complexity.

During IT strategy work, implementation projects for new IT procedures and systems appear particularly critical when it comes to impact measurement. Therefore, it is recommended to integrate IT performance measurement into the project at an early stage, especially during the preliminary analysis and conception phase, but also later before the rollout. A common problem is a lack of cost transparency as insufficient information is available on IT costs and services. Many IT costs are not visible (e.g., system failures due to lack of maintenance). Another pressing problem is the multitude of new cloud applications that make it necessary to carry out a neutral IT strategy comparison and a profitability analysis.

In any case, organizations are confronted with tons of data that need to be aggregated to key metrics, which serve as basis for reporting. Besides a purposeful aggregation, the metrics must meet the needs of the different stakeholder groups, so that they can make informed strategic decisions based on the controlling insights.

## 4.1 Why Measurement is the Key to Success

“If you can’t measure it, you can’t manage it”. This famous expression by Peter Ferdinand Drucker indicates the high importance of measurement in all business activities. Indeed, “as with any other managed object, a strategy should be measured and evaluated to ensure that progress is being made, the results are checked, and the direction is validated” (Limited, 2020, p. 138). That is, the three main objectives of measuring an IT strategy include the progress of the strategy, the performance, and the relevance.

IT applications, customer relationships, and employees, are predominantly understood as intellectual assets and are among the cornerstones of the competitiveness of companies, having a significant impact on their economic success (Kesten et al., 2012). Only if the IT is permanently aligned to the corporate strategy, the IT can develop their potential for increasing business value. Due to the increasing penetration of business processes with information technology, however, the dependency on these systems is also increasing, so that the aspect of IT risk management is also becoming increasingly important. Additionally, the investment budgets also tend to increase.

Resulting from these developments, there is a growing need to apply economically sound methods for measuring the impact of the IT strategy, through which it is possible to work out the IT-specific contribution to success. The associated tasks can be summarized under the term IT performance measurement (Strecker, 2008).

In view of the rapid technological development and the seemingly inexhaustible possibilities associated with IT for rationalizing existing or developing new business models, the use of IT is often viewed relatively uncritically and the associated benefits are not questioned any further (Kesten et al., 2012). Decisions about the proportions of the IT budget in the overall budget and the implementation of innovative IT systems are often made intuitively and depending on the IT affinity of the respective decision maker. On the other hand, it can be stated that although complex IT applications are closely interlinked with business processes and other operational resources, in very few cases a directly measurable effect on the organization’s success, especially on the revenue and savings potential in the departments, can be demonstrated. This complicates both the selection and the effective use of possible measurement instruments. Rather, the selection of measurement tools must link to the business processes on which the IT is supposed to have an influence. It follows that it is not the IT per se which is critical to success, but the way in which IT is used in the organization to optimize processes. The latter must therefore be the focus of IT performance measurement (Kesten et al., 2012).

A holistic IT performance measurement should aim at aligning the IT performance as best as possible with the organization’s strategic objectives, answering the following questions (Kesten et al., 2012, p. 2):

* What opportunities do innovative IT systems open up for increasing the organization's competitive position?
* How can the risks of increasing dependence on IT be managed?
* How does IT contribute to business processes and how can this be assessed?
* How can planned IT applications be prioritized with regard to their implementation?
* How can planned and ongoing IT projects be optimally coordinated in a holistic program management?
* What opportunities are there to control IT projects with regard to the achievement of time, budget and result targets?
* How can the exchange of services between IT and business departments be evaluated and controlled?
* Which methods can be used to support "make-or-buy" decisions in IT and how can the quality of cooperation with external partners be assessed?
* How can the overall operational performance of the IT department be measured and assessed in a holistic system?

A set of methods is required that on the hand is comprehensive enough to provide sufficient assistance in answering all the questions listed, and on the other hand has the necessary practicability to find appropriate solutions to specific problems quickly and with a reasonable amount of effort. In order to handle this trade-off, organizations are well advised to adhere to the following principles for IT performance measurement (Limited, 2020, p. 137):

* Conduct strategy reviews according to the internal and external dynamics (e.g., annual reviews may be advisable in a stable environment, less stable environments may require quarterly or even monthly reviews)
* Build on the existing strategy and adjust it according to the new requirements (rejecting the whole strategy does not make sense in most cases)
* Ensure that budget follows strategy, not the other way around (if economically feasible)
* Align operational reporting (largely concerned with efﬁciency - “do things right”) to strategic reporting (largely concerned with effectiveness - “do the right things”)

The last principle indicates that there may be different levels when it comes to IT measurement. Indeed, the questions raised above relate to different levels of planning, implementation and use of IT in companies, which form the IT performance measurement framework shown below.

Levels of IT performance measurement (based on Kesten et al., 2012)



At the strategic level, it is particularly important to consistently ensure that the IT is related to the corporate goals, expressed through the corporate strategy which sets the frame for the IT strategy ). The introduction of new IT applications and basic technologies as well as expansions and changes in the existing system landscape based on thesestrategicspecifications take the form of projects, which thus form the second level. At the IT operations level, IT performance measurement ultimately steers the ongoing delivery of IT services and includes the use of external partners. In order to sustainably support the operational control of the IT area with regard to the concrete measures to be taken on all three controlling levels, an ongoing performance measurement system must finally be established.

### Self-Check Questions

1. Please complete the following sentence:

The three main objectives of measuring an IT strategy include the progress of the strategy, the *performance*, and the *relevance*.

1. Please name the three levels of IT performance measurement.

*IT strategy*

*IT projects*

*IT operations*

## 4.2 Ways to Measure Strategy Impact

### To manage IT strategy impact, a set of instruments is required that question, prove, and communicate the individual contribution of the IT to business value in a comprehensible manner. In most cases, **metrics** systems are used for this purpose, which, however, often lack the fundamentally important strategy reference. Rather, what is required is an approach that records the strategic objectives, the measures to achieve these objectives, and measurement parameters on the various performance measurement levels (strategy, derived projects, and IT operations). In the following, we will introduce selected tools and frameworks that provide guidance for the measurement of the IT strategy.

**METRIC**

A metric is a measurement or calculation that is monitored or reported for management and improvement.

### (IT) Balanced scorecard as a holistic performance measurement

### The balanced scorecard (BSC) approach (Kaplan & Norton, 1996) promises to meet these requirements as a holistic performance measurement instrument. One of the most important prerequisites for the success of a balanced scorecard is building consensus on the overall direction of the organization. The balanced scorecard was originally developed as a multi-dimensional concept for corporate management. Because of the universality of the approach, it can also be used for other tasks. In the context of IT performance measurement, the methodology must have the identified IT strategy as a starting point, which is to be derived from the corporate strategy. Due to the special requirements that result from the IT strategy, the balanced scorecard model must be modified depending on the context in order to represent an efficient control instrument for the IT area (Kesten et al., 2012).

In this section, the instrument of the IT balanced scorecard is presented, which is a holistic way for measuring the impact of the IT strategy. As such, the IT balanced scorecard is applied by 30% of German organizations to control the IT activities, for example. At Daimler-Benz, for example, the IT scorecard was realized within 700 projects worldwide (Gadatsch, 2020, p. 56-57).

The Balanced Scorecard (BSC) was introduced in the early 1990s by R. S. Kaplan and D. P. Norton as a metric-based management tool. The measuring systems used up to then traditionally focused on financial aspects and strongly oriented towards the past. Also, strategy and operational business were not interlinked, often resulting in unsuccessful strategies. The BSC links the future-oriented corporate strategy and the operational action planning using cause-effect relationships. The BSC contains several networked analysis areas (so called perspectives), for which goals, key metrics, target values ​​and specific measures are determined by means of cause-effect chains. The chosen perspectives are individual but often the areas finance, processes, customers and employees are chosen because they are essential for almost all fields of application. The balanced scorecard can be used for sub-areas, departments or projects down to the individual employee. Applied to IT strategy development, the following table provides an overview of questions answered across the various perspectives as well as corresponding indicators (Gadatsch, 2020, p. 54-55):

**INDICATOR**

A metric that is used to assess and manage something.

|  |  |  |
| --- | --- | --- |
| IT balanced scorecard | | |
| **Perspective** | **Exemplary questions** | **Exemplary indicators** |
| **Finance** | * What contribution does the IT make to the organization's financial success? * How can IT process costs be reduced? | * IT costs per employee * Increase in profitability after an IT project implementation * Number of workstation systems per employee * Share of IT costs in sales / sales volume / total costs |
| **Processes** | * How does the use of information technology improve process quality? * How can IT processes be accelerated through outsourcing? | * Number of complaints, complaints escalations * Number of interventions by executives in operational IT processes * Throughput speed from process input to output |
| **Customers** | * Which products does the IT create for its customers? * How do customers rate the services compared to other service providers? | * Number of visitors to trade fairs, in-house exhibitions and similar events * Processing time for inquiries, complaints, troubleshooting * Share of new customers in the total customer base |
| **Employees** | * Which skills do the IT specialists have? * How can the professional and social skills of the IT staff be increased? * What is the level of employee satisfaction? | * Fluctuation, overtime and sickness rates in the IT area * Number of suggestions for improvement (absolute / per IT employee) * Number of participants in training events, organization parties or organization meetings |

The measurement system for the IT strategy should be linked as closely as possible to the strategic positioning of IT and the strategies derived from it (Kesten et al., 2012). Without this strategic reference, the specification of operational goals or the selection of effective individual measures becomes difficult, and necessary organizational and procedural adaption are hard to justify. The changes introduced by the IT management will, on the one hand, impact the three levels of IT performance measurement (strategy, projects, operations) and, on the other hand, the IT resources (finance, processes, employees, customers) as well as the satisfaction of IT customers (Kesten et al., 2012).

The IT scorecard promotes the strengthening of the entrepreneurial view of the IT department, as the measures it is pursuing must have a business purpose. However, the interactions between the various measures can be not always determined exactly, which necessitates a careful planning. The effort for the introduction and the operation of a BCS is often rated as very high.

**OKR**

This acronym stands for Objectives and key results and is an agile management method.

In addition to the BSC as central way to measure the impact of an IT strategy, there are several other approaches that help measuring the IT strategy which the most important ones are briefly outlined in the following.

### Objectives and key results to define and track strategic goals and outcomes

OKR is a framework for defining, but also tracking and reviewing objectives and their outcomes (Limited, 2020). It is an agile management method that focusses on objectives, to which measurable results (key results) are assigned. OKR is a simple and effective method of setting goals, synchronizing them and making successes measurable.

Being first published by an Intel manager in 1983 (Grove, 1983), the OKR framework is used today by several of the most successful organizations in the technology sector, for example, Google, LinkedIn, Twitter, Uber, and Microsoft. Larry Page, co-founder of Google, states: “OKRs have helped lead us to 10x growth, many times over. They’ve helped make our crazily bold mission of 'organizing the world’s information' perhaps even achievable. They've kept me and the rest of the company on time and on track when it mattered the most.” (Doerr, 2018, preface).

According to Google, objectives express that “what” of the endeavor, in our case, of the IT strategy. Google defines that OKR objectives “express goals and intents; are aggressive yet realistic; must be tangible, objective, and unambiguous; should be obvious to a rational observer whether an objective has been achieved.” (Google, 2018, p. 3). Moreover, the successful attainment of an objective must deliver clear business value for the organization.

Derived from the objectives, key results represent the “how”, in our case, the measures how to achieve the strategic goals of the IT strategy. According to Google, key results in OKR “express measurable milestones which, if achieved, will advance objective(s) in a useful manner to their constituents; must describe outcomes, not activities […]; must include evidence of completion. This evidence must be available, credible, and easily discoverable. Examples of evidence include change lists, links to docs […]” (Google, 2018, p. 3).

Objectives and key results are reviewed on a short time period (objectives are reviewed monthly or quarterly; progress is reviewed weekly). This method enables an organization to rapidly react to any kind of changes.

#### OKR example (Profit.Co, n.y.):

Objective: Improve data disaster recovery process

Key result 1: Rise number of data centers in eastern region from 2 to 4

Key result 2: Decrease the data backup time from 60 to 30 minutes

Key result 3: Increase the number of disaster recovery sites from 3 to 7

### Earned-value-analysis to measure project performance

The ongoing evaluation of projects is an important instrument in IT performance measurement. The earned-value-analysis is used for measuring multiple projects (Gadatsch, 2020). Project leads are often confronted with questions regarding the progress and benefit of a certain IT project, for example, whether the project is still in scope, time and budget. Often there are no suitable answers to these questions because basic data is missing. A comparison of the actual costs of a project with the planned cost leads to incorrect results because there is usually no proportionality of the passage of time and the cost development. The earned-value-analysis determines target costs (theoretically achievable cost value and thus the project value) to avoid this problem, and compares it with the actual costs. Thus, the analysis measures the project performance based on the originally planned costs. The earned-value-analysis as instrument for IT project controlling answers the following exemplary questions (Gadatsch, 2020, p. 81):

* How high are the actual costs?
* How high will the costs be if the course goes according to plan (target costs)?
* Is the project running economically (actual-target)?
* Is the planned service provided (target plan)?

The advantages of the method are that it offers the possibility to build an early warning system, and that key metrics enable a quick information of supervisory bodies (for example, project steering committee). However, the earned-value-analysis can only be used if a complete and detailed project planning is available.

#### Earned-value-analysis example (Gadatsch, 2020, p. 82 ff.):

An insurance company is planning to introduce an online claims processing system to speed up claims processing. An external software company took over the project. A total of five work packages (WP) are planned for the system to develop:

* WP1: Preparation of a preliminary study (1 month, € 20,000)
* WP2: Requirements analysis (2 months, € 40,000)
* WP3: Software selection and procurement (1 month: € 10,000)
* WP4: Customizing and adaptation (3 months: € 120,000)
* WP5: Commissioning the system (1 month, € 25,000)

The project takes the following course: The preliminary study (WP1) is delayed by two weeks due to various circumstances. Through the use of a working student, the costs could be decreased to € 15,000. The requirements analysis (AP2) is carried out completely according to plan with a duration of eight weeks and costs of € 40,000. The software selection and procurement (AP3) delayed around a week because the IT buyer becomes sick and the representative needs more time to familiarize himself. The costs for selection and procurement increase to € 12,000, because there is overtime for training. The work package 4 can be completed after a processing time of 2 months because the insurance company has taken over numerous standard processes unchanged and thus the planned effort is omitted. Due to the use of external employees for customizing, the personnel costs are higher than planned. For the WP4, a total of € 90,000 occur.

After the execution of the earned-value analysis (refer to Gadatsch, 2020, p. 82 ff. for the detailed calculation and formulas), the project has significantly lower costs than planned due to the shortening of the customizing activities. In addition, it is a little faster than expected. Overall, it is a positive project.

### Utility analysis to measure IT investments

One of the classic approaches to make the qualitative benefits of an investment project measurable is the utility analysis, which is widely used in practice due to its ease of use (Kesten et al. 2012). Using a scoring approach, a wide variety of qualitative and quantitative criteria can be assessed and weighted against one another. The result is a point value that is particularly suitable for comparing alternatives with one another. However, it is not possible to make a statement about the monetary effects. Another point of criticism is the pronounced subjective component associated with this process. The criteria and their weightings, and the scores depend to a large extent on the decision-maker’s assessment. In the end, almost every investment alternative can be put into perspective through a clever selection of the parameters. Combinations of the utility value analysis with monetary effects do not represent an improvement, since it is particularly not clear how to proceed in conflict situations (monetary result is negative, qualitative point value is positive).

#### Utility analysis example (Gadatsch, 2020, p. 74 ff.):

An authority sees itself as a national service provider for citizens. It offers innovative services in direct citizen contact. The authority management strives for a digitization of the processes to reduce costs and to increase the perception as an innovative citizen service provider. The management is at the same time very risk-conscious and urges high "IT security". The IT budget released for the next period is € 5 million. The IT steering group receives projects suggestions and must decide about the portfolio for the next period.

Project list:

* Project 1: Introduction of a new merchandise management system on the basis of a cloud solution which stores the data in data centers on all continents. By introducing the system, the authority can save approx. € 0.5 million annually. The project cost is € 2.5 million.
* Project 2: Migration of the content management system to the next release. This means that employees can access all of the documents in real time. The expense amounts to approx. € 0.5 million. The benefits of the project are controversial.
* Project 3: Introduction of an identity management system. Through this application, the authority is able to identify people and assigned rights. Users need less time to familiarize themselves with the system and only need to log in and remember a password. The cost of the project is estimated at € 0.5 million; benefits cannot be quantified.

The ranking of the projects based on the utility analysis can be derived as follows:

* Quantitative benefits / project costs (weighting 1) and strategic value contribution (weighting 2)
* Formula for the utility value: benefits / costs\*2\*strategic value contribution
* The strategic value contribution can assume the following values:
  + 0 = no value contribution
  + 1 = normal strategic contribution
  + 2 = high strategic contribution
* The budget should be used as much as possible. Thus, the order may be changed slightly if this means that remaining budgets can be exhausted.

### Benefit-chain-analysis to measure the effect of an IT application

The central idea of ​​the so-called effect or benefit chains is to create a model of the effects associated with an IT system that takes complex interdependencies into account (Kesten et al, 2012). A single event, for example, the central document storage of a document management system, triggers subsequent effects, for example, a faster access to required information for customer inquiries. The aim must then be to extend these chains of effects down to the level of monetary end effects, for example, increasing sales due to higher customer satisfaction. Even if the benefits have a speculative character with regard to their occurrence and the extent of the effects, the method can be helpful in order to obtain a comprehensive picture of the complex effects of an IT application. For the central task of monetizing qualitative and quantitative effects, at least well-founded indications are provided.

It becomes clear that the complex task of evaluating an IT investment cannot be mastered by an isolated procedure alone. In this respect, it makes sense to develop combined models based on the individual strengths of selected known processes.

Benefit-chain (based on Kesten et al., 2012)



### Self-Check Questions

1. Please complete the following sentence:

The balanced scorecard contains the four perspectives *finance, processes*, customers, and employees.

1. In addition to the BSC as central way to measure the impact of an IT strategy, there are several other approaches that help evaluating IT investments. Please name three of them.

*Earned-value-analysis*

*Benefit-chain-oriented processes*

*Utility analysis*

## 4.3 Evaluation and Reporting of Results

If there is a consensus in the IT department about the operational objectives and measures to be introduced to support the IT strategy, the next step is to define suitable key metrics that at least approximately capture the effects of the implementation of the measures over time. A key metric, also known as **KPI**, expresses “the planned or actual state of a control object at a particular point in time, or over a particular period of time. [It] is calculated from a quantitative, reproducible and objective measurement of a particular quantity” (Hanschke, 2009, p. 293). KPIs serve as basis for the ongoing information of the management (business side and IT side) as well as for the controlling of projects. They enable root cause analyses of the deviations between target values ​​and actual values ​​and signal necessary countermeasures to achieve the goals of the IT strategy (Gadatsch, 2020). The associated control process is shown below.

**KPI**

This acronym stands for key performance indicator which refers to an important metric used to evaluate the success of an object.

IT strategy control process (based on Gadatsch, 2020)

Shape

Description automatically generated with medium confidence

According to Hanschke (2009, p. 294-295), one can differentiate several types of indicators, compiled in the following table:

|  |  |  |
| --- | --- | --- |
| Types of indicators | | |
| **Type** | **Characteristics** | **Example** |
| **Indicators** | | |
| Quantitative indicators | * Measurable | * Availability of an IT system |
| Qualitative indicators | * Must be quantified (for example, via rating schemes) | * Code quality * Customer satisfaction |
| **Absolute numbers and ratios** | | |
| Indices | * Single number * Based on a set of values over time * Shows the evolution of a quantity over time | * Development of IT budget * Number of application users |
| Relationship ratios | * Express one quantity in terms of another | * IT costs to turnover * Cost to benefit |
| Proportion ratios | * Express a quantity as a fraction or percentage of the overall quantity or another sub-quantity | * IT infrastructure costs as percentage of overall IT costs |
| **Benchmarks** | * Require comparative indicators from the same industry or from other segments of the organization * Internal or external * CobiT (Control Objectives for Information and related Technology) or ITIL (Information Technology Infrastructure Library) as common basis to derive benchmarks | * Cost for external consultants * Costs for IT outsourcing |

Organizations usually own a plenty of data; however, the real challenge is to derive insights from it. Therefore, aggregating this data and reporting useful KPIs is crucial. During the KPI selection process, each potential metric should be checked regarding its quality, predictability /analyzability, profitability and organization. In case the KPIs should not have enough positive answers, the performance measure is not suitable for the respective application (Gadatsch, 2020, p. 91):

**Quality**

* What shall be controlled with the key metric?
* Does the key metric measure relevant goals for the IT strategy?
* Does the key metric measure the correct effect?
* Are the key metrics understandable for the recipients?
* How is the quality of the basic data to be assessed (are preparations necessary)?

**Predictability and analyzability**

* Can target ​​or expected values ​​be defined?
* Can corresponding actual values ​​be determined?
* How sensitively do the key metrics react to changes?
* Can the necessary basic data be determined?
* Are the key metrics drill-down capable?

**Profitability**

* Is the effort for the determination of basic data economically justified?
* Can the effort for the determination and processing be justified by a reasonable benefit from the ability to measure the performance?
* Can pragmatic substitute variables be determined?

**Organization**

* Can the employees responsible for data provision, calculation, reporting and for the content of the key metric be named?
* Are the key metrics tamper-proof?
* How do the key metrics react to organizational or technological changes?

As a rule of thumb, the long list of possible KPIs should in the end be condensed on a set of about 20 KPIs (Hanschke, 2009). Obviously, this recommendation can differ depending on the size of the organization, the complexity etc. These key metrics should be documented in a central database by means of a key metric profile. The profile contains a meaningful description (name of the key metric, addressees, reporters, essential content, target values, tolerance values), information about data sources and their preparation, form of presentation, responsibilities, organizational aspects etc.).

KPIs are the basis for reporting. However, reporting is not just about selecting the right KPIs according to the guidelines above, but also about matching the reporting to the target audience. Every IT decision-making group in the IT strategy project has different information needs depending on their hierarchical level and area of expertise that should be reflected in the respective KPI selection and depth of reporting (Hanschke, 2009).

Executive board:

* Main information need: Transparency of factors such as goal achievement, costs, risks and beneﬁts of IT
* Relevant KPIs for reporting:
  + Cost (absolute, historic, and benchmarked)
  + Risk (for example, per project)

**ROI**

The acronym stands for return on investment and is used to evaluate the efficiency of an investment or to compare the efficiencies of several different investments

* + Beneﬁt (monetary savings and optimization potential, business value)
  + Other relevant indicators: “Competitive differentiation, changeability, criticality, turnover or cost contribution, strategic ﬁt, customer satisfaction, cost efﬁciency, **ROI** and ﬂexibility” (Hanschke, 2009, p. 304).

Business managers:

* Main information need: Transparency of how IT supports business value
* Relevant KPIs for reporting:
  + Extent and quality of business support (e.g., standardization of business processes, digitalization of products) and customer satisfaction
  + Segment-specific costs (e.g., for infrastructure operations)

**SLA**

This acronym stands for service level agreement. IT is a commitment between a [service provider](https://en.wikipedia.org/wiki/Service_provider) (here: IT department) and a [client](https://en.wikipedia.org/wiki/Customer) (business unit), regulating aspects such as quality and availability.

* + Reliability of IT services (e.g., **SLA** fulﬁlment) Other relevant indicators: “Degree of dependency, functional ownership, degree of standardization, degree and number of redundancies and inconsistencies or degree of automation, degree of utilization, contribution to strategy, contribution to value proposition” (Hanschke, 2009, p. 304-305).

IT managers:

* Main information need: Transparency of reliability and costs of IT support on both strategic and operational level
* Relevant KPIs for reporting:
  + Strategic level: “Sustainability, degree of standardization or compliance with standards, degree and quality of business coverage, technical quality […], degree of integration or modularization of applications, freedom from redundancy and consistency of business objects, applications, process support and technical landscape model” (Hanschke, 2009, p. 305)
  + Operating level: “IT performance, costs […], beneﬁt, degree and quality of implementation of security and compliance requirements and statutory frameworks, complexity, ease of maintenance or adaptability or extensibility or integration ability, performance, scalability, reliability, availability, downtime or resilience, lifecycle, degree of automation” (Hanschke, 2009, p. 305)

Providing a compact overview in a dashboard for every stakeholder group that compiles not more than five to eight strategic and operative KPIs is a decent way to fulfill respective reporting needs. In order to enable stakeholders to derive concrete actions from the KPIs, the reported values should be equipped with a reference frame that indicates once a certain KPIs reaches an upfront set value, for example, by means of traffic lights. By reporting targeted KPIs of the IT strategy execution, all relevant stakeholders receive the necessary information to execute their governance responsibility more effectively.

However, there are some limitations on measuring and reporting the performance of an IT strategy. In fact, literature only provides scarce information on specific measurement tools for the IT (Kesten et al., 2012). This is not surprising, since the described task areas of IT performance measurement overlap in many aspects with those of controlling in other operational functional areas. In addition, the range of project management tools must be included in the considerations, since essential measurement tasks in IT relate to the control of projects. The complexity of the tasks and the associated variety of systems in IT performance measurement seem to be challenging. The consequence is the flood of numbers indicated above, with which many IT managers are confronted: performance indicators from the service management tools, benchmarking results, or data from project controlling must be analyzed and interpreted and must be implemented in suitable actions. This raises the question of whether the focus is kept on the essentials, on the decisive key metrics and information. The “information overload”, which is generally identified as a controlling problem, is likely to be particularly pronounced in the IT environment.

### Self-Check Questions

1. Please complete the following sentence:

During the IT strategy control process, key performance indicators enable root cause analysis of the deviations between *target values* ​​and *actual values* ​​and signal necessary countermeasures to achieve the goals of the IT strategy.

1. Please list three stakeholder groups for IT reporting.

*Executive board*

*Business managers*

*IT managers*

Summary

To make an IT strategy manageable, it must be measured. Specifically, the three main objectives of measuring an IT strategy include the progress of the strategy, the performance, and the relevance. There are different levels when it comes to IT measurement which form the IT performance measurement framework, namely the IT strategy, the IT projects, and the IT operations. The changes introduced by the IT management will impact these three levels of IT performance measurement as well as the IT resources, i.e., finance, processes, employees, customers. To control the developments in these four areas, the balanced scorecard (BSC) contains several networked perspectives, for which goals, key metrics , target values ​​and specific measures are determined by means of cause-effect chains. Thus, the BSC is a central way to measure the impact of an IT strategy. Besides, there are several other approaches that help evaluating IT investments, for example, the benefit-chain-oriented processes and the utility analysis. As for the reporting of the results of these tools, key performance indicators (KPIs) serve as basis. In this context, the information needs of the reporting stakeholders must be considered and targeted KPIs must be selected.

# Unit 5 – Adapting the IT strategy

**Study Goals**

On completion of this unit, you will be able to …

… differentiate various sources of change for the IT strategy

… explain several approaches that help capturing feedback

… locate different entry points for improvement along the IT strategy lifecycle

… implement improvement measures

# Unit 5 – Adapting the IT strategy

## Introduction

IT strategy work is not done once the goals are set and the strategy concept is designed and in implementation. Rather, IT strategy work is a continuous effort that gets fuels by various sources of change. However, this feedback is not always easy to take, as nobody likes to hear that he or she did not perform well. This also applies to the context of IT strategy work. Here, strategy reviews should be conducted according to the organizations’ needs in order to react to the internal and external dynamics, and the existing strategy should be adjusted according to the new requirements.

In order to not end up in heated debates about who is responsible for the smaller and bigger mistakes that were done throughout the IT strategy lifecycle (“I told you before that your suggested direction would not work for us, but I cannot provide a reasonable suggestion how to make it better!”), there are various approaches how to capture insights on the progress, performance, and relevance of the IT strategy. Luckily, IT executives do not have to reinvent the wheel, but can rely on proved approaches that may already be in use in their organization. For example, the agile management approach Scrum already contains two distinct elements that prepare the stage for reviewing the IT strategy (or rather specific elements of it). As an example, the sprint review is a meeting of the entire Scrum team and the relevant stakeholders, where successes are cherished, and informal exchange is encouraged. Criticisms or suggested changes come as ideas in the backlog and are prioritized again. This enables an open discussion and a conscious decision about further investments. In addition, there are other sources of change and clear directions how to deal with the emerging feedback which is subject of this unit.

## 5.1 Sources for Change: Feedback, Reviews, Results

Organizational members are constantly confronted with sources of change. For example, feedback on how they could improve their performance, or how they could better communicate or treat their employees is often more than they can implement. Indeed, feedback can be a tricky thing because it challenges the status quo and may be understood as personal offense. Thus, many organizations react to feedback with answers such as “So what, we're too busy to do anything about it anyway" (Folkman, 1998, p. 9). However, external input can be a valuable source for change, as external stakeholders (e.g., employees) see things that may not be apparent for those involved directly (Folkman, 1998). In the following, we differentiate three sources for change, namely feedback, reviews, and results.

### Feedback

In human communication, feedback refers to the return of information by the recipient of a message to the sender of that message. In our context, this feedback can refer to any aspect of the IT strategy and can be provided by any stakeholder that is involved in the strategy (for example, employees or suppliers). There are different ways to capture this feedback. The two widest spread ones are the (formal or informal) bilateral feedback, as well as meetings or workshops that are conducted in a group setting.

In every case, when individuals provide or receive feedback on the IT strategy, they should adhere to the general best practices that are relevant in every feedback situation (Capras, 2021). These are:

* Be specific: This rule applies to the feedback giver and the receiver. The person who receives feedback should state exactly what he or she would like to receive feedback on (for example, the strategic goals). To provide effective feedback, the person who gives it should avoid vague or even ambiguous statements.
* Value the positive things: A person who gives feedback gets him- or herself in rage very quickly, especially if he or she is personally affected by the grievance. Moreover, our western culture is used to focus on the negative things, leaving the positive ones which often overweight out of sight. Thus, giving feedback does not only mean to express the negative perceptions but also the positive ones, that can be transferred to further strategic initiatives. In turn, the feedback receiver should respond with appreciations and express his or her thanks.
* Be constructive: Another trap many people who give feedback fall into is that they only complain about the things they do not like, but do not provide concrete suggestions how these things can be improved. However, constructive or corrective feedback can be one of the major sources of change and the IT strategy project can greatly benefit from that.
* Remain respectful: Both the feedback giver and the receiver should avoid disrespectful statements and should never blame their counterpart on a personal level.
* Be self-reflective: No strategy is perfect. For this reason, implementing feedback can significantly improve its quality. These adaptions do not necessarily have to apply to the whole strategic approach, but also incremental adaptions can have an impact.

Obviously, a feedback situation can be a difficult endeavor. Encouraging feedback in a group setting can be even more challenging than having a feedback talk with only one other person. Capturing feedback from a group is a demanding task, as besides the feedback content as such, group dynamics have to be handled. People tend to be more encouraged to speak up openly when they feel supported by others.

Often, group feedback is stimulated in a workshop setting. In order to structure the incoming feedback, there should be a workshop moderator who is impartial, yet equipped with enough functional background to moderate the discussion. Often, this role is taken over by external employees such as business consultants. There are different qualification requirements for workshop leaders (Chies, 2015, p. 52):

* Workshop moderators must be able to support business and IT representatives in articulating their needs
* They need an understanding of different cultures and expressions from internal and external parties
* They need knowledge of moderation techniques; training in moderation is therefore recommended
* They should be able to handle difficult situations and conflicts constructively; knowledge of conflict management and negotiation techniques through appropriate training is therefore recommended as well

Collecting feedback from various stakeholders can take place throughout the whole strategy lifecycle. The earlier constructive feedback is announced, the easier the course of action can be influenced.

### Reviews

Besides feedback in its various form, formalized strategy reviews are another important source for change. In most cases, the terminology of the term “review” is not used precisely, with the result that there are often misunderstandings and misguided expectations among those involved. Despite all the differences, reviews always have a common goal: to ﬁnd defects and evaluate the subject matter at hand (Masak, 2009). All people, including so-called experts with a great technical background, are not free from their mental attitudes. The implementation of IT architecture reviews, for example, can pose problems because a review usually represents a threat and not an opportunity for the employees. The term review includes evaluation, appraisal and comparison of results. However, it is very difficult for those involved to distinguish criticism of their work results from criticism of their own person, which is why reviews are unconsciously perceived as a kind of threat to the own ego (Masak, 2009).

IT strategy reviews should be conducted according to the internal and external dynamics, for example, annual reviews may be advisable in a stable environment, less stable environments may require quarterly or even monthly reviews (Limited, 2020). These reviews can be conducted internally by employees from within the organization, or companies can hire external consultants to review their strategy and to bring external input and benchmark insights.

There are different methodologies to review a strategy that range from less formalized discussion about the objectives, conceptual foundations and implementation activities towards a more formalized review process. Representing the more formalized approaches, there are various approaches that can be used to review an IT strategy or individual components of it. In the following we will present the review part that is part of the **TOGAF** framework, review parts of the Scrum methodology, as well as the management approach objectives and key results (OKR).

**TOGAF**

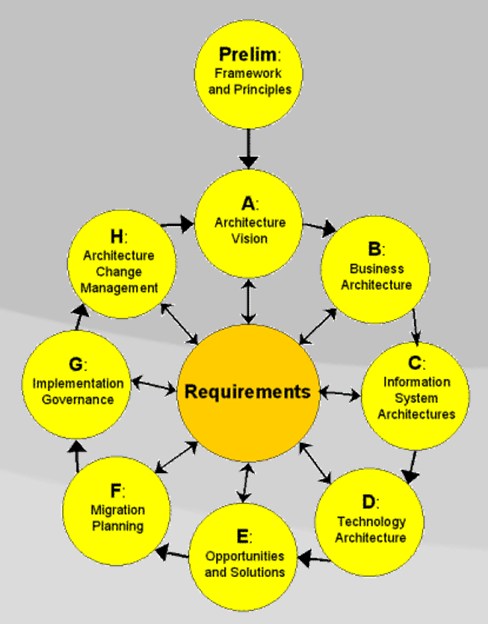
This acronym stands for The Open Group Architecture Framework and offers an approach for the design, planning, implementation and maintenance of enterprise architectures.

### Architecture change management according to TOGAF

The TOGAF framework (The Open Group, 2009) is a tool-independent framework for developing technical architectures (Masak, 2009). TOGAF was created by members of The Open Group Architecture Forum. This forum is an IT consortium made up of end users, service providers, consulting firms, educational institutions and others. As one of the widest spread frameworks in practice (Matthes, 2011), we take TOGAF as example how employees in charge of the IT strategy can gain information for change regarding their IT architecture which is an essential part of the IT strategy.

TOGAF suggests nine phases when it comes to the development of enterprise architectures (The Open Group, 2009). As we are specifically interested in sources of change, phase nine called “Architecture Change Management” is of special interest. This is the phase where tools and surveillance techniques are installed. Thus, technology or business changes and their effects on the architecture can be recognized. Moreover, the value of individual areas for business alignment is continuously monitored here. Risks to the enterprise architecture are managed and recommendations with regard to the IT strategy are formulated. Additionally, this phase contains the analysis of change management and the development of requirements for this change management (Matthes, 2011).

TOGAF: Architecture Change Management (Marley, 2002, public domain)



### Reviews in the Scrum methodology

Scrum is a process model for project and product management, especially for agile software development. The Scrum flow defines the framework in which all development activities take place. It is a sequence of strategic and tactical phases in a sprint. In these phases, the meetings and artifacts are used to ensure that the Scrum team and customer become active together to create the product (Gloger & Margetich, 2018). Particularly, the sprint review and the retrospective are meant to encourage feedback:

#### Sprint review

The sprint review is a meeting of the entire Scrum team and the relevant stakeholders at the end of a sprint in which the team presents the results (i.e., user stories) and receives feedback on it. It is also discussed what will be processed in the next sprint.

The review meetings differ from a regular status update. The latest developments are presented in the review and tried out by the business units and other stakeholders. Only those developments that are finished are presented which ensures that the teams can turn to playful learning which is the real task of the review meeting. The idea is that the team learns more about the development project by trying out different things together with developers, product owners, customers, users and stakeholders. The review is the meeting where successes are cherished, and it is a platform for a more informal exchange. The hard facts have already been negotiated before. If nothing has been delivered, then there is no review either. Criticisms or suggested changes come as ideas in the backlog and are prioritized again. This enables an open discussion and a conscious decision about further investments (Gloger & Margetich, 2018).

#### Retrospective

The retrospective (short: retro) is a meeting after the sprint review in which the Scrum team reflects on the collaboration in the sprint in order to discover potential for improvement and determines changes for the next sprints. Thus, the Sprint retrospective enables the team to learn systematically.

When teams, motivated by large projects as part of the IT strategy, find each other in the thicket of everyday project life, it is often clear that the goal will not be achieved quickly enough, if at all. In the retro, the team searches for the problem collectively or on the basis of individual contributions. In the spirit of continuous improvement, the team regularly looks at their team play together with their ScrumMaster. In this context, regularity is key. Thus, the teams invest exactly 90 minutes every two weeks into the retro, not only when nothing works, but in good times as well.

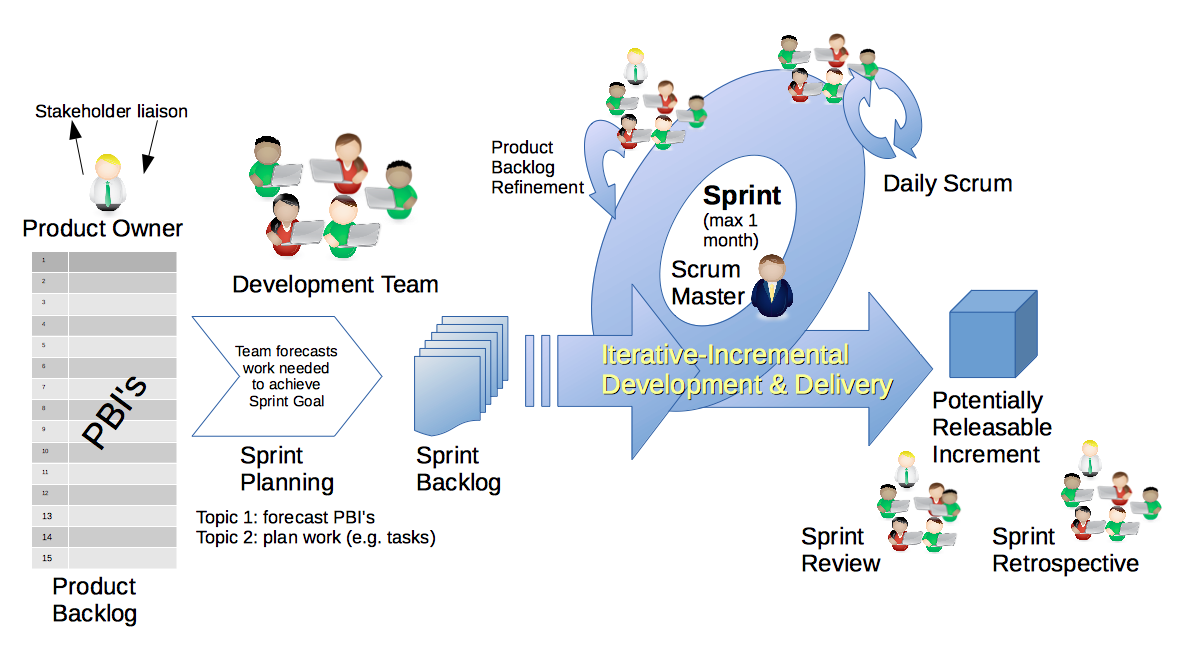
In the retro, the team works on three questions (Gloger & Margetich, 2018, p. 73):

* What have we done particularly well as a team in the past two weeks?
* What has hindered us in the past two weeks?
* What do we want to do better as a team in the next two weeks?

The ScrumMaster (not the project lead) moderates this process and keeps the team focused. Finally, the team prioritizes the obstacles from question 2, separated into those that the team can influence itself and those that the organization can influence. The crucial task here is to prioritize according to the relevance of the obstacle for the next two weeks or a near time horizon. This way it is secured that the team deals with important and urgent problems. However, as the team is also advised to identify issues that they cannot solve themselves but that indicate improvements on a larger scale (i.e., general problems in the enterprise architecture or the IT processes), the retro is of special importance for the IT strategy. In this vein, it needs to be ensured that the evolving strategy-relevant issues are forwarded to those who oversee the IT strategy.

Moreover, the retro indicates that feedback does not only refer to the technical part of the IT strategy, but also to the collaborative aspects. Particularly, the topic of business IT alignment has a high level of collaborative efforts and can be reviewed here.

Reviews within the Scrum framework ([CC BY-SA 4.0](https://creativecommons.org/licenses/by-sa/4.0))



### Objectives and key results

Objectives and key results (short OKR) is a framework for defining, but also tracking and reviewing objectives and their outcomes (Limited, 2020). It is an agile management method that focusses on objectives, to which measurable results (key results) are assigned. OKR is a simple and effective method of setting goals, synchronizing them and making successes measurable. Being first published by an Intel manager in 1983 (Grove, 1983), the OKR framework is used today by several of the most successful organizations in the technology sector, for example, Google, LinkedIn, Twitter, Uber, and Microsoft. Larry Page, co-founder of Google, states: “OKRs have helped lead us to 10x growth, many times over. They’ve helped make our crazily bold mission of 'organizing the world’s information' perhaps even achievable. They've kept me and the rest of the company on time and on track when it mattered the most.” (Doerr, 2018, preface).

The focus of the OKR framework is a three-month, iterative process during which goals and associated key results are defined and their success is reviewed. Goals are formulated at all company levels and are derived hierarchically along the company structure, based on a common vision, via the managing director, the team leader and the individual employee. The goals of the individual employees and teams are not prescribed but are based on the respective overarching goals and are developed directly in the team or by the employee. The resulting artifact is a company-wide overview of goals that can be viewed by every employee. Moreover, results or outcomes can be review against these goals.

OKR is a method that “is focused on defining strategic objectives and their outcomes and tracking both to see that they are achieved” (Limited, 2020, p. 136). Thus, OKR can be applied to any forms of strategy. In our case, IT executives can utilize OKR to monitor the ongoing performance of the IT strategy. Specifically, OKR unfolds its potential “when the data is hard to collect, or when there are no clear links between actions and results” (Limited, 2020, p. 136).

According to Google OKR playbook, objectives express that “what” of the endeavor, in our case, of the IT strategy. Google defined that OKR objectives “express goals and intents; are aggressive yet realistic; must be tangible, objective, and unambiguous; should be obvious to a rational observer whether an objective has been achieved.” (Google, 2018, p. 3). Moreover, the successful attainment of an objective must deliver clear business value for the organization.

Derived from the objectives, key results represent the “how”, in our case, the measures how to achieve the strategic goals of the IT strategy. According to Google, key results in OKR “express measurable milestones which, if achieved, will advance objective(s) in a useful manner to their constituents; must describe outcomes, not activities […]; must include evidence of completion. This evidence must be available, credible, and easily discoverable. Examples of evidence include change lists, links to docs […]” (Google, 2018, p. 3).

Objectives and key results are reviewed on a short time period (objectives are reviewed monthly or quarterly; progress is reviewed weekly). This method enables an organization to rapidly react to any kind of changes. It is vital not to neglect the change effort that the implementation of OKRs as new management tool poses to an organization, as it changes how individuals work and teams collaborate (from outputs to outcomes). All objectives that are defined in the OKR context should be derived from higher strategic objectives (for example, the IT vision).

### Results

Results in the form of “hard facts” may be the most objective source for feedback on the IT strategy. Here, all key performance indicators (KPIs) that result from the previously implemented measurement toolkit (e.g., the IT balanced scorecard) can provide information regarding a necessary strategy adaption. The higher the deviation from the actual KPI value and the target value, the higher the need to carefully explore necessary changes. These hard facts, illustrated by the KPIs, are the most important yardstick to evaluate the performance of the IT strategy project lead and his or her team, and may be the basis for individual performance reviews.

Ideally, the hard facts point into the same direction like the feedback of the employees, for example. In case the feedback of the employees and the numbers do not match, a thorough investigating is necessary, as this deviation may itself be a hint that something goes wrong during the IT strategy implementation.

Eventually, there are plenty of sources of change that IT employees can tap to improve the IT strategy (compiled below). However, the key is to adapt the strategy target-oriented and in accordance with the feedback which is subject to the following section.

|  |  |  |
| --- | --- | --- |
| Selected sources of IT strategy change | | |
| **Feedback** | **Reviews** | **Results** |
| * Informal or informal * Bilateral or in a group | * Architecture reviews (e.g., change management according to TOGAF) * Management approaches * Scrum framework (sprint review and retrospective) * Objectives and key results (OKR) | * “Hard facts” derived from performance measurement tools * Illustrated by means of KPIs |

### Self-Check Questions

1. Please list two elements of the Scrum methodology that can be sources of change for the IT strategy.

*Sprint review*

*Retrospective*

1. Please complete the following sentence:

## When it comes to providing and receiving feedback, our western culture is used to focus on the *negative* things.

## 5.2 Ways to Improve the Strategy

Based on the insights from the various sources of change, the IT strategy can be improved. Generally, there are various entry points within the IT strategy lifecycle where the improvement can take place. Thus, when talking about “IT strategy adaption”, this can refer to various parts of the IT strategy lifecycle:

* Goals: Adapting this part of the IT strategy may create a mountain of work in chain reaction, as the IT strategy goals are the basis for further IT strategy design, implementation and measurement. However, those responsible for the IT strategy may experience that they made wrong assumptions about crucial aspects in the beginning of their strategy work and that changes in the objectives are necessary. Of course, this must not necessarily affect the whole goal system, but can affect only a specific goal.
* Design: Goal adaptions must ultimately be checked regarding their impact of the IT strategy design. Besides this relationship, an adaption of the IT strategy design may also occur in answering specific events that happen during the IT strategy implementation, for example.
* Implementation: As this phase probably is the most resource-consuming phase within the IT strategy lifecycle, it offers to most occasions for possible adaptions. Whenever strategic projects run out of scope, quality, time, or budget, adaptions may become necessary. Also, changes of the goals or design elements of the IT strategy may result in adaptions in the implementation planning.
* Measurement: Naturally, this phase of the IT strategy is meant to be the phase that should shed light on possible adaption needs. However, during IT strategy work it is also possible that the responsible persons find out that their originally designed measurement toolkit does not sufficiently report the IT strategy. This may, for example, lead to additional measurement tools, or a fine-tuning of reported KPIs.
* Business IT alignment: Although this topic is not part of the technical content of the IT strategy, adaption needs regarding the way how the organization aligns business and IT departments during the IT strategy work may occur during IT strategy reviews.
* Business strategy: Obviously, adapting the business strategy as response of IT strategy reviewing is rather unlikely. However, if there is a thorough IT strategy review in place, this may also trigger thoughts about the progress, performance or relevance of the business strategy, which may also lead to adaptions here. Consequently, these changes should be checked regarding possible spill-over-effects on the IT strategy.

Entry points for IT strategy improvement



Generally, issues that relate to an adaption in the field of business IT alignment are harder to implement than, for example, issues related to bugs in the software, as changing individual and / or group behavior is more difficult than systems and processes (Folkman, 1998).

The improvement can thereby tie up to the progress of the IT strategy (in case the strategy is not being implemented as planned), the performance of the IT strategy (in case defined objectives are not reached as planned), or the relevance (in case there are relevant changes in the internal or external environment) (Limited, 2020). In the following, we will elaborate on how to deal with these adaption needs.

### Improving the IT strategy progress

All stakeholders, including the IT strategy lead, have a great interest that the projects and measures used to implement the IT strategy are proceeding as planned. Therefore, a distinct IT strategy reporting helps to make the status quo of the IT strategy implementation transparent and provides early warning when the actual values tend to miss the target values. However, it may happen that a project runs out of scope, quality, time, or budget. In this case, there are different ways to improve the IT strategy progress and to manage the deviations (Limited, 2020, p. 138 ff.):

* Informing the corporate managers and other relevant internal and external stakeholders about possible delays or cost overruns
* Determining whether more and/or other resources are needed to complete the respective IT strategy project as planned and assigning additional budget
* Deciding whether to pursue the strategic initiative as planned or whether to switch to an alternative strategic scenario (necessitates rescheduling of work)
* Altering the IT strategy appropriately

### Improving the IT strategy performance

Completing strategic initiatives does not automatically result in achieving all the objectives of the strategy. There are many other factors at play. For example, the strategy might have overlooked a critical element, or might have underestimated the importance of some aspects of the organization or its environment. A strategy that depends on market acceptance of a technology, for example, will fail if the market rejects that strategy, no matter how well the initiatives have been implemented. Leaders responsible for defining and implementing the strategy will need to know how the organization is progressing against its stated objectives. Some of these will be performance-based (e.g., whether revenue is increasing). Others will be related to achieving a milestone (e.g., achieving cloud-based computing for central applications). Yet others might be measured in other achievements, such as achieving accreditation to deliver a service in a market.

In this case, there are different ways to improve the IT strategy performance:

* Altering the IT strategy to provide an answer to a certain event (e.g., a new competitor took the originally aspired first-mover position in a certain market)
* Switching to implementing an alternative strategy scenario (e.g., the IT strategy was based on a high customer willingness to conduct consultations via an online chat bot, but experience has shown only a limited willingness, which was a substitute scenario in the strategy)
* Assigning extra resources to the change-affected part of the organization (e.g., if customer demand surpasses expectations, additional employees must be hired to process the additional requests)
* Withdrawing from a strategic opportunity, thus annulling the respective element of the IT strategy (e.g., the organization pursued a differentiation strategy that requires IT excellence to support the development of an extraordinary technology-enabled customer service, but the internal IT capabilities cannot be upgraded to fulfil this service)

### Improving the IT strategy relevance

Even if an organization is implementing the IT strategy according to plan, changes in the internal and/or external environment may necessitate an adaption of the IT strategy at any time. In order to stay active within this process and to not only react to these changes, it is vital to monitor the factors of the environment, for example, by using the PESTEL framework that helps separating concerns regarding the political, economic, social, technological, environmental, and legal environment (Ward & Peppard, 2002). Moreover, IT responsible persons must remember “that as soon as the organization starts implementing a strategy, it triggers change […]. Strategy reviews should consider that the strategy itself is causing change, not just reacting to changes in external factors.” (Limited, 2020, p. 139). This indicates that the IT strategy reporting must reflect changes independent of the strategy, as well as cause-effect relationships embedded within the IT strategy itself.

### Prioritization of changes

The biggest challenge in initiating change based on feedback, results or reviews is deciding about the prioritization of issues (Folkman, 1998). Often, there are some pressing points that came up from several sources (e.g., several employees claim that the new application portfolio is too complex) which makes prioritization easier. In other cases, executives must focus their attention and identify what to do first in order to maximize the probability of success. Moreover, every change of the IT strategy must be harmonized with other activities during the strategy implementation and alongside with the daily business. Thus, IT strategy leaders and other executives must learn how to prioritize issues from the various sources of change to implement beneficial adaptions, because once the feedback is articulated, employees expect actions on their input. At this point, transparent communication of how the feedback will be processed is of crucial importance. Managing expectations clearly and providing feedback regarding which priorities are being executed will satisfy the feedback providers.

To prioritize feedback issues, they can be sorted according to the following criteria (Folkman, 1998):

* Felt need: How high is the perceived need to change a certain aspect (e.g., high, medium, low)? When nine out of ten IT strategy project team members perceive that a certain aspect should be changed, this is a strong indicator that this aspect must be on the top of the prioritization list.
* Ease of change: How easy is it to implement a certain aspect? It is advisable to focus on the so-called low hanging fruits first, which are factors that are easy to implement (for example, hiring an intern to get support for easy tasks). This way, employees feel satisfied when they see that their concerns are addressed quickly, and it contributes to their motivation to further work on the IT strategy. As a rule of thumb, “issues dealing with things are much easier to change than those dealing with people” (Folkman, 1998, p. 58).
* Impact: What is the expected impact of the IT strategy adaption on the success of the IT strategy? To evaluate the impact of a certain issue on the IT strategy performance, one can check which issues are the most significant (e.g., essential, necessary, nonessential), and how effective the organization has to be on this issue in order to achieve its strategic goals.

Eventually, the results from all three criteria evaluations together form the final prioritization of which issues to adapt first.

During this lesson, it became obvious that there are plenty of sources of change during IT strategy work which result in a multitude of possible adaptions. Indeed, the reality of IT strategy development only seldom reflects the original ideas. Rather, changes resulting from, for example, employee feedback, new opportunities, or implementation failures let new strategic foci emerge which, in the end, lead to another realized strategy than the intended one, and may leave other strategic aspects unrealized. This reality of IT strategy development is depicted in the following graphic.

Reality of IT strategy development (based on Ward & Peppard, 2002)



### Self-Check Questions

1. Please list three entry points within the IT strategy lifecycle where improvement can take place based on feedback, reviews or results.

*Goals*

*Design*

*Implementation*

*Measurement*

*Business IT alignment*

1. Please complete the following sentence:

The biggest challenge in initiating change based on feedback, results or reviews is deciding about the *prioritization* of issues.

Summary

Employees that are responsible for the IT strategy are constantly confronted with sources of change (i.e., feedback, reviews and results) that can help adapting the IT strategy. Like in every feedback situation, individuals who provide or receive feedback on the IT strategy should adhere to the general feedback best practices: being specific, valuing also the positive things, being constructive, remaining respectful, and being self-reflective. Feedback can be obtained in one-on-one discussions, or more formalized in workshops. Besides workshops, other ways to capture change input are reviews, that can take place, for example, in the form of architecture reviews (e.g., as part of TOGAF), in the form of sprint reviews or retrospectives within the Scrum methodology, or as review part of the OKR method.

Based on the insights from the various sources of change, the IT strategy can be improved. Generally, there are various entry points within the IT strategy lifecycle where the improvement can take place, for example, the strategic goals, or the implementation. The improvement can thereby tie up to the progress of the IT strategy (in case the strategy is not being implemented as planned), the performance of the IT strategy (in case defined objectives are not reached as planned), or the relevance (in case there are relevant changes in the internal or external environment). Here, the biggest challenge in initiating change based on feedback, results or reviews is deciding about the prioritization of issues. To prioritize issues, they can be sorted according to their felt need, their ease of change, and their Impact.

# Unit 6 – Specific Aspects of an IT Strategy: Typical Business Demands

**Study Goals**

On completion of this unit, you will be able to …

…apply tools to implement business IT alignment

…identify goal conflicts in business demands

…differentiate the demand and supply side of the IT

…identify the impacts of compliance regulations on the IT

…understand the role of the IT in merges and acquisitions

# 6. Specific Aspects of an IT Strategy: Typical Business Demands

## Introduction

Experienced IT strategists will not be surprised to reunite with several typical business demands in every new IT strategy project. Indeed, business voices raising needs for a faster, better, and at the same time cheaper IT can be heard often in IT strategy and management meetings. Not surprisingly, these objectives are hard to meet at one time. Therefore, a close alignment of the business and the IT is needed, in order to secure that the organizational focus is put on those projects with the highest expected business value contribution. However, this alignment does not work based only on joint coffee dates but must be facilitated by distinct tools. The related alignment tasks are typically executed by the demand side of the IT, whereas the supply side makes sure to deliver IT service in (less) time, (less) budget, and (higher) quality.

Moreover, there are reoccurring business demands resulting from industry-specific legal regulations that involve IT compliance. In this context, the IT strategy must anticipate related requirements and plan strategic projects to implement respective IT compliance measures. In order not to tail off in the thicket of compliance regulations, organizations can rely on the COBIT framework, which is used as basis for compliance audits, for example. Lastly, a solid IT strategy does not only foster business IT alignment and handles IT compliance confidentially, but also is a strength during mergers and acquisitions.

## 6.1 Implementing Business Requirements & Business IT Alignment

The need to align business and IT does not only become highly relevant during the goal setting and the conceptual design of the IT strategy, but also during the implementation of the IT strategy. Only when business demands are managed efficiently, guaranteeing the best possible support of the business, then IT budgets can be used in a satisfactory manner for all those involved in the IT strategy.

In order to implement and manage business requirements, several tools are recommended, including project portfolio management, service catalogs, and chargeback, which are widespread in practice and therefore described in the following (McKeen & Smith, 2015, p. 295-296):

* Project portfolio management (PPM): PPM is used to prioritize IT investments based on selected criteria. It allows an organization to grasp business needs and to identify the investments needed to deliver IT solutions to accomplish those benefits. The business demand is sharpened as only those projects that succeed in meeting the criteria for IT investments are funded. Thus, PPM yields a perennial prediction of IT budgets that restrains overall business demand and yields increased project inquiry.
* Service catalog: Here, various IT services are labeled with a price tag. For example, “hardware services might include costs for a standard desktop/laptop/tablet configuration and a standard smart phone configuration; application services might include costs for developing a business case, designing a solution, building a solution, and/or implementing a solution.” (McKeen & Smith, 2015, p. 295). Thus, a service-catalog channels IT service orders and demands and makes the implications of demanding IT services more transparent for business and allows managers “to order from a menu rather than saying I’m hungry” (McKeen & Smith, 2015, p. 296).
* Chargeback: This is a financial management technique that charges business units according to the amount of IT services used. Thus, business demand is organized “through direct price-based allocation to business consumers as motivation to act rationally and to discourage unnecessary demands” (McKeen & Smith, 2015, p. 296).

The benefits of these three tools to implement business requirements can be leveraged at maximum level when some best practices are ensured. They start with “defining standardized services, exposing those services to customers via an IT service catalog, controlling and shaping demand through guided self-service, and providing cost transparency through […] chargeback (McKeen & Smith, 2015, p. 296). This way, a “great adoption of cost-effective service options, consumption choices that result in lower IT costs, and effective planning to meet business needs and minimize over-capacity” (McKeen & Smith, 2015, p. 296) can be secured.

The importance of demand management and of aligning business and IT stakeholders results from the close interconnection of business and IT during IT strategy work. The topic of business and IT alignment has been discussed in the information systems literature for more than three decades (Henderson & Venkatraman, 1993). In today’s era of digital transformation, alignment and the relationship between business and IT is still a relevant, yet not completely solved issue (Queiroz et al., 2020). While there are various definitions for alignment, it remains a bit fuzzy what exactly is meant by this expression, how it works, and how it can be reached. We follow the understanding of Chan and Reich (2007) who state that alignment is “the degree of fit and integration among business strategy, IT strategy, business infrastructure, and IT infrastructure” (Chan and Reich, 2007, p. 300). To operationalize alignment, there are various frameworks, one of them being an alignment model called strategic alignment model (SAM) that still serves as a basis for alignment discussions today (Henderson & Venkatraman, 1993). The SAM differentiates two perspectives of business and IT integration, namely strategic and operational. The strategic integration “deals with the capability of IT functionality to both shape and support business strategy” (Henderson & Venkatraman, 1993, p. 476). The corresponding operational integration deals with “the link between organizational infrastructure and processes and IS infrastructure and processes” (Henderson & Venkatraman, 1993, p. 476), underlining the importance of the coherence of the business requirements and expectations and the delivery capabilities of the IT.

Besides this strategic and operational / structural perspective on alignment, scholars discuss social alignment as another, probably the most enduring aspect of alignment (Chan, 2002). This informal structure perspective deals with mutual understanding of and commitment to IT and business objectives and plans among business and IT executives. Relationships are introduced as an important part of the informal structure of an organization (Chan, 2002). In our case, the relationship of business and IT is built by two parties. First, business representatives are managers and lower-level employees that are involved in the primary processes of the organization, e.g., marketing or supply chain. Second, IT representatives are “managers and lower-level employees involved in IT processes, such as IT strategy, development, implementation, and maintenance” (van den Hooff & de Winter, 2011, p.258). In this relationship, IT delivers the technology, and the value from this technology gets unlocked by business. However, business and IT are two different work groups with different work domains and knowledge regimes (van den Hooff & de Winter 2011). Here, tension primarily arises from knowledge and communication shortcomings. Moreover, the relationship is troubled by a lack of trust and respect (Wagner & Weitzel 2012).

To reconcile both groups, several aspects have been identified. Thus, business IT alignment can be enabled by means of strong support for the IT showed by senior business executives, involvement of the IT in the business strategy development, a strong mutual understanding, establishment of business IT partnerships, well-prioritized IT project portfolios, and a strong leadership role of the IT (Luftman et al. 1999).

### Self-Check Questions

1. Please list three measures how to manage business demands.

*project portfolio management*

*service catalogs*

*chargeback*

## 6.2 Reducing Costs, Increasing Speed and Quality

**Supply side**

The supply side of the IT covers the ability of the IT to produce IT services in terms of resource and scheduling constraints.

IT managers have had a strong focus on managing the **supply side** of the IT for decades, aiming at increasing IT productivity by delivering their products and services cheaper, faster, and better to the business (McKeen & Smith, 2015). This is scarcely surprising, as the supply side is in the locus of control of the IT and does not necessitate a deep partnership with the business, which is possibly perceived as challenging. Also, it is a direct reaction on the ever pressing business demand to deliver IT products and services at reduced costs, increased speed and quality, reflecting the traditional IT role of a pure cost factor, providing primarily commodities to the organization (Hanschke, 2009). Moreover, “most IT organizations interpret any role in manipulating IT demand as a political minefield to be conscientiously avoided” (McKeen & Smith, 2015, p. 292).

Eventually, the goal of the supply side of the IT is efficiency, the goal of demand management effectiveness. Those two objectives drive business management across all topics and can be defined as follows (Bea et al., 2020, p. 32):

* Efficiency: Efficiency is the relationship between current output and current input; here, the focus is on safeguarding of profitability in the implementation of operational planning
* Effectiveness: Effectiveness describes the relationship between the current and desired output and can thus be used as a guideline for long-term strategic orientation

An alternative famous interpretation of the two objectives is the following: Effectiveness means doing the right things, while efficiency means doing things right (Hofer & Schendel, 1987).

Looking at the objectives of the supply side, it becomes obvious that the efficiency paradigm moves the securement of the profitability of the IT operations in the foreground. The content of the IT project itself is not fundamentally discussed. For efficient IT operations, the three target dimension costs, speed and quality (Bea et al., 2020) play an important role and are at the core of what business requires here from the IT. The requirements can be described as follows:

* Reducing costs: The height of IT investments has been focus to management discussion since decades. Often, IT is seen as “costs that occur anyway”, which especially holds true for commodity services. Thus, reducing costs is one of the most pressing business demands which is answered with outsourcing and shared service solutions, for example.
* Increasing speed: Ideally, business managers want to have everything that eases their daily business sooner than later. Thus, increasing speed in the provision of IT services is another overarching business demand.
* Increasing quality: Lastly, business seeks to have a satisfying quality when it comes to IT services. This can refer to, for example, the innovative capability of IT services provided, but also to aspects such as system reliability, etc.

**Goal conflict**

A goal conflict always occurs in goal relationships when at least two goals that are to be pursued cannot be achieved at the same time and to the same extent because they are incompatible with one another.

For obvious reasons, reaching all three overarching objectives at the same time is almost impossible. In fact, the three objectives represent a classical **goal conflict**. For example, enhancing the quality of data integration by reducing costs for IT resources at the same time are incongruent goals. Against this backdrop, business and IT managers must jointly and cased-base discuss which goal is to be pursued with priority. Often, these discussions arise during the heat of the moment during the implementation. Here, the IT strategy can help to find the right focus points.

**(Incongruent) goals of IT supply**



In closing, it can be stated that the part of the IT that deals with implementing business recruitments represents the **demand side** of the organization. Here, the major objective is to secure IT effectiveness. In comparison to this, there is the supply part of the organization, which aims at providing IT services in time, quality and budget. Here, the major objective is to secure IT efficiency.

**Demand side**

The demand side of the IT manages orders of IT services and products.

### Organizing the demand and supply side of the IT

Considering the above-mentioned explanations, the question arises about how these two sides of the IT can be organized. Indeed, many organizations split their IT into two parts, namely the demand and the supply organization (Johanning, 2019). With the demand / supply organizational model, the IT can grow out of its technical and commodity role. With the demand branch, the IT can move closer to the business departments and the management to proactively recognize the business requirements at an early stage. The top management is also actively involved and provides the strategy that serves as basis for the IT. The supply branch represents the former technological core of IT.

In the demand / supply organizational model, the demand branch contains the following units (Johanning, 2019, p. 201):

* Request and change management (demand management)
* Cost / benefit and profitability analysis
* IT process management

The supply branch can be operated internally as well as externally, but also as a hybrid model between internal and external components. The supply branch includes the provision of IT services in the form of applications and their basis through infrastructure and IT operations. The following areas or departments are typical assigned to the supply branch (Johanning, 2019, p. 201):

* Application development and support
* IT quality and test management
* Operations and infrastructure

The necessity of managing business demand is well established, as well as the balance of the demand side with the ability to produce products and services accordingly, which reflects the supply side (Gentle, 2007). One might assume that the IT department, which can be seen as “a company within a company” that delivers IT products and service to its customers, represented by the business units, has well established practices for IT demand. However, demand management is one of the top strategic priorities by IT leaders since years. The following graphic summarizes how the demand and the supply side of the IT can be implemented by means of the demand / supply organization.

IT demand and supply side (based on Johanning, 2019)



### Self-Check Questions

1. Which two sides of the IT can be differentiated?

*Demand side*

*Supply side*

## 6.3 Time to Market

**Time to market**

The term "time to market" means the time needed from product development to placement of the product on the market. During this time, the product incurs costs, but it does not generate any revenues.

A typical business requirement which is often reflected in any objective of the IT strategy is the improvement of the so called **time to market**, which in our case describes the time frame from the day the business demand is articulated until the day the business demand is implemented, for example, when the business can finally use the application (“internal market”), or the customers of the organization can use a new technology-enabled service (“external” market). Not surprisingly, business managers are interested in improving the time to market, as belated IT projects can jeopardize the competiveness of the organization.

However, the problem of decreasing the time to market or increasing efficiency does not only lie in the responsibility of the IT (Johanning, 2019). Instead, the topic of business IT alignment gains importance here, as time to market can be improved only in close cooperation and based on a better understanding of the technical possibilities on both sides. Not only IT has to open up to the business departments, but also the business departments must become more tech-savvy, understand better what is technically possible and how it can best be used for the organization’s purpose. In this context, the IT strategy can help to improve time to market by sustaining the process of close collaboration between business and IT. Also, concrete strategic projects such as outsourcing can help improving the time to market.

### Self-Check Questions

1. Please complete the following sentence:

The time to market describes the time frame from the day the business demand is *articulated* until the day the business demand is *implemented.*

## 6.4 Compliance

Compliance is a term that is used more and more often in connection with IT strategy work and IT management. Indeed, it is an important topic as it has the potential to cause high additional costs that are made necessary by fulfilling legal requirements. The implementation of compliance measures also regularly affects the IT area. In some cases, the regulations are also backed by a rather strict management board liability, which means that the associated measures are implemented vehemently in the organization (Keller, 2017).

Compliance is defined as “the practice of obeying rules or requests made by people in authority; procedures that must be followed to ensure full compliance with the law” (Oxford Online Dictionary). Therefore, compliance means, completely unspecific, that one adheres to laws and rules. At first sight, this has little to do with IT management. However, if you were the IT director of a pharmaceutical company, for example, you would be able to report that the obligations to provide evidence for the approval of pharmaceuticals force you to purchase suitable document management systems that go far beyond what a normal electronic archive, e.g. those by a bank, would do.

Although compliance is very industry specific, there are various topics that are mentioned frequently with regard to compliance which are of direct importance for the IT in many industries (e.g., IT security, IT availability). However, it would be impossible to write a complete chapter on compliance for even one industry and one country that would not be out of date in a short time. To get a feeling for how many IT compliance regulations are out there, one may take a look at the **Unified Compliance** framework pages at www.unifiedcompliance.com. The list of around 400 potentially relevant documents that are required when doing business in the USA alone is impressive. For this reason, we will showcase only selected examples to demonstrate the effects compliance issues can have on corporate IT in the following. Examples of terms that are more frequently discussed among IT managers under the umbrella term compliance include (Keller, 2017, p. 201):

**Basel II**

Basel II is a report on the "International Convergence of Equity Measurement and Capital Requirements" for internationally active banks.

**Unified Compliance**

Unified Compliance is the integration of processes and tools to aggregate and harmonize all compliance requirements applicable to an organization.

* Basel II and Basel III
* Solvency II
* Sarbanes-Oxley Act (SOX)
* Newer regulations for electronic bookkeeping and archiving of business documents

Apart from Solvency II, which essentially only concerns insurance organization, the remaining issues potentially affect the IT of all industries. IT managers should have a little more than a vague idea of ​​what these regulations mean for their organization, and must integrate respective measures to comply to these regulations within the IT strategy. For this reason, the most important regulations and how they affect the IT are specified in the following.

### Basel II and Basel III

The basic of **Basel II** **and III** (Bank für Internationalen Zahlungsausgleich, 2004) is that in major economic nations the national banking supervisory authority imposes requirements on the banks as to how much equity they have to hold if they want to grant a certain volume of loans with a certain risk. As it can happen that debtors can no longer meet their payment obligations, every loan granted therefore also represents a risk for the banks. The existence of an adequate equity base means that a bank will not collapse if a certain number of debtors no longer meet their payment obligations. The international banking system is supposed to be secured against the fact that individual larger failures throw the entire world economy out of balance in a domino effect. Realizing these requirements presupposes several things for organizations. The banks must be able to quantify the risk of their credit portfolio according to uniform, reproducible and verifiable principles. Moreover, there must be rules as to how to deal with risks (Keller, 2017).

**Data warehouse**

A data warehouse is a central database, optimized for analysis purposes, which brings together data from several, usually heterogeneous sources.

This imposes extensive, functional additions to the banks' IT systems. For the IT architectures of banks and for Basel implementation projects, Basel II meant at that time that one had to think about how to implement the approximately 240 pages of the document (Bank für Internationalen Zahlungsausgleich, 2004). This document neither contains detailed instructions nor detailed technical specifications for what is to be done, but rather texts that can be interpreted relatively freely. At least the following measures are required for this on the IT side (Keller, 2017, p. 205):

**Data mart**

A data mart is a partial database of a data warehouse that is kept as a copy for a special purpose.

* A **data warehouse** or **data mart** is to be implemented in which incoming payments for loan servicing are recorded
* A statistical financial modeling tool has to be acquired with which one can statistically simulate changes in cash receipts

About 20 percent of the about 240 pages contain a potential IT investment in the six-digit Euro range if the corresponding applications are not already available in the organization (Keller, 2017). IT strategies must anticipate similar upcoming regulations and set up strategic projects accordingly in order to secure that their IT is compliant.

### Solvency II

**Solvency II**

Solvency II is a directive of the European Union, with which the European insurance supervision law was fundamentally reformed.

Solvency II is the analogue of Basel II for insurance organizations. The insurance supervisory authority can determine whether sufficient equity is available for the risks accepted by the insurer. In insurance contracts, the customer's rating at a bank corresponds to the risk assessment for the risks to be accepted. For insurance companies, for example, customers have always had to undergo a medical examination if they want to buy a life insurance that has certain characteristics.

Corporate IT managers from insurance companies will in future be confronted with lists of claims similar to those of their colleagues in banks in the context of Basel II and III. Larger and not very inexpensive IT projects have to be planned in a timely manner, thus calling the IT strategy on the plan.

Sarbanes-Oxley Act

**Sarbanes-Oxley Act**

The Sarbanes-Oxley Act

Is a US federal law designed to improve the reliability of reporting by companies that use the US public capital market in response to accounting scandals by companies like Enron.

The Sarbanes-Oxley Act (SOX) is an act to “protect investors by improving the accuracy and reliability of corporate disclosures made pursuant to the securities laws, and for other purposes (Senate and House of Representatives of the United States of America, 2002, p. 1). The aim is, as with Basel II and Solvency II, to increase the security of the financial system. Even if the means in this case are different, namely to put pressure on the reporting system not being manipulated by publicly traded companies, and delivering results that are as close as possible to the legally defined requirements. The board of directors must therefore ensure that its reporting (quarterly reports, annual balance sheets, etc.) is 100 percent accurate. Since the threat of punishment also applies if figures have simply been incorrectly calculated due to IT errors, for example, they will have to strengthen their internal control system so that fraud in the company's financial reports are diminished. If a company can be proven that it

* has general security gaps in the IT, i.e., is susceptible to hackers,
* does not secure its data properly which can cause economic damage
* does not plan (IT) projects properly and therefore has not-designated financial risks
* does not test its software properly and thus runs the risk of expensive production errors,

then this can always be assessed as a violation of a proper risk report (Keller, 2017, p. 210). This means that in a company that is affected by SOX, the IT has to be made bullet-proof and the usual negligence can no longer be afforded. The list can be greatly extended. As a rule, at least the COBIT framework (ISACA, 2019a), short for Control Objectives for Information and Related Technology, should be implemented (see section below). For the IT, a successfully passed COBIT audit has established itself as the de facto standard for checking whether the IT corresponds to the state of professional practice.

### Archiving of business documents

More banal than the guidelines and laws presented above are the archiving requirements that can be found in the context of tax legislation. In Germany, for example, the so called Abgabenordnung (Bundesamt für Justiz und Verbraucherschutz, 2021) contains several storing duties. From this law, two examples are briefly presented in the following, each of which can cause considerable costs in the IT (Keller, 2017, p. 213-214):

* E-mails must be archived: Received and dispatched commercial and business letters are to be archived for six years. Since e-mails can also contain declarations of intent or simply information such as offers, price information, this means that they must be archived for at least six years, too.
* Old IT systems must be kept ready: Imagine you want to switch off a system for managing life insurance contracts in an insurance company because, for example, the provider is stopping the maintenance for the system software. You are then nevertheless obliged to keep the system operational for another ten years, so that at least information and evaluations are possible at the discretion of the tax authorities. Fulfilling this requirement can be expensive. It is explicitly not sufficient, for example, to print out all contracts from the system and to archive them optically.

Concluding, compliance requirements of all kinds must be considered in the IT strategy design (in order to anticipate requirements early and to react in a timely manner) as well as in the implementation (in order not to implement, for example, an IT infrastructure that is hard to adopt to compliance-related future requirements).

#### COBIT as basis for compliance checks

In practice, COBIT is often used for compliance checks, e.g., as part of a SOX or Basel III audit. A COBIT test is evaluated as proof that the IT of a company basically meets the requirements of SOX or Basel III. In order to demonstrate what would be considered as proper IT planning in a SOX audit or a Basel III audit, the process “APO02 Manage Strategy” (ISACA, 2019b, p.57) from the COBIT domain “Align, Plan and Organise” (ISACA, 2019b, p. 49 ff.) is presented below. Specifically, the progress goals in the context of the IT strategy and related metrics (“measurement or calculation that is monitored or reported for management and improvement”, Limited, 2020, p.222) are extracted in order to showcase how it can be measured whether the IT strategy fulfils the necessary compliance requirements.

|  |  |
| --- | --- |
| COBIT-5 process APO02 (Manage strategy) | |
| **Process goal**  (all explanations are directly quoted from ISACA, 2019b, p. 57) | **Related metric**  (all explanations are directly quoted from ISACA, 2019b, p. 57) |
| “All aspects of the IT strategy are aligned with the enterprise strategy.” | * “Percent of objectives in the IT strategy that support the enterprise strategy” * “Percent of enterprise objectives addressed in the IT strategy” |
| “The IT strategy is cost-effective, appropriate, realistic, achievable, enterprise-focussed and balanced.” | * “Percent of initiatives in the IT strategy that are self-funding (financial benefits in excess of costs)” * “Trends in ROI of initiatives included in the IT strategy” * “Level of enterprise stakeholder satisfaction survey feedback on the IT strategy” |
| “Clear and concrete short-term goals can be derived from, and traced back to, specific long-term initiatives, and can then be translated into operational plan” | * “Percent of projects in the IT project portfolio that can be directly traced back to the IT strategy” |
| “IT is a value driver for the enterprise.” | * “Percent of strategic enterprise objectives obtained as a result of strategic IT initiatives” * “Number of new enterprise opportunities realised as a direct result of IT developments” * “Percent of IT initiatives/projects championed by business owners” |
| “There is awareness of the IT strategy and a clear assignment of accountability for delivery” | * “Achievement of measurable IT strategy outcomes part of staff performance goals” * “Frequency of updates to the IT strategy communication plan” * “Percent of strategic initiatives with accountability assigned” |

### The goals listed in the table above are more than reasonable. However, this makes it clear that an organization without a strategy will find it difficult to pass a COBIT-5 audit. In order to score well in a COBIT audit, a corporate strategy and an aligned IT strategy must be in place.

### Self-Check Questions

1. Which framework can be used as basis for compliance audits?

*COBIT*

**M&A**

M&A is short for Mergers & Acquisitions. This is a collective term for transactions in the corporate sector such as mergers of companies and company sales and acquisitions, as well as special forms such as takeovers, spin-offs, and carve-outs.

## 6.5 Mergers & Acquisitions

A well-functioning IT plays an important role in **M&A** activities of companies. In this context, questions of how the existing IT can be taken over or integrated are of major relevance besides other topics such as strategic issues, for example. According to the global consulting firm McKinsey, IT often makes up more than half of the synergies in a merger (Sarrazin & West, 2011).

Before discussing the role of the IT within M&A, we want to quickly elaborate on the M&A process as such. A typical M&A transaction follows the steps outlined hereinafter (Engelhardt, 2017, p. 3 ff.):

* “Beautifying" the bride (i.e., to organization that is to be sold) and, if necessary, reorganization and repositioning
* Finding a buyer: If the market is experiencing an increased supply of liquidity, vendors often approach a large number of potential buyers (strategic investors or financial investors) to find the optimal purchase price. The approach usually takes place via M&A advisors or banks or law firms in the context of a bidding process or auction.
* First discussions and letter of intent (LOI): In the so-called letter of intent the cornerstones of the planned transaction are agreed. It includes both organizational issues (e.g., schedule, participants, exclusivity) as well as the core issues of the subsequent purchase contract, as far as already foreseeable (e.g., purchase price).
* Due diligence: In the due diligence check, the prospective buyer checks what is to be acquired as closely as possible to identify potential risks of the transaction. Only significant risks are considered, as in the case of a company acquisition there are many uncertainties. The results of the due diligence check are so-called due diligence reports and are also reflected in the sales contract. Another reason for performing due diligence lies in the responsibility of the buyer (i.e., board member or managing director) towards their own company or the own shareholders. Conversely, the seller also has a reasonable interest in carrying out a due diligence so that any rights of withdrawal or excessive safeguards can be avoided. The due diligence is usually a focus of the overall M&A project. Increasingly, the topic of compliance becomes a separate area of ​​due diligence reports, which also covers IT compliance.
* Contract negotiations
* Signing and closing: Signing is the notarial certification of the purchase contract, and closing refers to the point in time at which the transaction is completed.
* Implementation and integration

During M&A, the IT is put to the test especially during the due diligence phase. Here, the prospective buyer wants to check what is to be acquired as closely as possible (Engelhardt, 2017). The goal of the due diligence is the identification of potential risks for the buyer. Major activities concerning the IT are the identification of IT risks that may potentially break the deal, as well as effort estimation for integrating the new IT into the existing organization (Johanning, 2019).

To get a holistic overview of the status quo of the IT during the due diligence, a similar approach like in the as-is-analysis can help to assess the integration effort before the purchase or takeover (i.e., analysis of the IT strategy, IT processes, IT architecture, IT measurement cockpit etc.). Generally, if an organization is planning an acquisition or will merge in the foreseeable future, an IT strategy is the best basis for all decisions regarding IT M&A. It paints a clear picture of what IT looks like and what it will look like in a few years’ target. This clearly structured initial situation is ideal for comparing the current IT of the buyer with the additional IT of the purchased organization.

Besides its prominent role during the due diligence phase, the IT is also involved in the following phases of a M&A transaction with distinct activities (Johanning, 2019, p. 30):

Merger planning: Creating a vision of the joint future

* Development of an initial idea for the reorganization or integration of the IT
* Development of an IT integration framework
* Migration and integration of the most important data streams and systems
* Definition of clear service transition rules
* Calculation of the integration budget

Post-merger integration: Executing the plans

* Implementation of future IT services
* Review of and compliance with the service transition rules
* Migration of all data
* Execution of retention and severance plans
* Shifting to business as usual

Synergy realization: Reaping the benefits of the M&A transaction

* Execute decommissioning plans
* Track synergies
* Implement long-term IT transformation programs

### Self-Check Questions

1. Please name the most important phase during M&A activities where the IT is put to the test.

*Due diligence*

Summary

In order to allocate IT resources efficiently, business demands must be managed. Typical business demands are to increase speed and quality and to decrease costs, which build a goal conflict when aimed at all together. In order to implement and manage business requirements, tools including project portfolio management, service catalogs, and chargeback can help IT managers.

Regulations that come with partly immense implications for the IT compliance are Basel II and Basel III, Solvency II, Sarbanes-Oxley Act (SOX), and newer regulations for electronic bookkeeping and archiving of business documents. The framework COBIT is often used for compliance checks. In order to pass COBIT-based audits to satisfaction, a solid business and IT strategy need to be in place. Lastly, a well-designed IT strategy and derived IT capabilities play an important role in mergers and acquisitions of companies or parts of companies. If an organization is planning an acquisition or will merge in the foreseeable future, an IT strategy is the best basis for all decisions regarding IT M&A.

# Unit 7 – Building Blocks of an IT strategy

**Study Goals**

On completion of this unit, you will be able to …

…explain why IT governance, risk management and security are important aspects of any IT strategy

…understand the importance of IT service management

…use ITIL as framework for IT service management

…discuss how application portfolios and enterprise architectures are intertwined with the IT strategy

…evaluate different IT sourcing options

# Unit 7 – Building Blocks of an IT strategy

## Introduction

Despite the fact that every IT strategy has to be developed individually based on the needs of the receptive organization, there are various building blocks that are at the core of almost every IT strategy design or re-design. These are, for example, that the IT strategy has to define IT governance rules as well as risk management and security approaches. The other way around, changes in these areas have to be investigated in regard of their potential implications for the existing IT strategy.

As technology is proceeding faster than ever before, developments in cloud computing, big data analytics, block chain, and related technologies enable new business models and ways for value generation. Thus, the IT is becoming an important value driver and foundation of competitive advantage. This makes IT service management a key strategic capability, which is why the IT services and their management are also an important building block of the IT strategy.

As these new developments bring new IT applications into the organization, the application portfolio management does not only become an important operational, but also strategic task. In a bigger context, the IT strategy does not only have to deal with technological applications, but also with their embedding in the overall enterprise architecture, which also contains the business strategy, organization, and processes, amongst others. However, an organization does not have to execute everything IT-related itself, but can rely on external providers, which makes strategic sourcing decisions another important building block of the IT strategy.

## 7.1 IT Governance, Risk Management, and Security

Speculation losses at banks, illegal interest rate manipulations, data theft and other triggers led to stricter regulations of IT use (Baumöl, 2012). At the same time, these incidents also led to drastic cuts of IT budgets. From this tension field, two major challenges arise for the corporate management: first, the entire IT must correspond to these requirements, and second, the value of IT needs to be determined even more consciously so that budget cuts do not become an automatism (Baumöl, 2012).

In order to secure that the IT is delivered as expected, the entire IT must be aligned accordingly in the organization - not just from an IT perspective, but much more from the view of the business departments, their language and their mindset. This can only be achieved through a framework that defines the relevant cornerstones and provides a guideline, which is called IT governance. Derived from the corporate governance which “constitutes the entire accountability framework of the organization” (**IFAC**, 2004, p.6), IT governance “includes all the activities of business/IT alignment, planning, execution and governance of IT, as well as the leadership of those entrusted with the task” (Selig, 2008, p. 3). More precisely, IT governance “formalizes and clarifies oversight, accountability and decision rights […]. It is a collection of management, planning and performance review policies, practices and processes“ (Selig, 2008, p. 9). Thereby, associated decision rights “establish authority, controls and performance metrics over investments, plans, budgets, commitments, services, major changes, security, privacy, business continuity and compliance with laws and organizational policies” (Selig, 2008, p. 9).

**IFAC**

The acronym stands for International Federation of Accountants which is an international association of auditors.

Against the background of the above mentioned understanding, IT governance is an indispensable basis for the development of the IT strategy (Baumöl, 2012). Therefore, it must be clearly differentiated between the governance of the IT, i.e., the setting of guidelines, and the actual management of the IT, i.e., the active leadership based on the guidelines. With that, IT governance is an indispensable part or even a prerequisite for strategic IT management.

The purpose of IT governance is multifold (Selig, 2008, p. 9):

**VOC**

The acronym stands for Voice of the Customer. The term is used in the business IT context to define the process of collecting business demands.

* to synchronize IT and business investments and priorities
* to consistently manage business demands, improving the **VOC**, and the resulting work within the IT
* to secure responsible (IT) resource utilization
* to create and secure roles, responsibilities and decision rights
* to ensure that the IT department delivers in time, quality, and budget
* to proactively manage risks and change
* to improve IT performance, IT maturity, IT compliance and IT outsourcing initiatives

When managed properly, all relevant stakeholder groups in an organization can benefit from IT governance (Selig, 2008, p. 10):

Executives gain business enhancements that result from well-informed participation in IT-related decisions; moreover, they can benefit from optimal IT investment allocation, and they can secure that the corporate IT is compliant with laws and regulations

Business managers can assure that their joint business and IT resources are being managed effectively, and they benefit from higher commitment due to well established contact persons in the IT

IT managers receive top-management backing and a clear strategic and operational focus, and can improve their relationship with business by delivering outcomes “in a more predictable and consistent manner, with the involvement of the customer” (Selig, 2008, p. 10)

Strategy, program, and project managers receive help in driving their initiatives, in reviewing the progress and performance, and they benefit from faster decisions

Ultimately, all employees involved in the IT strategy benefit from governance as it eases communications about how IT contributes to business value, improves collaboration and synergies between business and IT as well as within the various units. Moreover, it leads to less stress, higher employee satisfaction, and, most likely, increases IT strategy performance throughout the whole lifecycle. Selected tasks of IT governance are the active management of IT risks as well as the ensuring of IT security, which will be described afterwards.

### IT Risk Management

**Risk IT**

ISACA’s Risk IT Framework offers a structured approach for organizations to manage IT risks.

During IT strategy projects, the technical content as such is increasingly upstaged, and the effort for risk management, compliance and IT security are steadily increasing (Keller, 2017). Therefore, risk management is, amongst others, an important building block of the IT strategy. The fact that IT governance, IT risk management, and IT security are more and more viewed as one unity can be seen from the fact that the corresponding ISACA frameworks (Information Systems Audit and Control Association), namely COBIT, **Risk IT** and **Val IT** have been merged in the current fifth version of COBIT (ISACA, 2019).

**Val IT**

Val IT is a governance

framework that can be support business value creation from IT investments.

Generally, a risk is the probability that an event will occur which negatively influences the goal achievement (COSO, 2004). In general, three large blocks of IT risks can be differentiated (Keller, 2017, p. 273):

* The risk that the IT value contribution is not delivered: This risk class contains all the factors that have the potential to prevent the planned value contribution of the IT
* IT program and project risks: This risk class contains the “normal” risks of business operations, for example, unexpected costs or performance problems that negatively affect the success of the project (and probably in consequence, the whole IT strategy)
* IT operations and service delivery risks: This risk class contains all events that occur in the day-to-day operations of the IT and that may harm the organization. This can be both system shutdowns as well as software errors during operation

To manage IT risks, organizations may proceed according to the following process blueprint (Keller, 2017, p. 274):

* Goal setting: A proper development and documentation of all (strategic) goals, which can be negatively influenced by certain event, is essential as first step
* Identification of events: The IT risk manager identifies together with the affected business departments possible events that could interfere with achieving the (strategic) goals. In this step, these events are only listed and described
* Risk assessment: Further, it must be assessed whether it is necessary to take countermeasures for the respective risk. For example, if a risk leads to a damage of 100,000 euros and countermeasures would cost 500,000 euros, such a risk will be simply accepted. Here, organizations define risk classes, with each risk class stating whether it is acceptable for the company or whether countermeasures are defined. The graphic below presents a template of a typical risk assessment according to the risks’ impact and their probability of occurrence:

Classification of IT risks



* Risk reaction: This is where the assessment is made of whether measures have to be initiated to reduce the likelihood of the risk (mitigation: avoid), whether the risk is acceptable (mitigation: accept) or whether it can be shared with others, for example, an insurance company (mitigation: share). In the end of this phase, there should be no more risks that are unacceptable, or at least there should be appropriate measures defined in order to bring the risks into the acceptable range within a defined time
* Control activities: These activities deal with whether the risk responses can actually be implemented

**Random sampling**

A random sample is a subset of objects selected from a larger set in which the objects are selected randomly, with equal probability

* Monitoring: It must be ensured on a permanent basis by **random sampling** that the organization's risk management is working as intended

The following graphic summarizes the IT risk management process.

IT risk management process (based on Keller, 2017)

### IT Security

Gathering information and know-how nowadays play an increasingly important role in organizations. An organization’s computer system often contains all of the major company secrets and, for the most part, sensitive data from customers and business partners. Unauthorized access to such data can ruin an organization in a number of ways. Protecting this information must therefore be given high priority, which makes IT security another important building block of the IT strategy.

Security requirements can come from different sources (Keller, 2017, p. 223):

* Documented security requirements from the business units
* Security requirements prescribed by law (e.g., data protection law, product safety / product liability)
* Security requirements from relevant organizations (e.g., insurance industry)
* Requirements arising from voluntary commitments, corporate philosophy or the brand image

In this context, two different categories of requirements can be distinguished (Keller, 2017, p. 223):

* Functional requirements: These are functions that are visible to the user and that can be implemented directly by the programmer. They describe what the software should do (examples: logging, authentication, authorization)
* Non-functional requirements: These are requirements for the circumstances under which the required functionality is to be provided (i.e., hacker resistance)

IT security considerations during IT strategy work span three dimensions (Keller, 2017, p. 224). First, there must be security in the technology and in the products. Second, the necessary security processes must be created, or necessary safety-relevant process steps must be added to affected processes. Third, employees are responsible both for the implementation of technologies as well as for the operation of processes. That is, the distribution of the security responsibility within the organization must be considered. Respective concepts may be subject to the IT strategy.

Levels of IT security (based on Keller, 2017)

IT security concepts as element of the IT strategy

Despite all the threats related to IT (in)security, the goal of IT security must not be the theoretical maximum of security. Instead, those involved in IT security must find the right level of security. This compromise search takes place between two levels (Keller, 2017, p. 221):

* On the one hand, too little IT security is dangerous and increases the risk of economic damage, while too much security is expensive and uneconomical. For all IT security measures, entrepreneurial risks and total costs must be balanced.
* On the other hand, IT security moves in a field of tension with different system requirements: operability, data protection, user comfort and interoperability, to name a few. Here, an increased security often comes with a limitation of aspects such as user comfort. The design goal in the area of ​​IT security is therefore a needs-based IT security safety.

Finding the IT security optimum (based on Keller, 2017)



Eventually, we can conclude that IT governance, IT risk management and IT security are strongly interwoven. During IT strategy work, possible implications for these areas need to be considered.

Meshed IT governance, risk management, and security (based on Keller, 2017)



7.2 IT Service Management & Infrastructure

The increasing digitization of all areas of life means for organizations that IT is moving more and more from an operational support function to a central value creation instrument. It is therefore necessary that the corporate IT works according to principles similar to those of the company's core processes. Reliable operations require a high level of innovation and provide a high rate of change. Against this background, a future-oriented IT service management (ITSM) is increasingly demanded to provide end-to-end IT services (Fröschle, 2019). IT service management is a “process-oriented service improvement framework similar to Total Quality Management (TQM), Business Process Management (BPM), and Business Process Re-engineering (BPR)” (Marrone et al., 2014, p. 866).

Generally speaking, a service is defined as “means of delivering value to customers. This is done by facilitating outcomes that customers want to achieve without the ownership of specific costs and risks” (Brewster et al., 2016, p. 3). Service management, in turn, is a set of dedicated organizational competences for providing customer value via services. As many services today are IT-enabled, there is a “tremendous benefit for organizations in creating, expanding, and improving their IT service management capability” (Limited, 2019, p. 17).

For IT service management, the so called IT Infrastructure Library (ITIL), published by the British Office of Government Commerce (OGC), is a comprehensive framework that contains all essential processes of IT service providers and service organizations (Kesten et al., 2012). ITIL is an indispensable standard for service management and is continuously being updated by users, manufacturers and consultants (Johanning, 2019). Although the exact adaption of ITIL in practice is not known, there are many indicators of growing acceptance (Marrone et al., 2017). Core to the ITIL framework in its current fourth version are the so called ITIL service value system (SVS) and the so called four dimensions model (Limited, 2019):

ITIL framework (based on Limited, 2019)



The ITIL SVS represents “how the various components and activities of the organization work together to facilitate value creation through IT-enabled services” (Limited, 2019, p. 18). Thus, it facilitates integration and coordination throughout the whole organization by providing a unified, value-focused direction. The essential aspects of the ITIL SVS are:

* ITIL service value chain: “An operating model for service providers that covers all the key activities required to effectively manage products and services” (Limited, 2019, p. 161)
* ITIL practices: These practices “can be used to guide an organization’s decisions and actions and ensure a shared understanding and common approach to service management across the organization. [They] create the foundation for an organization’s culture and behaviour from strategic decision-making to day-to-day operations” (Limited, 2019, p. 18)
* ITIL guiding principles: These principles are “recommendations that can guide an organization in all circumstances, regardless of changes in its goals, strategies, type of work, or management structure” (Limited, 2019, p. 161)
* Governance: These activities enable organizations “to continually align their operations with the strategic direction set by the governing body” (Limited, 2019, p. 18)
* Continual improvement: Every part of the ITIL SVS is reinforced by continual improvement. ITIL “provides organizations with a simple and practical improvement model to maintain their resilience and agility in a constantly changing environment” (Limited, 2019, p. 18-19)

To guarantee a complete approach to service management, ITIL sketches four dimensions of service management, from which each area of the SVS should be evaluated. These are:

* + Organizations and people: This dimension “ensures that the way an organization is structured and managed, as well as its roles, responsibilities, and systems of authority and communication, is well defined and supports its overall strategy and operating model” (Limited, 2019, p. 163).
  + Information and technology: This dimension “includes the information and knowledge used to deliver services, and the information and technologies used to manage all aspects of the service value system” (Limited, 2019, p. 160).
  + Partners and suppliers: This dimension “encompasses the relationships an organization has with other organizations that are involved in the design, development, deployment, delivery, support, and/or continual improvement of services” (Limited, 2019, p. 163).
  + Value streams and processes: This dimension “defines the activities, workflows, controls, and procedures needed to achieve the agreed objectives” (Limited, 2019, p. 167).

Despite its proliferation, the ITIL framework is also target of criticism. The most frequently expressed points of criticisms are (Johanning, 2019, p. 209):

ITIL is currently only of practical importance in the operational service support and partly in the service delivery. That means for the development of the IT strategy, that ITIL is not a complete process or organizational model for the entire internal IT, but only a collection of best practices for selected areas. Important parts such as application management, infrastructure management and the entire business perspective are not or only partially represented in ITIL.

ITIL focuses on describing “what” should be done to be service oriented; the "how" of the implementation is only inadequately considered. ITIL is a generic model and does not contain any branch or company-specific variations. That means adapting the collection of best practices to the respective organization must always be done individually. There is also no differentiation between small, medium and large organizations.

Although IT service management increasingly is understood as best practice “for organizing processes and people around customer-oriented services, rather than around tasks related to managing systems and physical infrastructures” (Winkler & Wulf, 2019, p. 640), it is useful to briefly focus on the IT infrastructure itself, as it is the basis for all IT-based services in an organization. When using the term IT infrastructure, many people think of the workstation computer, printer, network and other IT end devices such as monitors, scanner, mouse and keyboard. However, there are various definitions that connote the IT infrastructure with more than the pure hardware (Johanning, 2019). Against this backdrop, the IT infrastructure contains the following components:

|  |  |
| --- | --- |
| Elements of the IT infrastructure (based on Johanning, 2019) | |
| Hardware | * Decentralized or centrally operated server * Network printer * Networks and their components * Workplace end devices (desktop / notebook, printer, mouse, keyboard, etc.) |
| **Software** | * Operating systems * Administration tools * Database systems |
| **Overarching elements** | * Office communication, workflows * Office products * Browser |
| **Services** | * Communication and information services (email, intranet and / or Internet, directory and signature services) |
| **Development tools** | * Development environments |

The term IT infrastructure should not be mixed up with the term enterprise architecture (see section 7.3), as it is just a part of the enterprise architecture.

The IT infrastructure and its operations are two essential components of the corporate IT that nowadays are often transferred to an external service provider. Nevertheless, the IT infrastructure must be solid and the operation smooth, which is why IT infrastructure decisions may be part of any IT strategy. For example, the selection of a well-scalable and high-performance database as an IT infrastructure component is an important strategic decision. Once this decision is made, the provision of these IT services does not necessarily have to take place in the organization. External IT suppliers often have much more specialist knowledge in such services. It is therefore advisable to design a sourcing strategy for these commodities services.

### Self-Check Questions

1. Please list four building blocks of the IT strategy.

*IT governance*

*IT security*

*IT risk management*

*IT service management*

### 7.3 Application Portfolio Management & Enterprise Architecture Management

Whereas ITIL falls rather short in providing support for selected issues such as application management, these areas are important building block of the IT strategy as well. In order to design related concepts, those responsible for the IT strategy may rely on other concepts, frameworks and approaches instead, which are presented in the following for the management of application portfolios and the enterprise architecture.

### Application Portfolio Management

In many large organizations, there are 5,000 up to even 10,000 applications or services, but also small and medium-sized companies can sometimes have several hundred applications for a wide variety of purposes (Johanning, 2019). Although no manager doubts the importance of maintaining applications, everyone is “concerned with rebalancing the IT budget allocation to increase the discretionary spend by decreasing the maintenance spend, ensuring that the set of applications is well aligned with business needs, and positioning the organization technologically to respond to future initiatives” (McKeen & Smith, 2015, p. 274). Against this backdrop, application portfolio management (APM) does not only become an important operational, but also strategic task. APM can be understood as “the ongoing management process of categorization, assessment, and rationalization of the IT application portfolio” (McKeen & Smith, 2015, p. 274). It enables organizations to identify which applications to keep, invest in, substitute, or withdraw, and it can have significant influence on the selection of new applications and the (strategic) projects that are needed to deliver these applications.

The general objective of APM is “to enable organizations to determine the best approach for IT to meet business demands from both a tactical and strategic perspective through the use of capital and operating funds allocated to building and maintaining applications” (McKeen & Smith, 2015, p. 274). Part of APM is typically an analysis of expenses per application, a demand analysis at the application level, and an application portfolio analysis, where the current and desired business and technology value of the application are opposed). A central tool for APM is the IT portfolio matrix (Johanning, 2019). It entails the application landscape of an organization, classifying the applications into so-called question marks, stars, cash cows, and poor dogs. As part of the application strategy, all applications of the portfolio are continuously evaluated, and specific courses of action are derived.

### Enterprise Architecture Management

An enterprise architecture (EA) “describes the structures in business and IT and the links that exist between them” (Hanschke, 2009, p. 56). A well-developed architecture enables an organization to react in a timely manner and in an effective way to internal and external changes. The more transparent the enterprise architecture is, the easier it is to capture the interrelations between business units and the IT, and their interdependencies. Thus, an EA pulls together “the pockets of information scattered across the organisation’s various business units and projects, creating a uniﬁed picture which highlights how the information is networked and what mutual dependencies exist” (Hanschke, 2009, p. 56). Against this background, the strong connection of the enterprise architecture with the IT strategy becomes obvious, making the EA and its management an important building block of strategic IT management.

The EA is not about the technology only, but consists of several layers that need to be managed. EA models often contain an enormous number of components. Unfortunately, there is no agreement on the included components. In accordance with the consistent practices, we differentiate the following EA components and layers, which are describes afterwards (Ahlemann, 2012, p. 17 ff.).

Layers of the enterprise architecture (based on Ahlemann, 2012)



* The business and strategy layer defines the strategic positioning of an organization as a whole, or selected business units, on an abstract level. Typical **artefacts** that are located in this layer are, for example, strategic goals, target market, customers, and related KPIs (key performance indicators).

**Artefact**

An artefact generally is man-made item.

* The organization and process layer specifies organizational and procedural foundations of an organization. The organization (static view) entails, for example, the business units and the roles and responsibilities of the employees. The processes (flow view) entail, for example, the processes related to core business functions such as customer sales.
* The information systems layer describes “how information is processed and shared electronically within and across organizations” (Ahlemann, 2012, p. 18). There are three sub layers here, which are the application layer that defines “the main software components that implement the business logic in order to support business processes” (Ahlemann, 2012, p. 18), the data layer which pronounces “how key business information (such as product, customer or supplier data) is represented and implemented in databases” (Ahlemann, 2012, p. 18), and the integration layer which describes “how applications share, or could share, data and functions with other applications and databases” (Ahlemann, 2012, p. 18).
* The IT infrastructure layer comprises the IT services that form the organization’s technical infrastructure. It is built by computer and communication devices, as well as by software.
* The human resources, skills and competencies layer represents the human side that is obligatory to develop and run an EA containing the aforementioned layers.

The signiﬁcance of EAs increases with the size of the organization and the number of operated IT systems: “Every new application, every new interface or technology that joins the landscape adds to its complexity and increases the risk of data redundancy and inconsistency” (Hanschke, 2009, p. 56). For this reason, the management of enterprise architectures (EAM), which entails all processes responsible for the development, implementation, monitoring and improvement of corporate architectures, is crucial. More precisely, EAM is a “management practice that establishes, maintains and uses a coherent set of guidelines, architecture principles and governance regimes that provide direction for and practical help with the design and the development of an enterprise’s architecture in order to achieve its […] strategy” (Ahlemann, 2012, p. 20). The necessity of EAM becomes even more pressing against the background of increased outsourcing, increased importance of IT to support business value, and challenges in business IT alignment. Whereas EAM in the 1980 was understood as “advanced IS engineering” (Ahlemann, 2012, p. 13), during the 1990s and 2000s as “advanced IT management” (Ahlemann, 2012, p. 13), EAM today has a strong connection to strategic (IT) management. Executives know that EAM can only unlock its full potential by linking it closely to the corporate strategy, making EAM not only a responsibility for IT managers, but a strategic function. However, EAM is not a tool, not an IT function, not a new management process, and also not strategy development. Rather, EAM is a management philosophy, an organizational function, a methodology, and a culture (Ahlemann, 2012).

### Self-Check Questions

1. Please complete the following sentence:

The EA is not about the technology only, but consists of several *layers* that need to be managed.

### 7.4 Sourcing & Cloud Strategy

After the requirements for the application landscape are defined, a decision must be made who operates these applications and the IT infrastructure required for them. The answer is given by means of the sourcing strategy. This is another central building block of the IT strategy, as this is where decisions are made which resources are required internally, and which ones are outsourced. As part of the sourcing strategy, the question of "make-or-buy" is answered. That is, the question which IT services can or should an organization operate itself and what services should the organization buy from third parties on the market. In practice, sourcing usually means the outsourcing of IT services in the sense of the buy-variant. Some of the most important motives to outsource IT services are (Johanning, 2019, p. 153-154):

* Reduction of the vertical range of manufacture
* Cost savings through economies of scale at the provider
* Variability in fixed costs
* Improved access to know-how, skills, procedures and methods
* Improved quality of IT services
* Enablement of flexible adaptation to the actual needs of IT services
* Concentration on core competencies

These arguments for the outsourcing of IT services represent the positive effects of outsourcing and are quite solid arguments for the management that speak in favor of the buy-option. However, in order to objectively shed light on the topic of sourcing, also the make-variant must be evaluated. Arguments in favor of leaving IT services in the internal IT, or for the retrieval of previously outsourced IT services (so-called in-sourcing) can be the following (Johanning, 2019, p. 154):

* Leave the know-how internally, as these are essential core processes of the company that need to be protected
* Recover lost know-how
* Save time spent on coordination with the providers or suppliers
* Reduce dependency on providers
* Reduce of quality problems or defects

To facilitate the make-or-buy decision-making process, the matrix below provides a good overview of when the IT service should be outsourced or when they should better be provided in-house.

Make-or-buy decision matrix (based on Johanning, 2019)



In addition to the general definition of the vertical range of manufacture for the IT, executives must consider three different aspects when making outsourcing-decisions (Johanning, 2019, p. 163):

* The degree of outsourcing: The range of outsourcing spans from full outsourcing (complete outsourcing of either all infrastructure or applications of the organization to a provider) over selective outsourcing (outsourcing of a part of IT services, called **best of breed** approach), to shared service centers, where processes of the same type from different areas of the organization are combined and performed by central offices or departments.

**Best of breed**

The term refers to company software and stands for the philosophy of choosing the best solution for each application area and integrating it into the own IT infrastructure, instead of relying on a single manufacturer.

* Number of service providers: The main question here is with how many providers the organization want to collaborate. In this context, the so-called vendor lock-in effect must be considered. This effect describes the dependency that can arise due to mostly medium or long term contracts with an outsourcing partner. With classic outsourcing, it is not so easy to change the provider. Moreover, there is a long transition phase to another provider. Also, the fallback-option in terms of insourcing back into the own IT can be time-consuming. Therefore, the question arises whether it can make sense not to contract with only one provider, but with several providers.
* The location of the service provision: In addition to the degree of outsourcing and the consideration about the number of providers, the question of the geographic area where to outsourcing provider is located arises. Here, a general distinction is made between three different forms, namely onshore (within the own country), nearshore (close to the own country) or offshore (often far away from the own country, where wage costs advantages can be realized). All these options have their distinct advantages and disadvantages.

When it comes to the content of outsourcing, there are four different variants seen in practice which are presented in detail below. These are IT infrastructure outsourcing, application outsourcing, business process outsourcing, and cloud computing (Johanning, 2019, p. 159 ff.).

### IT infrastructure outsourcing

**DevOps**

DevOps is a collection of different technical methods and a culture for collaboration between software development and IT operations.

The IT infrastructure forms the basis for all IT-based services in an organization. It includes hardware (e.g., printer), software (e.g., office software, system-related software such as operating systems or databases), communication services (e.g., E-Mail system) and **DevOps**. All of the IT infrastructure components are so-called "commodities". Organizations should focus on the value-adding processes and systems to make their IT competitive and not primarily on the commodities, which are part of make-or-buy decisions and can often be operated more economically by third parties.

### Application outsourcing

As part of application outsourcing, entire IT systems or applications are outsourced to an external provider. This form of outsourcing can be found primarily in the context of strongly standardized systems, such as ERP (enterprise resource management). There is a general distinction between two forms of application outsourcing (Johanning, 2019, p. 160):

* Application management outsourcing: Here, the software is owned by the organization that uses the application (e.g., licenses). The provider is responsible for the operation and maintenance of the software.
* Software as a service (SaaS) or application service providing (ASP): Here, the provider also assumes the ownership of the software in the form of licenses and license management. This method is based on a rental model per user and is obtained from the cloud (SaaS).

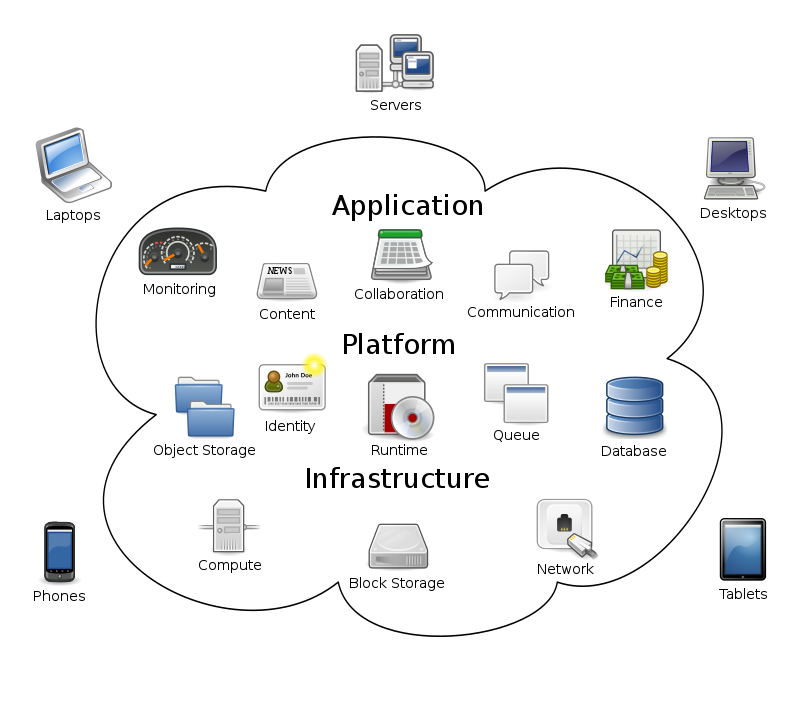
### Business process outsourcing

Business process outsourcing is the highest form of outsourcing. Here, in addition to the entire IT (infrastructure and applications), entire business processes are outsourced to a provider. These processes are highly standardized business processes which are not of great strategic relevance for the organization. These include, above all, operational personnel processes such as the enveloping of salary or payroll as well as finance and accounting processes that do not have a competitive value.

#### Cloud computing

Cloud computing is “a model for enabling ubiquitous, convenient, on demand network access to a shared pool of configurable computing resources […] that can be rapidly provisioned and released with minimal management effort or service provider interaction” (Mell & Grance, 2010, p. 2). Put more simply, cloud computing enables users to access software and other computing services from anywhere over the Internet.. The cloud metaphor is one of the oldest symbols of information technology and refers to computer networks“where the inside is more or less unknown” (Fowler & Worthen, 2009, n.p.). The term cloud computing was mainly shaped by successful internet companies like Amazon and Google who had to secure sufficient system performance despite the rapid growth of their customer base.

Cloud computing metaphor (CC BY-SA 3.0)



Cloud computing enables new sourcing models in addition to the aforementioned options. These are called services which can be obtained "on demand". Cloud computing technology and services can be divided into three areas by the types of the resources provided (Benlian et al., 2018):

* Software as a service (SaaS): Here, software is provided via the Internet. The SaaS provider takes full responsibility for the software, i.e., for maintenance, support, administration, and development. The owner is not the user, but the

provider (example: Salesforce CRM).

* Infrastructure as a Service (IaaS): The IaaS provider operates server systems for the customer, for example, for backup, archiving or even entire server farms in the sense of small data centers (example: Microsoft Azure).
* Platform as a Service (PaaS): This model is a merger of SaaS and IaaS. Here, complete bundles of hardware and software are offered (example: Google App Engine).

A further distinction can be made between three different sourcing models in the context of cloud computing, namely the public cloud, the private cloud, and the managed private cloud (Johanning, 2019, p. 161-162):

* Public cloud: The responsibility and the complete management of the cloud are taken over by an external provider. This ensures maximum scalability. Invoicing takes place via pay-per-use (the organization only pays for what is actually used).
* Private cloud: With this model, the IT department retains control over its own cloud. This model offers the advantage of security that is often questioned when outsourcing sensitive data.
* Managed private cloud: This variant of cloud computing combines both advantages of the private and the public cloud. In this setting, the organization receives a tailored infrastructure from a provider in a public cloud. On the basis of secure internet connections (for example, **VPN**), scalability can be increased and safety advantages can be leveraged.

**VNP**

The acronym stands for "Virtual Private Network". With a VPN, a protected network can be established via public networks.

In contrast to classic outsourcing, it is important to note that in cloud computing the service provider specifies standards that the organization has to adhere to. This stands in contrast to a classic outsourcing provider who adapts the outsourced systems as part of a customizing offer to the respective business processes and conditions. This necessitates a change and adaption of internal workflows and business processes. A central advantage of cloud computing over traditional outsourcing lies in the profitability, which comes in classic outsourcing solutions usually only after four to five years (Johanning, 2019).

Shifting towards cloud technology has organizational and procedural implications for the IT department, and necessitates a transformation of the role of the IT within the organization (Vithayathil, 2018). When it comes to the “external‐facing role of the IT department” (Vithayathil, 2018, p. 641), the IT department becomes an intermediary between the cloud vendor who provides the cloud services and the business units that they support. When it comes to the “internal‐facing role of the IT department” (Vithayathil, 2018, p. 641), the IT must develop new skills in understanding the business needs and problems faced. At the same time, the IT is “relieved of many of the traditional functions (e.g., installing, maintaining, upgrading IT infrastructure) because the cloud vendor takes on these functions” (Vithayathil, 2018, p. 641). As a consequence, IT employees get rid of related tasks, which necessitates the organization to think about downsizing the IT department, or to invest into a stronger support of the IT to increase business value.

### Self-Check Questions

1. Please list three different sourcing models in the context of cloud computing.

*public cloud*

*private cloud*

*managed private cloud*

Summary

Despite the fact that every IT strategy has to be developed individually based on the needs of the respective organization, there are various building blocks that are at the core of almost every IT strategy design or re-design. In this vein, IT governance is an indispensable basis for the development of the IT strategy and is strongly intertwined with related activities in the area of IT security and risk management. Also, IT executives have to make up their minds about how to design and manage application portfolios and whole enterprise architectures. The sourcing strategy is another central building block of the IT strategy, answering the classic question of "make-or-buy". Beside the vertical range of manufacture for the IT, executives must decide about the degree of outsourcing, the number of service providers, and the location of the service provision (on-, near-, off-shore). In this context, IT infrastructure outsourcing, application outsourcing, business process outsourcing, and cloud computing are options IT executives have to consider during IT strategy work.

# Appendix 1 – References

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# Appendix 2 – List of Tables and Figures

**Key elements of the IT in an organization**

Source: Hagen, 2021.

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**Evaluation of different forms of IT organizations**

Source: Hagen, based on Johanning (2019).

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Areas of information technology (IT)

Source: Hagen, 2021.

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**IT strategy lifecycle**

Source: Hagen, 2021.

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**Examples of IT visions**

Source: Hagen, 2021.

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**External factors**

Source: Hagen, based on Ward & Peppard, 2002.

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**IT goals derivation process**

Source: Hagen, basedon Hanschke, 2009.

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**Example of a SMART IT goal**

Source**:** Hagen, 2021.

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TOGAF: Architecture Development Method

Source: Marley, 2002, public domain.

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**(IT) portfolio matrix**

Source: Hagen, adapted from Slechner, 2021, CC BY-SA 4.0.

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IT strategy communication

Source: Hagen, based on McKeen & Smith, 2015.

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Centralized versus decentralized IT organization

Source: Hagen, 2021.

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TOGAF Architecture Development Method

Source: Marley, 2002, public domain.

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Structure of FitSM

Source: FitSM, 2015, CC-BY-4.0

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IT strategy roadmap template

Source: Hagen, 2021.

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IT project portfolio template

Source: Hagen, based on Johanning, 2019.

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Lifecycle of IT portfolio management

Source: Hagen, based on Gadatsch, 2020.

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Change curve

Source: Timpo, 2017, CC BY-SA 4.0

**Levels of IT performance measurement**

Source: Hagen, based on Kesten et al., 2012.

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**IT balanced scorecard**

Source: Hagen, based on Gadatsch, 2020.

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Source: Hagen, based on Kesten et al., 2012.

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IT strategy control process

Source: Hagen, based on Gadatsch, 2020.

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**Types of indicators**

Source: Hagen, based on Hanschke, 2009.

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TOGAF: Architecture change management

Source: Marley, 2002, public domain.

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**Reviews within the Scrum framework**

Source: Mitchell, 2015, [CC BY-SA 4.0](https://creativecommons.org/licenses/by-sa/4.0).

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Selected sources of IT strategy changes

Source: Hagen, 2021.

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Source: Hagen, 2021.

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Make-or-buy decision matrix

Source: Hagen, based on Johanning, 2019.

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Cloud computing metaphor

Source: Johnston, 2009, CC BY-SA 3.0

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