

Chapter 2

Enterprise Governance of IT

Abstract The previous chapter provided a high-level description what Enterprise Governance of IT is about. However, having developed a high-level model for Enterprise Governance of IT does not imply that governance of enterprise IT is actually working in the organization. Conceiving the model for Enterprise Governance of IT is the first step, deploying it throughout all levels of the organization is the next challenging step. To achieve this, Enterprise Governance of IT can be deployed using a mixture of various structures, processes, and relational mechanisms. These practices will be discussed in this chapter, including an illustration how they were leveraged in the context of a large international airline company. Also, specific topics will be discussed such as the role of the board in enterprise governance of IT and the challenge of approaching enterprise governance of IT in an interorganizational context. Finally, a more theoretical view on enterprise governance of IT is discussed through the lens of the Viable Systems Model Theory.

2.1 Practices for Implementing Enterprise Governance of IT

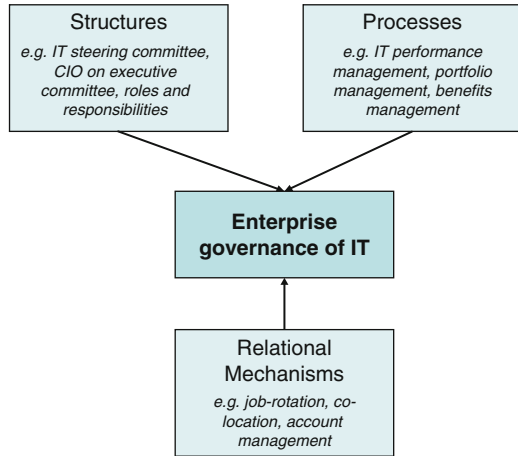
Having developed a high-level model for enterprise governance of IT does not imply that governance is actually working in the organization. Conceiving the enterprise governance of IT model is the first step, implementing it into a sustainable solution is the next challenging step. Our research (De Haes and Van Grembergen, 2009; Van Grembergen, 2004) showed that organizations can and are deploying enterprise governance of IT by using a holistic mixture of various structures, processes, and relational mechanisms.

Enterprise governance of IT structures include organizational units and roles responsible for making IT decisions and for enabling contacts between business and IT management decision-making functions (e.g., IT steering committee). This can be seen as a kind of blueprint of how the governance framework will be structurally organized.

Enterprise governance of IT processes refers to the formalization and institutionalization of strategic IT decision-making and IT monitoring procedures, to ensure that daily behaviors are consistent with policies and provide input back to decisions (e.g., portfolio management).

The relational mechanisms finally are about the active participation of, and collaborative relationship among, corporate executives, IT management, and business

Fig. 2.1 Structures, processes, and relational mechanisms for IT governance



management and include job-rotation, announcements, advocates, channels, and education efforts. Some examples of these structures, processes, and relational mechanisms are provided in Fig. 2.1.

In the many case organizations we visited (De Haes and Van Grembergen, 2009; De Haes et al., 2011), we saw that most organizations are indeed leveraging a mix of structures, processes, and mechanisms. Of course, it should be noted that a “silver bullet approach” does not exist in this matter. Each organization has to select its own set of enterprise governance of IT practices, suitable for their sector, size, culture, etc.

Our case research clearly showed that organizations tend to find it much easier to implement structures in their organizations as opposed to processes. However, we have also seen that many of these structures cannot be effective without supporting processes. For example, an IT steering committee cannot make appropriate investment decisions without an appropriate and mature portfolio management process, including the development of solid business cases. It also appeared that relational mechanisms, such as training, awareness building, etc., receive a lot of attention in the beginning stages of an enterprise governance of IT implementation project and become less important when the governance framework gets embedded into day-to-day operations. This is not surprising as the introduction of an approach towards enterprise governance of IT should be regarded in the first place as a large change programme within the organization.

Another interesting finding to pinpoint is that our enterprise governance of IT definition implies a prime responsibility of the board of directors (as part of their corporate governance responsibility), while specific mechanisms to achieve this such as “IT expertise at level of board of directors” are less existent in organizations (see separate Sect. 2.3 on this matter). This can possibly be explained by the fact that making the board of directors more IT literate is not easy to achieve, or that the board is still not fully aware of the strategic importance of IT.

More recently, the idea of “IT leadership” emerged in many discussion fora. IT leadership can be defined as the ability of the CIO or similar role to articulate a vision for IT’s role to the company and ensure that this vision is clearly understood by managers throughout the organization. If the CIO is not able to talk in business-oriented terms at executive level, his impact at that level will be small. This mechanism is highly

dependent on the individual competencies of the CIO and not many methods are available to manage it. However, we have seen that good leadership can be a very powerful catalyst to bring enterprise governance of IT in an organization to a next level. A good balance between leadership and the appropriate governance structures and processes needs to be found (De Haes and Van Grembergen, 2009).

To better understand how organizations can implement enterprise governance of IT, we have supplemented our case research with Delphi research, leveraging an expert panel of academics, business and IT managers and consultants, to try to inventorize and evaluate structures, processes, and relational mechanisms that contemporary organizations are using in implementing enterprise governance of IT (De Haes and Van Grembergen, 2009). This exercise resulted in a list of 33 enterprise governance of IT practices, and their respective evaluations in terms of perceived effectiveness and perceived ease-of-implementation (see Fig. 2.2). Based on their answers regarding perceived effectiveness, also a minimum baseline was constructed, as a list of practices that organization at least should have. After several review rounds, the expert panel categorized these ten practices indicated in bold as key instruments for enterprise governance of IT (Fig. 2.2).

This minimum baseline (in bold) contains a mixture of more strategic-oriented (e.g., IT strategy committee at level of board of directors) and management-oriented (e.g., IT project steering committee) practices. It is also clear that practices such as IT steering committee, portfolio management, and project governance/management constitute the core framework to describe how investments in organizations emerge are prioritized and realized. In that sense, most of the practices above clearly contain both business and IT-oriented roles and responsibilities.

Assignment Box 2.1: IT Steering Committee Charter

You are working for an international bank and the CEO has asked you to create a charter for a new IT steering committee. Using the template below, provide a description of how you see the role, responsibility, participants, and frequency of meetings. Be prepared to defend your solution.

IT Steering Committee - Charter

- Role**

- Responsibility (decision power)**

- Frequency**

- Participants**

Assignment Box 2.2: Assessment of Enterprise Governance of IT Practices

If you have access to an organization, assess the presence and maturity of the enterprise governance of IT practices as discussed in this section. You can use the template below, each time indicating whether the practice is not present (0) versus very mature (5) and providing a corresponding rationale. You can also add other practices in the list that where not discussed in this chapter.

	Organisation	
	Maturity	Rationale
IT strategy committee at level of board of directors	0 1 2 3 4 5	
IT expertise at level of board of directors	0 1 2 3 4 5	
(IT) audit committee at level of board of directors	0 1 2 3 4 5	
GIO on executive committee	0 1 2 3 4 5	
GIO reporting to CEO and/or COO	0 1 2 3 4 5	
IT steering committee (IT investment evaluation / prioritisation at executive / senior management level)012345	0 1 2 3 4 5	
IT governance function / officer	0 1 2 3 4 5	
Security / compliance / risk officer	0 1 2 3 4 5	
IT project steering committee	0 1 2 3 4 5	
IT security steering committee	0 1 2 3 4 5	
Architecture steering committee	0 1 2 3 4 5	
Integration of governance/alignment tasks in roles&responsibilities	0 1 2 3 4 5	
Strategic information system's planning	0 1 2 3 4 5	
IT performance measurement (e.g. IT balanced scorecard)	0 1 2 3 4 5	
Portfolio management (incl. business cases, information economics, ROI, payback)012345	0 1 2 3 4 5	
Charge back arrangements - total cost of ownership (e.g. activity based costing)	0 1 2 3 4 5	
Service level agreements	0 1 2 3 4 5	
IT governance framework COBIT	0 1 2 3 4 5	
IT governance assurance and self-assessment	0 1 2 3 4 5	
Project governance / management methodologies	0 1 2 3 4 5	
IT budget control and reporting	0 1 2 3 4 5	
Benefits management and reporting	0 1 2 3 4 5	
COSO / ERM	0 1 2 3 4 5	
Job-rotation	0 1 2 3 4 5	
Co-location	0 1 2 3 4 5	
Cross-training	0 1 2 3 4 5	
Knowledge management (on IT governance)	0 1 2 3 4 5	
Business/IT account management	0 1 2 3 4 5	
Executive / senior management giving the good example	0 1 2 3 4 5	
Informal meetings between business and IT executive/senior management	0 1 2 3 4 5	
IT leadership	0 1 2 3 4 5	
Corporate internal communication addressing IT on a regular basis	0 1 2 3 4 5	
IT governance awareness campaigns	0 1 2 3 4 5	
Other practices		
General remarks		

A generic indication of the maturity scale is provided below. To make the analysis in-depth, the scale should be made specific for each of the practices (e.g., what do you expect if portfolio management is at level 5).

0. Nonexistent: There is a complete lack of any recognizable IT Governance practice.
1. Initial/ad hoc: The organization has recognized that IT Governance issues exist and need to be addressed.
2. Repeatable but intuitive: There is awareness of IT Governance objectives, and practices are developed and applied by individual managers.
3. Defined: The need to act with respect to IT Governance is understood and accepted. Procedures have been standardized, documented, and implemented.
4. Managed and measurable: IT Governance evolves into an enterprise-wide practice and IT Governance activities are becoming integrated with the enterprise governance process.
5. Optimized: Enterprise governance and IT Governance are strategically linked, leveraging technology and human and financial resources to increase the competitive advantage of the enterprise.

	Index	IT governance practice	Definition
IT governance structures	S1	IT strategy committee at level of board of directors	Committee at level of board of directors to ensure IT is regular agenda item and reporting issue for the board of directors
	S2	IT expertise at level of board of directors	Members of the board of directors have expertise and experience regarding the value and risk of IT
	S3	(IT) audit committee at level of board of directors	Independent committee at level of board of directors overseeing (IT) assurance activities
	S4	CIO on executive committee	CIO is a full member of the executive committee
	S5	CIO (Chief Information Officer) reporting to CEO (Chief Executive Officer) and/or COO (Chief Operational Officer)	CIO has a direct reporting line to the CEO and/or COO
	S6	IT steering committee (IT investment evaluation / prioritisation at executive / senior management level)	Steering committee at executive or senior management level responsible for determining business priorities in IT investments.
	S7	IT governance function / officer	Function in the organisation responsible for promoting, driving and managing IT governance processes
	S8	Security / compliance / risk officer	Function responsible for security, compliance and/or risk, which possibly impacts IT
	S9	IT project steering committee	Steering committee composed of business and IT people focusing on prioritising and managing IT projects
	S10	IT security steering committee	Steering committee composed of business and IT people focusing on IT related risks and security issues
	S11	Architecture steering committee	Committee composed of business and IT people providing architecture guidelines and advise on their applications.
	S12	Integration of governance/alignment tasks in roles & responsibilities	Documented roles & responsibilities include governance/alignment tasks for business and IT people (cf. Weill)
IT governance processes	P1	Strategic information systems planning	Formal process to define and update the IT strategy
	P2	IT performance measurement (e.g. IT balanced scorecard)	IT performance measurement in domains of corporate contribution, user orientation, operational excellence and future orientation
	P3	Portfolio management (incl. business cases, information economics, ROI, payback)	Prioritisation process for IT investments and projects in which business and IT is involved (incl. business cases)

Fig. 2.2 Practices for enterprise governance of IT

	P4	Charge back arrangements - total cost of ownership (e.g. activity based costing)	Methodology to charge back IT costs to business units, to enable an understanding of the total cost of ownership
	P5	Service level agreements	Formal agreements between business and IT about IT development projects or IT operations
	P6	IT governance framework COBIT	Process based IT governance and control framework
	P7	IT governance assurance and self-assessment	Regular self-assessments or independent assurance activities on the governance and control over IT
	P8	Project governance / management methodologies	Processes and methodologies to govern and manage IT projects
	P9	IT budget control and reporting	Processes to control and report upon budgets of IT investments and projects
	P10	Benefits management and reporting	Processes to monitor the planned business benefits during and after implementation of the IT investments / projects.
	P11	COSO / ERM	Framework for internal control
	R1	Job-rotation	IT staff working in the business units and business people working in IT
	R2	Co-location	Physically locating business and IT people close to each other
	R3	Cross-training	Training business people about IT and/or training IT people about business
IT governance relational mechanisms	R4	Knowledge management (on IT governance)	Systems (intranet, ...) to share and distribute knowledge about IT governance framework, responsibilities, tasks, etc.
	R5	Business/IT account management	Bridging the gap between business and IT by means of account managers who act as in-between
	R6	Executive / senior management giving the good example	Senior business and IT management acting as "partners"
	R7	Informal meetings between business and IT executive/ senior management	Informal meetings, with no agenda, where business and IT senior management talk about general activities, directions, etc. (e.g. during informal lunches)
	R8	IT leadership	Ability of CIO or similar role to articulate a vision for IT's role in the company and ensure that this vision is clearly understood by managers throughout the organisation
	R9	Corporate internal communication addressing IT on a regular basis	Internal corporate communication regularly addresses general IT issues.
	R10	IT governance awareness campaigns	Campaigns to explain to business and IT people the need for IT governance

Fig. 2.2 (continued)

2.2 Principles for Enterprise Governance of IT

In practice, organizations often try to express a number of “principles,” which clearly state how business and IT will collaborate in the organization. These principles are to be defined jointly by business and IT and constitute a kind of contract between business and IT. These are often a good starting point to use as reference when building enterprise governance of IT structures, processes, and relational mechanisms.

Examples of principles used in real-life organizations are provided in Fig. 2.3. Each of these principles of course require more detailed definitions and descriptions of what exactly the implications are towards required structures, processes, and relational mechanisms. In that sense, such principles become the starting point to “design” and appropriate model for enterprise governance of IT. In Sect. 2.3, an illustration is provided how such principles can be translated towards required enterprise governance of IT structures, processes, and relational mechanisms.

- IT is a professional organization that effectively and efficiently manages its resources in alignment with the needs of the organization.
- IT is the exclusive provider of IT services. Outsourcing is always organised in joint partnership between business and IT.
- IT is pro-actively engaged in further developing and innovating the organization.
- IT primarily develops and maintains competencies that are aligned to and required for supporting the expertise available in the organization.
- The priorities within IT are aligned to the strategic goals of the organizations through integrated planning cycles.
- All IT applications comply with rules and policies as mutually agreed upon by business and IT
- IT is pro-actively engaged in reviewing and designing efficient business processes.
- IT and the business collaborate based on fixed agreements. Based on a scope definition, impact analysis and capacity reviews, both business and IT commit for timely delivery within quality requirements.
- There is transparency on the required service quality that IT has to deliver to the business, and this service quality is continuously monitored.
- Starting from the initial development of a new business project, the potential impact on IT needs to be analysed.

Fig. 2.3 Enterprise governance of IT principles

Assignment Box 2.3: Understanding Enterprise Governance of IT Principles

Discuss in group the meaning of the Enterprise Governance of IT principles as depicted in Fig. 2.3. Describe which structures, processes, and relational mechanisms you would propose to design an enterprise governance of IT model that allows these principles to be realized in the organization. Present and discuss the results to the class.

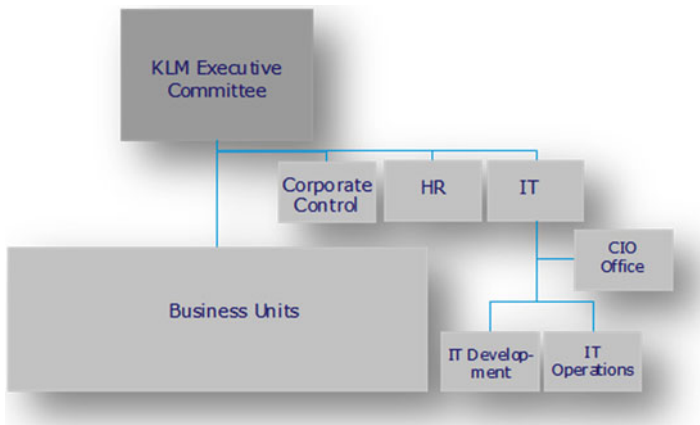


Fig. 2.4 Organizational structure of KLM

2.3 Case Study: Enterprise Governance of IT at KLM

The airline company KLM was founded in 1919, and has its home base and hub in Amsterdam Schiphol Airport (Netherlands). KLM currently employs over 33,000 people worldwide, and manages a fleet of about 200 aircraft. In 2004, KLM merged with Air France, after which both companies continued to operate as separate airlines, each with their own identity and brand, and each benefiting from each other strengths. In financial turnover, Air France-KLM is the world's largest airline group, transports the most passengers and is the world's second largest cargo transporter. In 2009, Air France-KLM operated flights to 255 destinations in 115 countries on 4 continents.

This case focuses on the KLM activities within the Air France-KLM group. The KLM Executive Committee (Fig. 2.4) is composed of the CEO, CFO, Managing Director, and all Executive Vice Presidents (EVP) of the major business units and services (Commercial, In-flight Services, Operations, Ground Services, Cargo, Engineering & Maintenance, IT and HR). In 2009/2010, KLM IT employed close to 1,000 (internal and external) FTEs, with an IT budget of around 300 million euro. As shown in Fig. 2.4, KLM IT is organized around IT development activities, IT operations activities, and the CIO-Office addressing aspects of the enterprise/IT

architecture, IT strategy, value and portfolio management, sourcing strategy, and risk & security. The mission of the IT department is to “create business value by delivering reliable IT services to the business processes, and innovative IT solutions to enable and support business changes.” The following strategic goals for IT support this mission:

- IT is a world class Information Services provider and will be able to deliver the best value to the company
- The IT cost-levels will be at a competitive industry level
- The IT architecture and infrastructure will enable the growth ambitions of Air France-KLM

2.3.1 KLM's Trigger Points to Start the Journey

IT is a business-critical enabler for KLM yet, at the same time, can be a source of both success and discontent. In 2001, the balance had tilted towards discontent due to a lack of trust in what was perceived as a very costly and unresponsive IT department. This, in a business climate that was increasingly challenging, and which became dramatically more so after the 9/11 terrorist attacks. After that event, KLM's CEO seized the opportunity to make a structural break with the past, and reexamine and transform KLM's business and IT governance.

The Executive Vice President (EVP) of the Operations Control Centre was appointed as new CIO. It was felt that having the CIO coming out of the “real business” would help in getting the “IT governance” discussion out of the IT area, and have it put on the business executive's agenda. The newly appointed CIO received three clear priorities:

1. Provide the reasons why, or why not, to outsource IT;
2. Create a business/IT board to organize joint success; and
3. Design simple governance principles to restore control enabling steering by the Executive Vice Presidents (EVPs) and the CIO.

In order to respond to these requirements, the CIO-Office was established as a support function to the CIO, consolidating a number of already existing, loosely coupled, and different functions such as an IT Strategy Office, Programme Management, and business/IT liaison roles. In the words of the Vice President (VP) of the CIO-Office: “In the scenario that we would outsource IT, both IT operations and development would mainly be sourced outside KLM, but the activities of the CIO-Office would be kept internally, as it governs IT strategy, architecture, security, business/IT alignment, etc. The goal of the CIO-Office is to enable effective IT, in support of business needs.”

2.3.2 Embarking on the Journey

It was decided that, ahead of the first priority stated above, the primary focus should be to introduce better governance principles and practices (priority 3). A project under the title “IT: A Collaborative Effort” was launched, focused at enabling all stakeholders to better understand the cost and value of IT, which in turn would enable them to make more informed decisions on what and how to potentially outsource (priority 1). In support of priority 2, a business/IT board was established, composed of the CEO, CIO, and all business units EVPs, meeting every quarter to discuss and decide on strategic issues involving IT.

With regard to priority 3, the CIO-Office, in collaboration with the business, designed a set of principles that would significantly simplify IT-related governance. The starting premise was that these principles should put the business in full control of all IT demand and IT spend. In support of these principles, a number of governance practices were introduced in the business and IT organizations, including the establishment of the business/IT board and demand management functions for each business domain. These governance principles and practices were introduced as “the only way of working” between business and IT for all business units and activities. These practices also supported the creation of portfolio management processes driven by the business units. The portfolio management processes evolved from being IT resource- and supply-driven towards business demand-driven with an innovative and rigorous approach to evaluation and selection.

2.3.2.1 Governance Principles and Practices

The definition of the first draft set of governance principles and practices was mainly driven by the CIO-Office. These principles were later refined with the involved business parties and are now shared in the organization through the intranet. According to the Director Value Management & Alliances (member of the CIO-Office): “These principles and practices are still challenged from time to time. Our position is that we are always open for discussion for each of these principles and practices, but up till now, we have each time in the end reconfirmed them.” The stated principles and practices apply for all business units and are presented in internal KLM presentations as shown in Fig. 2.5. The involved parties acknowledge that this list does not really distinguish between principles and practices and presents them in a mixed way, but it was felt to be a pragmatic and practical list that was workable for KLM. The CIO-Office developed more detailed background information and internal documentation to explain the impact and consequences of each of these principles and practices.

The first key principle (1) states that, for the business, there should be no difference in dealing with an internal or external IT provider. This recognizes that business should be in full control of all IT demand and IT spend (supply). Related to the latter, criteria were developed regarding choosing between allocating work in-house for

1. For the business there should be no difference between working with an internal or external IT-provider.
2. Differentiate between WHAT and HOW (and WHY).
3. Improve the Demand-function by creating a Business Demand Office per business domain.
4. Improve the Supply function by creating an Innovation Organizer and a Service Manager per business domain.
5. Create monthly decision meetings of What and How (management and IT).
6. Focus on the cost that can be influenced in full and those that can be influenced in part: Split between Innovation and Continuity.
7. Each Innovation (investment) has one business owner to which all cost are charged.
8. Each Service (Continuity) has one business owner to which all cost are charged.
9. Top-down budget framework and simplified budget process.
10. Activity-Based Costing applied to process primary cost to product cost.

Fig. 2.5 Principles for enterprise governance of IT at KLM

customized development, or through external IT providers for standardized solutions. These “selective sourcing” agreements are internally referenced as the “Stay on the Surfboard Principle” (Fig. 2.6). Generic business processes that bring no competitive advantage (such as office support, collaboration, and payroll) will be supported by generic (low development cost, off-the-shelf) applications packages. Business processes, which have the potential to create competitive advantage (such as CRM, revenue management), can and will be supported by in-house (higher development cost) custom-built applications. The VP CIO-Office explains: “In the past, we evolved to a situation where many commodity services were built and maintained in-house, when businesses were only interested in a good service at low cost for these mainstream applications. The surfboard helped in the discussions on what and what not to outsource, and to bring the debate on ‘we want more IT for less money’ to another level, oriented towards ‘we need different IT for different businesses’.”

The next set of principles and practices (2–5) define a clear split between IT-related activities in terms of the WHAT-activities and HOW-activities, or in other terms between Demand and Supply. Before 2001, IT demand came in via 14 Information Management committees and numerous informal channels. According to the VP CIO-Office: “In the old situation, demand came in through too many different channels, and there was no coordination between those channels. For example, it could be that five similar investment requests were put forward, initiated from different business lines.” “Moreover,” as reinforced by the Director Value

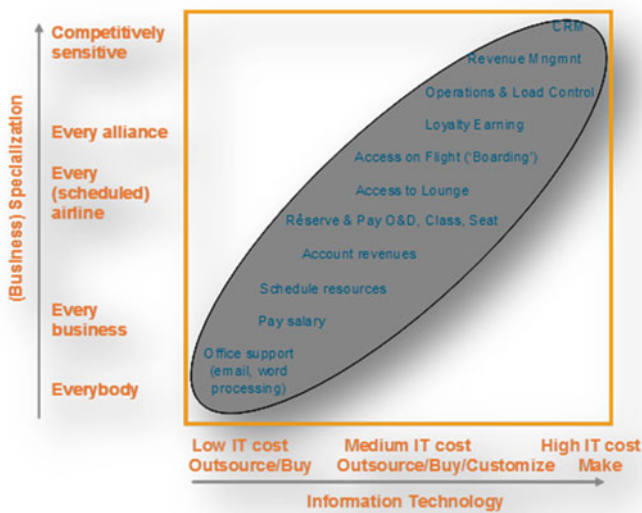


Fig. 2.6 Surfboard principle for outsourcing

Management & Alliances, “some of the Information Management groups also managed a separate IT development team, leading to a very scattered approach.” To improve the demand function, all business demand for investments and innovation is now channelled via Business Demand Offices (BDOs) for the five business domains of KLM (Engineering and Maintenance, Cargo, Passenger Commercial, Passenger Operations, Corporate).

These BDOs are formally positioned in the business department in close contact with their EVPs and with a reporting line to the CIO. Commenting on this, the VP Finance and Control Ground Services says: “Putting the BDOs directly in the business was a very important governance design decision, as it enabled them to really act as business representatives.” Each BDO has a dedicated counterpart or mirror-role on the IT supply side, called the “Innovation organizer,” responsible for all HOW-activity (see Fig. 2.7). Realizing this split was a challenge, as the VP CIO-Office explains: “This clear distinction between demand and supply seems obvious, but it implied a huge effort in terms of company meetings, consultations and moving people.”

As stated in principle 6, a clear differentiation is established between the innovation cost that can be fully influenced by the business, and the continuity cost (running cost to “keep the lights on”) that can only be partly influenced. The innovation budget includes all manpower, purchases, work-by-3rd-parties, and other out-of-pocket project cost required to build new IT services and functional changes to existing IT services (“enhancements”). The BDOs register agreed “innovation” work on the basis of which the Innovation Organizer coordinates IT development,

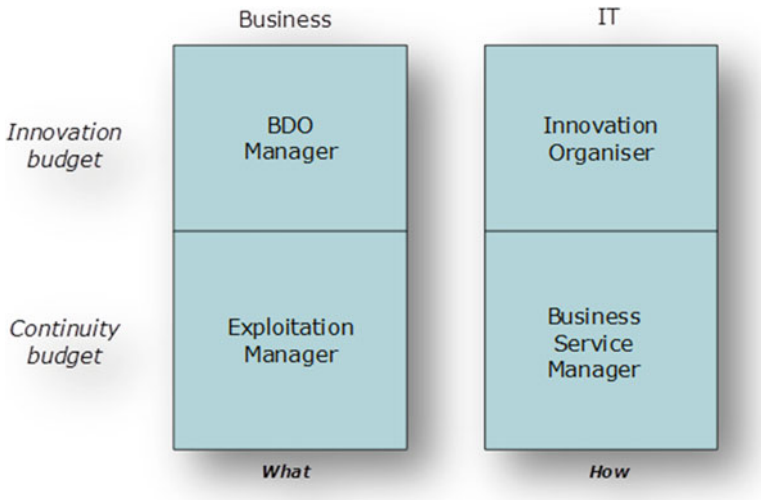


Fig. 2.7 Mirror roles between business and IT

time-accounting, and charge-out. The continuity budget includes cost for IT services, desktops, data communication, and telecommunication and is managed, in terms of volume and quality, by the “exploitation manager” on business side, together with the “business service manager” on IT supply side (see Fig. 2.7). The objective of these business service managers is to deliver continuity of the KLM operations in an efficient way and at lowest IT cost.

This split between the innovation (programme) portfolio and the continuity (service) portfolio is internally explained with the image of “the bicycle” (Fig. 2.8). This “bicycle” is mainly used as a visual aid to internally communicate at a high and conceptual level the split and relationship between the continuity and innovation budget. As visualized, the business/IT strategy drives the definition and application of the governance principles and priority rules and the definition of business cases. The approved business cases are managed in the programme (innovation cycle), which, after delivery, become operational services being deployed and administered in the service (continuity) portfolio. As a result of ongoing evaluation, services may continue with no change, reenter the innovation cycle through a new business case, or be eliminated (retired).

All these roles created different decision platforms for IT-related governance, as shown in Fig. 2.9. There are a number of scheduled activities, involving different stakeholders and occurring at different frequencies, which occur throughout the year:

- Twice a year the Group Executive Committee is updated on how IT will respond to new challenges and directions in the businesses.
- The CEO, CFO, CIO, and Business EVPs meet every 2 months in the Business/IT Board to discuss and decide on strategic planning related to IT, and approve the IT budget and portfolio of programmes.

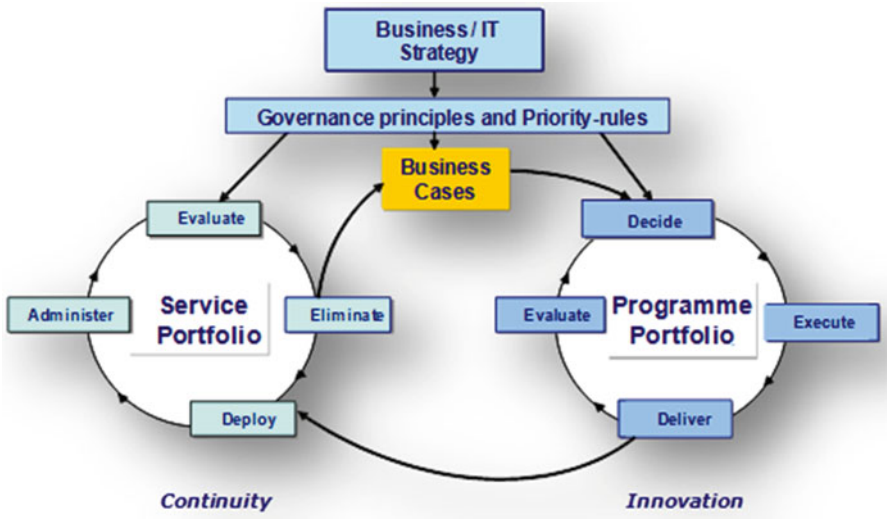


Fig. 2.8 The innovation-continuity bicycle

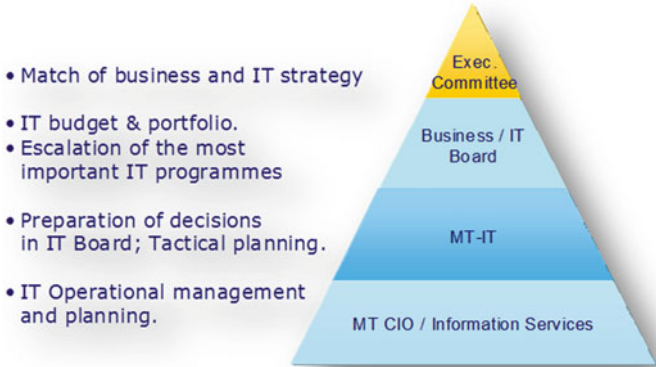


Fig. 2.9 Enterprise governance of IT decision platforms

- The Management Team of the IT provider plus the five BDOs meet monthly in the MT–IT, chaired by the CIO. They discuss and decide on tactical planning matters and prepare decisions for the business/IT board.
- Every 2 weeks the management team of Information Services meets to discuss and decide on operational and running issues.

To manage the demand of the IT function for infrastructure investments, business cases for which have traditionally been difficult to justify, a separate BDO for the IT department was created. The Director Finance and Control IT Operations argues: “If, for example, you have a storage technology which cannot be virtualized, you

may be able to build a business case to migrate to a new storage technology where virtualization is possible, resulting in lower business service costs. But for other infrastructure type investments, such as the migration of operating systems, the business case will be built on a risk avoidance and cost of future operational support.” The IT-BDO, part of the CIO-Office, analyzes future needs and capacity based on the incoming business cases of the businesses. Potential investments are then translated into an IT business case, and are discussed with the other BDOs in the “Information Security and Architecture Meeting” (ISAM). Once approved, the CIO-Office takes ownership to implement these infrastructure services. If possible, such investments are linked to other business investments that are being planned.

Principles 7–10 address the budgeting and cost accounting processes. The previous process of charging out IT costs to the business, with more than 3,300 technical cost components being charged to more than 3,400 cost account centers, was unwieldy, and provided little useful management information. The VP Finance & Control Ground Services concluded: “As a result, business perceived IT as a black box which they could not control, and therefore as something that was very likely to be too expensive.” Drastic simplification of the budgeting process was needed, essentially from charging hundreds of technical items to hundreds of departments of users, to charging only 7 products with associated cost: 2 for innovation and 5 for continuity, to 12 respective single/unique business owners (units). All budgets and costs (both continuity and innovation) are managed, forecasted, and made transparent through a cost portal, driven by activity-based costing principles, enabling clear and active ownership of the business of all IT-related costs.

2.3.2.2 Portfolio Management

The above governance principles and practices were needed as key building blocks in support of having effective portfolio management processes driven by the business units. The design of these portfolio management processes was done by the Portfolio Management Office (part of the CIO-Office) and is shown in Fig. 2.10. Three approval stages are defined, going from “idea selection” to “programme go” and “investment approval.” For each of these phases, clear decision thresholds were defined. For investments between 150,000 and 500,000 €, the EVP, Director Finance and Control and BDO of a business unit could approve the go/no-go decision in each phase, investments above 500,000 € are approved by the Business Unit Investment Committee (BIC), comprising the business unit COO, EVP, Director Finance and Control, and BDO and investments above 5,000,000 € are approved by the Executive Committee (EC).

The initial phase (1) addresses the initiation of the investment proposals or idea generation. In this phase, all business ideas are gathered and captured by the BDOs (demand process) and turned into potential initiatives for which a high-level business case (HLBC) will be developed. These HLBCs include descriptive information, classifications and high-level cost and benefits estimates and risk. The VP BDO Passenger Operations clarifies: “It is often hard to quantify some benefits at this stage. For example, the cost avoided of an aircraft not needing to land on

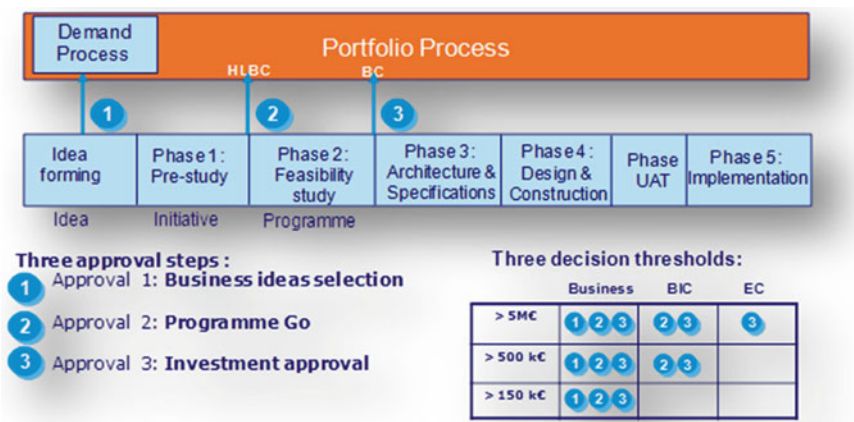


Fig. 2.10 Portfolio management process

another location because of better support systems. But still, we try to make as good as possible educated estimations.” If an initiative is approved (2), it is turned into a programme for which a full business case (BC) is developed based on a detailed feasibility study. To enable common and comparable business cases, a business case template was developed as a mandatory instrument for all investments above 150,000 €.

In order to be able to prioritize all these business cases, it is crucial to know what the organization’s business drivers are. The Director Value Management and Alliances makes clear: “Our experience was that it was often difficult to obtain a clear list of business priorities from a business unit. However, we needed these priorities to enable the selection of ‘the right things’ and for that reason we used a methodology to help us and the business in making these business priorities transparent.” The business drivers of a business unit are captured by the CIO-Office through interviews with the business unit executives. In the example of the Passenger Operations business unit, seven different business priorities were identified (see Fig. 2.11). Next, each of these business drivers are ranked through a pairwise comparison technique. Instead of just ranking the drivers from 1 to n , this technique relates each driver to the other drivers in terms of relative importance, ranging from “extremely less” toward “extremely more” in five sequential steps (e.g., “competitive unit cost” is relatively more important than “quality in physical comfort”). After completion of this pairwise comparison by each of the executive directors, a prioritized list of the defined business drivers is created and normalized into percentages that sum up to 100 % as shown in the Passenger Operations example below.

In the following step, the same pairwise comparison technique is used to determine the contribution of the investment proposals to each business driver. For each investment proposal the contribution to each of the business drivers is determined, ranging from “low” toward “extreme.” The result of these steps is an initial portfolio containing a ranked, but still unconstrained, list of all investment proposals at business unit level. The VP BDO Passenger Operations explains the importance of this process: “These

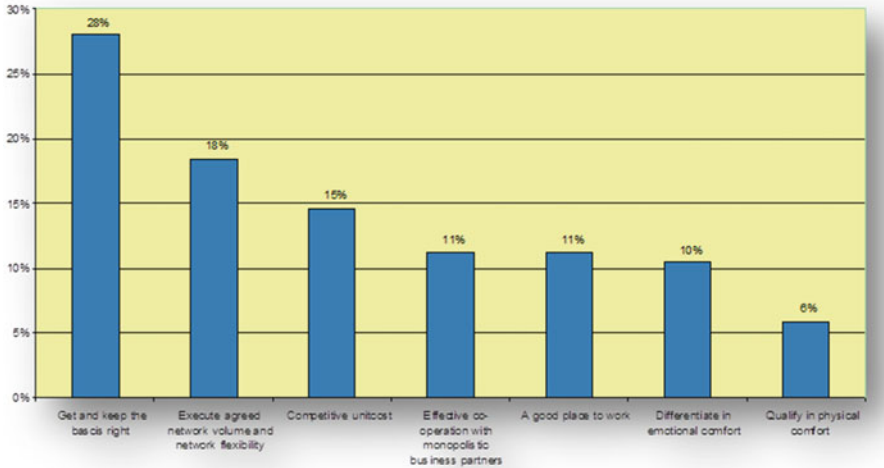


Fig. 2.11 Definition of the business drivers for passenger operations

priorities are the basis to build a ‘business plan’ for the BDO of a specific business unit, describing all the things that the BDO-office of a business unit can be held accountable for. I have even turned this business plan into a video clip on you-tube, to demonstrate to all our business and IT stakeholders our commitment for the next year.”

After this prioritization, total demand of all business units typically exceeds the budget made available by the executive committee. The Director Value Management and Alliances describes how this is handled: “Instead of using a ‘cheese slicer’ and, for example, forcing all business units to cut 30 % out of the project portfolio, a process of informal discussions is initiated between the BDOs to determine how the portfolio can best be optimized. As long as this process works, this approach is preferred instead of escalating to the next management level.” This process generally works well, and as a result, the business/IT board receives an overview of the major programmes and just has to endorse the outcome of the portfolio management process. The Director Value Management and Alliances concludes: “Through a good portfolio management process, we strive for seamless decision making.”

Once the portfolio of programmes is optimized, the business investment committee (for project above 500,000) or executive committee (for project above 5,000,000) still has to release the funding before design, construction, user acceptance testing (UAT), and implementation can start. This might appear as a duplicated decision structure, but it acts as a final check and it also gives the final authority and decision power back to the business executives. The VP BDO Passenger Operations explains: “In the end, the business executives decide. This approach helped in getting them engaged in the portfolio management process because they get their control back, although until now they have never ‘used’ it. Another important aspect in this context is that we try is to make the time between the business idea and approval on the investment committee as short as possible, as this period is perceived as ‘IT being slow’.”

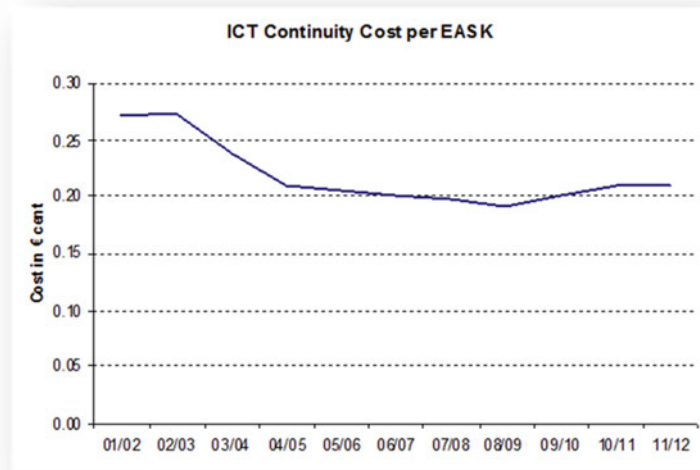


Fig. 2.12 IT continuity per business operation cost

2.3.3 *Reported Benefits*

During the interviews with the stakeholders in this case study, the following benefits of the improved enterprise governance of IT, which are discussed further in the following paragraphs, were consistently mentioned. They include:

- Lower IT continuity cost per business production unit
- Increased capacity for innovation
- Increased alignment of investments to strategic goals
- More trust between all involved stakeholders
- Moving beyond cost thinking towards a value culture

Lower IT continuity cost: A primary goal of the CIO-Office is to continuously promote, improve, and demonstrate the value of the enterprise governance of IT principles and practices in ensuring that IT-enabled investments contribute to real business value. In this effort, one of the metrics reported by the CIO-Office is the relation between all IT continuity costs and “Equivalent Available Seat Kilometers” (EASK), the key metric used to monitor airline production, which represents the total number of seats and cargo capacity multiplied by the total number of kilometers flown by the airline fleet. The graph below shows that although many business investments involving IT, such as e-Tickets, more web-based sales and web-based check-in, resulted in a year-on-year increase in the total IT budget, the unit cost of providing IT services (IT Continuity cost) per airline production unit decreased by more than 20 %. (The slight upward curve for the next 3 years is due to a temporary decrease of production in response to the world economic crisis.) This substitution of labour by IT also resulted in lower business cost per unit, since IT is cheaper than labour (Fig. 2.12).

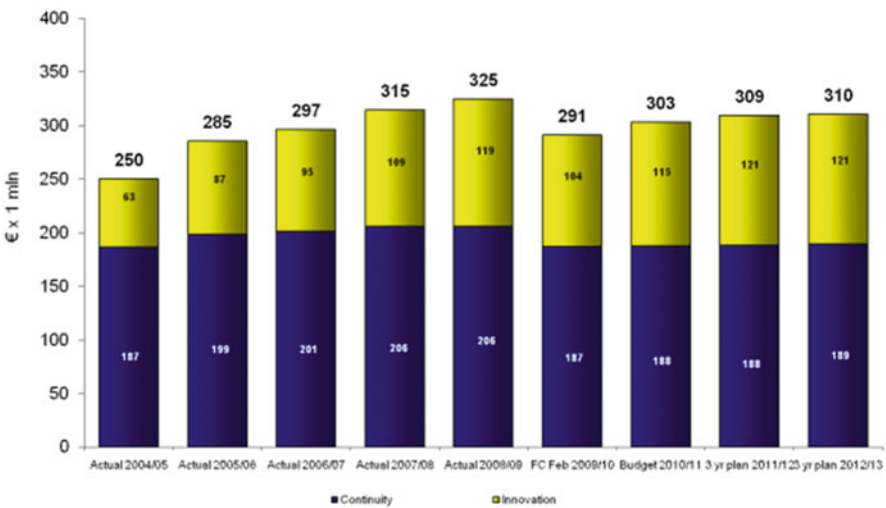


Fig. 2.13 IT continuity versus innovation budget

Increased innovation capacity: In addition to direct cost savings, the innovation capacity has increased as lower, or at least stable IT continuity costs contributed to freeing up financials for IT-based innovation. Again here, the CIO-Office develops metrics to demonstrate this outcome, of which one example is shown in Fig. 2.13. This bar chart shows a relative stable IT continuity budget, enabling the increase of the total IT budget to go almost entirely to new innovation, which has increased from 25 % in 2004/2005 to 39 % in 2010/2011.

Increased alignment of investments to strategic goals: The use of an innovative and inclusive process to capture and prioritize the business drivers of business units has enabled investment decisions to move beyond what was previously a fairly arbitrary process (in the case of cost reductions), or a largely subjective and emotional discussion (in the case of new innovations), to a more objective one. The new process, which involves discussions with and between business units and the CIO-Office, is based on contribution of existing or proposed spend to business drivers. It has resulted in increased alignment of investment and spend with business unit drivers and strategic goals, and increased confidence in the decision-making process. This increased confidence has also resulted in the business/IT board spending less time debating the merits of major programmes and generally endorsing the outcome of the portfolio management process.

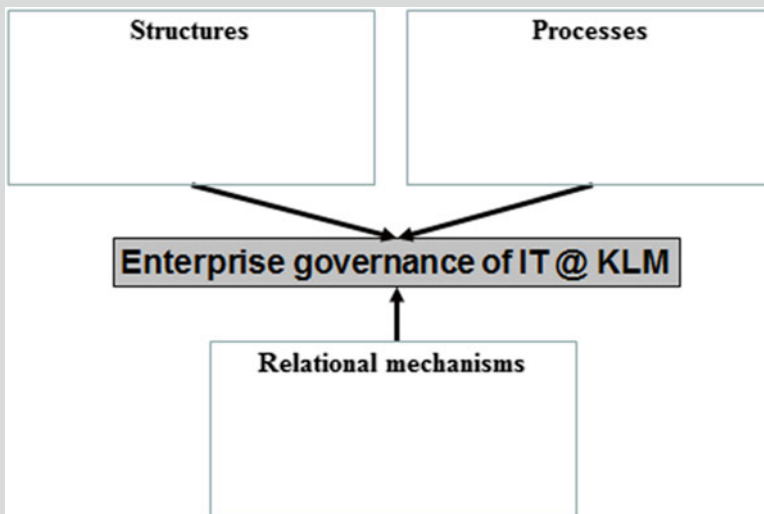
More trust: A fourth reported benefit is the increased trust between business and IT. The whole governance and portfolio management process has resulted in improved and more transparent decision-making. The results of the driver prioritization and investment contribution to the business strategy are visible for every

manager and stakeholder involved. It makes it difficult for executives to overvalue their own favorite proposals. Because of this, there is more trust, and this helps in continuing the “IT: a collaborative effort” journey.

A value culture: Finally, the process of managing the change towards improved enterprise governance of IT has its own benefits. The communication and discussions on portfolio management have improved management awareness and understanding, and supported the transformation from cost towards a value culture. It also continues to identify further opportunities to improve existing governance processes and practices.

Assignment Box 2.4: Identifying Practices for Enterprise Governance of IT

In the beginning of this chapter, Enterprise governance of IT is defined as an integral part of enterprise governance addressing the definition and implementation of processes, structures, and relational mechanisms in the organization that enable both business and IT people to execute their responsibilities in support of business/IT alignment and the creation of business value. Revisit the case and identify the structures, processes, and relational mechanisms applied in this case. Make sure you can clearly explain each of these practices and its role in the context of enterprise governance of IT.



2.4 Enterprise Governance of IT and the Board

In the previous decade, there has been a lot of confusion in the market and literature in the use of the terminology “IT Management” versus “IT Governance.” As will be discussed in one of the following chapters on COBIT 5, ISACA has provided in 2012 a clear definition of both the concept and the difference between them. In building these definitions, ISACA has built on the position put forward by ISO/IEC 38500 (ISACA, 2012).

In COBIT 5, ISACA states that IT governance and IT management processes encompass different types of activities. The governance processes are organized following the EDM model (“Evaluate—Direct—Monitor”), as proposed by the ISO/IEC 38500 standard on Corporate Governance of IT (Fig. 2.14).

IT governance processes ensure that enterprise objectives are achieved by evaluating stakeholder needs (Evaluate), directing, and delegating decision-making roles, responsibilities, and processes in the organization (Direct); and monitoring performance, compliance, and progress against plans (Monitor). In enterprises, IT governance should be the accountability of the board of directors under the leadership of the chairperson. An example of such governance activity of the board can be that the board needs to understand and articulate the role of IT for the organization. A typical approach here is to have a discussion in the board that leads to an interpretation of the quadrant as proposed by Nolan and McFarlan (2005), and that the board takes the consequences of these choices. For example, if the board evaluates that their organization is highly depending on both new technology for innovation as on reliable technology for supporting running business activities, the organization is positioned in the “strategic mode” quadrant. In such scenario, it is up to the board

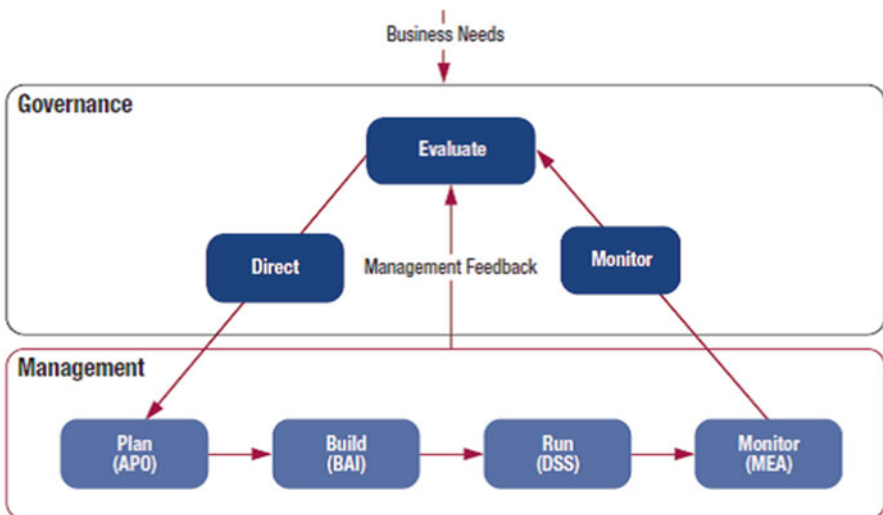
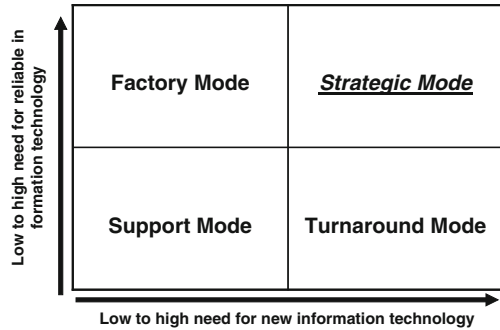


Fig. 2.14 Governance versus management process. ISACA, COBIT 5, 2012, www.isaca.org/cobit

Fig. 2.15 Role of IT in the organization. Adapted from: Nolan R., McFarlan F.W., IT Governance and The Board, Harvard Business Review, 2005



to identify appropriate governance structures and processes that enable that strategic choice. As an example, it would be an appropriate choice, in terms of governance structures, to have the CIO report to the CEO or be a member of the Executive Committee in this context (Fig. 2.15).

Based on the governance activities at board-level, business and IT management plans, builds, runs, and monitors activities (an interpretation of Deming’s PDCA circle Plan, Do, Check, Act) in alignment with the direction set by the governance body to achieve the enterprise objectives (ISACA, 2012). This all is in line with the definition as formulated in the beginning of this chapter: IT governance is the board’s accountability/responsibility and the execution is executive’s accountability/responsibility.

In their 2014 study, Turel and Bart (2014) concluded that “High levels of board-level ITG, regardless of existing IT needs, increased organizational performance.” The importance of board involvement is clearly demonstrated in this paper. However, other studies also point out that on average the involvement of boards in enterprise governance of IT is low and that boards should become more IT savvy to be able to govern the digitized organization. Andriole published an article in this context in 2009 and titled his work “The Surprising State of Practice,” which reported on the “surprising” low maturity of boards in this area.

A related research area concerns how boards report on IT governance towards the market and their investors. Drawing on voluntary disclosure theory and the notion of information asymmetry, research in IT governance has clearly advocated the importance of IT governance communications to external stakeholders of the firm (Gordon et al. 2010; Raghupathi, 2007). The theoretical underpinning, rooted in voluntary disclosure theory and agency theory predicts that firms can improve their liquidity and firm valuation through better information intermediation, enhance market reputation, reduce litigation costs, and the cost of capital (Healy and Palepu, 2001). Building on this theoretical premise of an association between potential economic benefits and voluntary disclosure, our research (Bünten et al., 2014) posited and demonstrated that a higher maturity of IT governance activities enables boards to create a better IT information environment and dissemination capability.

In order to assess the level of IT governance disclosure, we used the IT Governance Disclosure Framework developed by Joshi et al. (2013). This framework consists of 39 disclosure items across four broad ITG domains, namely IT

strategic alignment (ITSA), IT value delivery (ITVD), IT risk management (ITRM), and IT performance management (ITPM). ITSA is concerned with the linkage of strategy, architecture, and processes on the IT and business side (Henderson et al., 1993), whereas ITVD is related to “providing IT products and services on time, within budget, and with appropriate quality” (Joshi et al., 2013). ITRM investigates various IT risks such as operational, business continuity and security risk, while ITPM focuses on IT expenses and budgets. Each domain contains several items, indicating the existence of ITG-related features within that domain. Using this ITG disclosure framework, we recorded the data on IT governance reported in the annual reports of the sample firms (Fig. 2.16).

Against this framework, also the annual reports of 2012 of 21 Belgian en Dutch listed companies were analyzed (Caluwe, 2014). The results show that the category which is most reported on is IT risk management. An explanation can be provided by the Belgian and Dutch corporate governance codes. These state that organizations need to report on systems for risk and internal control. Since IT keeps growing in importance in today’s organizations, IT risk is often included. Topics from the category IT performance measurement are also mentioned relatively often. However, this can be attributed to two topics within this category. All companies in the sample report on the topic “IT-related assets are mentioned under intangible assets” and 67 % mention the IT software cost. Again, regulation can provide an explanation. Listed companies are required to make up their financial statements in accordance with the International Accounting Standards (IAS). According to IAS 38, software is a part of the intangible assets. The topics that belong to the category IT value delivery are mentioned fairly often as well. “IT is explicitly mentioned for achieving specific business objectives” is included in 90 % of all analyzed annual reports. Indeed, investors attach importance to the value creation from IT investments. Lastly, companies report very little on IT strategic alignment. Seven out of 11 topics are not included in any of the annual reports. Within this category, topics relating to IT governance at the level of the board of directors were included. According to the interviews and literature, boards of directors pay little attention to IT governance due to a lack of IT expertise among their members.

Assignment Box 2.5: Understanding the Difference Between Governance and Management of IT

Considering this section on Enterprise Governance of IT and the Board, distinguish between governance and management practices in the KLM case.

ITG disclosure framework (adapted from Joshi et al., 2013)		
Domain	Item ID/Description	
IT Strategic Alignment (ITSA)	ITSA1	IT expert on board
	ITSA2	IT expert with experience on board
	ITSA3	CIO or equivalent position in firm
	ITSA4	IT committee
	ITSA5	IT risk part of audit/risk committee
	ITSA6	IT is part of audit committee
	ITSA7	IT steering committee
	ITSA8	IT planning committee
	ITSA9	Technology committee
	ITSA10	IT committee at executive level
	ITSA11	CIO or equivalent on board
IT Value Delivery (ITVD)	ITVD1	ITG governance framework/standard
	ITVD2	IT issue in board meeting
	ITVD3	Advise on IT by board
	ITVD4	Section on IT project in annual report
	ITVD5	IT mentioned as strategic business issue
	ITVD6	IT projected as strength
	ITVD7	IT projected as opportunity
	ITVD8	Project update or comments
	ITVD9	IT explicitly mentioned for achieving business objectives
	ITVD10	Comments/Updates on IT performance
	ITVD11	IT training
	ITVD12	Green IT
	ITVD13	In/Outsourcing of IT
IT Risk Management (ITRM)	ITRM1	IT referred to under operational risk
	ITRM2	Special IT risk management program
	ITRM3	Use of IT for regulation & compliance
	ITRM4	Electronic Data Processing
	ITRM5	IT security policy/plan
	ITRM6	IT support for accounting
	ITRM7	Business continuity plan
IT Performance Management (ITPM)	ITPM1	Explicit information on IT expenditure
	ITPM2	IT budget
	ITPM3	IT hardware costs
	ITPM4	IT software costs
	ITPM5	Explicit IT manpower cost
	ITPM6	IT expenses mentioned under administrative cost
	ITPM7	IT related assets mentioned under intangible assets
	ITPM8	Direct cost on IT mentioned in percentage

Fig. 2.16 Enterprise governance of IT disclosure framework. Joshi, A., Bollen, L., & Hassink, H. (2013). An empirical assessment of IT governance transparency: Evidence from commercial banking. *Information Systems Management*, 30(2), 116-136

2.5 Interorganizational Governance of IT

While there is substantial research available on intraorganizational governance of IT, there is a lack of research that specifically looks at how organizations define their interorganizational governance of IT (Croteau and Bergeron, 2009; Grant and Tan, 2010; Croteau and Dubsky, 2011). Many organizations are however operating more and more in complex networked systems, often facilitated by innovations through IT (e.g., e-business), and many industries are using “network governance”—rather than bureaucratic structures within firms—to underpin their value chain (Jones et al., 1997; Chi and Hollsapple, 2005).

Jones et al. (1997) define network governance as “a select, persistent, and structured set of autonomous firms (as well as non-profit agencies) engaged in creating products or services based on implicit and open-ended contracts to adapt to environment contingencies and to coordinate and safeguard exchanges” (p. 914). This network governance perspective clearly poses new challenges for the governance of IT (Croteau and Bergeron, 2009). “These challenges revolve around the allocation of accountability, responsibility and decision rights in network arrangements where there is distributed ownership of ICT resources, systems and processes” (Grant and Tan, 2010).

According to Croteau and Bergeron (Croteau and Bergeron, 2009), this need for interorganizational governance of IT “is also observed within large organizations with several business units where each of them has its own mission, strategy, structure, processes and IT infrastructure and architecture. The challenge for such organizations is to create an inter-unit governance of IT that is developed in a similar way to the interorganizational governance of IT.” These authors define interorganizational governance of IT as the authority and accountability frameworks put in place to encourage the efficient and effective use of IT when sustaining electronic exchanges among business partners, which is dependent on a mix of structures, processes, and participants (relational mechanisms).

As such, it is felt that many of the principles, structures, processes, and relational mechanisms as discussed in KLM case study section (see Sect. 2.3) are of value for any IT governance setup, both intra- as well as interorganizational. Some specific recommendations out of this case towards the interorganizational context are:

An approach towards sourcing decisions in a global economy: Many organizations move towards networked arrangements to (out)source commoditized IT resources. KLM also operates in such a networked environment and developed selective sourcing criteria regarding choosing between allocating work in-house for customized development, or through external IT providers for standardized solutions. Based on the internal “Stay on the Surfboard Principle,” generic business processes that bring no competitive advantage are supported by generic (low development cost, off-the-shelf) applications packages, and business processes, which have the potential to create competitive advantage can and will be supported by in-house custom-built applications. In a networked and global environment, this principle can help in the discussions on what and what not to outsource towards other partners in a networked environment.

An innovative process to allocate resources across multiple business units: KLM is a multi-business-unit environment with distributed ownership over IT resources, systems, and processes. As such, these business units operate in a very similar environment as a network of organizations with shared IT resources. An important challenge for such an environment is to find a way to allocate IT (investment) budgets to business units and/or organizations in line with their specific strategies. KLM uses an innovative and inclusive process to capture and prioritize the, often diverse, business drivers of different business units. The design of this process can be inspirational for other multi-unit or interorganizational environments, as a way to engage—sometimes diverse—business units in the decision-making process around shared IT resources.

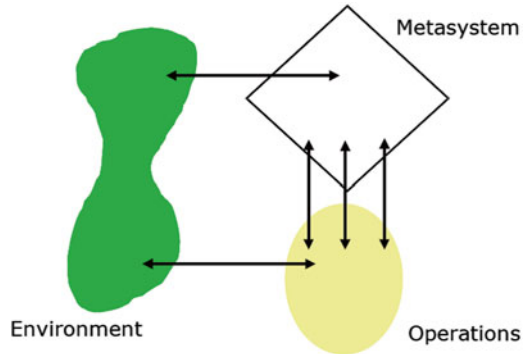
The need for an overarching function: When building a governance model for an inter-organizational or multi-business unit environment, the focus should be on the optimal value creation of the network (of organizations or units) as a whole. At KLM, the individual business units drive the current portfolio management processes and there is no real aggregation at KLM corporate level. However, The executive committee plays a crucial role in the optimization at group level, they are responsible for ensuring that the bottom-up portfolio management process in the end leads to optimal value creation of the KLM group (of business units) as whole. The existence of such overarching function, taking accountability for the governance of IT, appears to be crucial is guarding the value creation of the network (or organizations and units) as a whole.

An approach to manage multi-unit infrastructure investments: It is often difficult to build a business case for infrastructure investment because benefits are typically hard to articulate and spread across multiple units or organizations. At KLM, the CIO-Office manages a specific budget oriented towards these type of cross-unit (cross-organization) infrastructure investments. The CIO-office builds business cases that can apply for this budget, which are derived from the emerging business cases of the business units (to understand future infrastructure needs). This approach ensures that future infrastructure investments will be done required to support the network of business units (or organizations). To build a solid infrastructure in a networked environment, such role of a CIO-Office managing the future infrastructure needs and investments, can be a powerful mechanism.

2.6 Theoretical View on EGIT: Viable Systems Theory

The extant research often shows us descriptively how organizations are implementing IT governance, which IT-related decisions are governed and how they are governed. However, there is little focus on understanding in a more theoretical way what functions are required in an IT governance model and why. We suggest that the Viable Systems Model (VSM) can provide an unexplored perspective and help in focusing on functions that are required for achieving homeostasis in a complex adaptive system and in building a theory of governance of IT Peppard, (2005). Moreover, it takes a more comprehensive perspective of alignment, including

Fig. 2.17 Basic structure of the viable systems model



addressing the execution of projects and programmes that emerge from the alignment process, in the delivery of any expected value.

The VSM was developed in the 1950s by Beer, who first applied its principles to the steel and publishing industries. It was originally derived from his thinking about the “management” of the muscles by the brain and nervous systems, which he then applied to organizations. Beer wrote that a viable system is one that is able to maintain a separate existence and any system “that is capable to maintain its identity independently of other such organisms within a shared environment” (1979, pp. 21–22). In addition to variety, the notion of recursion is a fundamental concept of the VSM. For Beer, “any viable system contains, and is contained in, a viable system” (1979, p. 118). This means that every system contains subsystems that are able to maintain a separate existence, and that each of those viable subsystems has the same fundamental structure as the meta-system.

Like any model, the VSM is a generalized model that can be used to describe any organization. Proponents of the VSM claim that all self-organizing systems conform to this model, even if participants are unaware of this. The VSM treats an organization as an information processing system as it strives to maintain balance. It provides a framework for diagnosing the structure of an organization, its ability to communicate internally and externally, and its effectiveness in controlling the deployment of its resources. A VSM always relates to a purpose; a multipurpose system requires the construction of several VSMs. According to the VSM logic, self-organizing systems have

- Elements which do things (operations)
- Elements which control the doer (management or meta-system)
- Surroundings in which they function (the environment)

While the basic structure shown in Fig. 2.17 illustrates how VSM is typically drawn, in reality the environment should go all the way around both the operation and its meta-system, and the meta-system should be embedded in the operations; for clarity, they are shown separately.

<i>VSM domains</i>	<i>IT governance implications</i>
The coherence function (system 5)	Role of IT, principles and enterprise architecture
The planning / future focus function (system 4)	Innovation and portfolio management
The executive function (system 3)	Day-to-day monitoring and control of IT projects, services , operations
The coordination function (system 2)	Day-to-day coordination of IT projects, services , operations
The productive function (system 1)	Day-to-day execution of IT projects, services , operations

Fig. 2.18 A VSM for IT governance

The VSM has five subsystems, or functions, each having a specific task for maintaining the stability of the system. The VSM identifies these five functions as systems one through five. They are, respectively, the productive function, the coordination function, the executive function, the planning and future focus function, and the coherence function (see Fig. 2.18). All that goes on in an organization can be described in terms of one or more of these functions.

2.6.1 *System 1: The Productive Function*

The System 1 (S1) activities are the operations or wealth-producing parts of the enterprise. They carry out the tasks that the system is intended to accomplish (i.e., implementation of the system’s purpose). All other VSM subsystems are management—or decision-making—rather than action oriented.

2.6.2 *System 2: The Coordination Function*

System 2 (S2) is the coordination function, sometimes referred to as the “anti-oscillation function” because it keeps the different activities of the operations running smoothly and keeps them from stepping on each other’s heels. Beer (1979) provides the example of a school timetable; it is a service that ensures that a teacher has only one lecture at any one time period and that only one class uses a room at a given lesson slot.

2.6.3 System 3: The Executive Function

System 3 (S3) is the executive function, where day-to-day management responsibility lies (i.e., resource allocation, control, and monitoring of S1). It oversees the productive operations and manages their common resources, staff, capital, and budgets to secure efficiency of operations. Importantly, it does not determine strategy, define principles, or make policies but interprets these for the S1 activities. While Beer's original model also had a System 3*, ("three star" on the language of the VSM) we have subsumed these functions into System 3. In light of the agreed purpose, and based on the information regarding the state of System 1, Systems 3 influences System 1 by direct intervention or by modification of System 2. Moreover, it audits activities to sustain accountability and internal homeostasis.

2.6.4 System 4: The Planning and Future Focus Function

System 4 (S4), the planning and future focus function, like System 1, is connected directly to the environment. It includes research and development, market research, new products, and strategic planning. It investigates new technologies and customer needs. It emphasizes learning not only about the environment but also what is and isn't working in the organization. In many ways, it is akin to Simon's (1960) notion of intelligence as scanning the environment, both internal and external, seeking to identify problems and opportunities.

2.6.5 System 5: The Coherence Function

System 5 (S5) is the coherence function, maintaining the organizational identity and balancing the organization's present and future requirements. It considers the organization's purpose or identity and is thus responsible for the direction of the whole system. Considering the information generated by S4, it creates policies that are conveyed to S3 for implementation by S1. S5's second task is to monitor the balance between the long-term actions suggested by S4 and the short-term requirements articulated by S3. "System 5 must ensure that the organization adapts to the external environment while maintaining an appropriate degree of internal stability" (Jackson, 1991, p. 111).

2.7 Applying the VSM in the Context of Enterprise Governance of IT

The objectives of the VSM have strong resonance with those of IT governance: To provide stability and coherence and optimize performance. Furthermore, the language of the VSM also reflects the language found in the discourse on IT

governance; words such as adaptation, control, monitoring, coordination, synergy, balance, and policy, are prominent within this literature. Given its heritage, focus, and application, we suggest that the VSM can help in progressing both understanding and practice in relation to IT governance as well as theory development.

The VSM model can be used to assess the objectives of an existing IT governance structure and associated mechanisms and processes. To facilitate such analyses, it was felt that Beer’s terminology should change towards more evocative and relevant language in the context of the contemporary discourse. The labels assigned to some of the systems are somewhat dated and have been superseded by a newer and more relevant nomenclature. For example, “policy” had specific meaning in the 1960s—as in business policy—and is today more appropriately referred to as strategy. In the IT and computing literature, policy also has a precise meaning, referring to a guideline, standard, rule, or prescription.

The new proposed terms for the VSM are as follows: Day-to-day execution of IT projects, IT operations, and service delivery (System 1); day-to-day coordination of IT projects, IT operations, and service delivery (System 2); day-to-day monitoring and control (including resource allocation and synergies) of IT projects, IT operations, and service delivery; innovation and portfolio management (System 4); and role of IT, governance principles, and architecture (System 5).

The VSM defines the functions (i.e., coordination, resource allocation, etc.) necessary for an entity to self-organize. It also recognizes that in self-organizing, the entity is not immune to what is happening in the external environment (i.e., new technologies, competitor moves, etc.). Working from the VSM model for IT governance as described above, it is possible to move on to assess how the organization handles the objectives and requirements of each of the functions.

Assignment Box 2.6 Viable Systems Model and IT Governance

Revisit the KLM case discussed in this chapter. Analyze the identified EGIT practices and categorize them according to the five VSM areas as discussed above (see template). Be prepared to justify your categorization and discuss where there are areas for improvement identified using VSM as a lens.

VSM domains	IT governance implications	IT governance practices (processes, structures, relational mechanisms)
The coherence function (system 5)	Role of IT, principles and enterprise architecture	
The planning / future focus function (system 4)	Innovation and portfolio management	
The executive function (system 3)	Day-to-day monitoring and control of IT projects, services , operations	
The coordination function (system 2)	Day-to-day coordination of IT projects, services , operations	
The productive function (system 1)	Day-to-day execution of IT projects, services , operations	

Summary

Having developed a high-level model for Enterprise Governance of IT does not imply that governance is actually working in the organization. Conceiving the model for Enterprise Governance of IT is the first step, deploying it throughout all levels of the organization is the next challenging step. To achieve this, Enterprise Governance of IT can be deployed using a mixture of various structures, processes, and relational mechanisms. These practices need to be embedded at both the level of the board as executive and senior management in the organization.

It is important to recognize that each of the applied processes, structures, and relational mechanisms serve specific or multiple goals in the complex alignment challenge. This chapter discussed the VSM as a lens to better understand these different layers of objectives in enterprise governance of IT.

However, dividing the Enterprise Governance of IT framework into smaller pieces, and solving each problem separately, does not always solve the complete problem. A holistic approach towards Enterprise Governance of IT acknowledges its complex and dynamic nature, consisting of a set of interdependent subsystems (processes, structures, and relational mechanisms) that deliver a powerful whole. The challenge for organizations is to select an appropriate set of practices, specifically for their own environment. To assist organizations in this challenge, this chapter discussed a list of Enterprise Governance of IT practices and illustrations of their application in the context of the airline company KLM.

Study Questions

1. Discuss and illustrate important structures for Enterprise Governance of IT.
2. Discuss and illustrate important processes for Enterprise Governance of IT.
3. Discuss and illustrate important relational mechanisms for Enterprise Governance of IT.
4. Explain the difference between enterprise governance and enterprise management of IT.
5. Identify and discuss governance practices that are most relevant for obtaining board involvement.
6. Discuss how the VSM is related to Enterprise Governance of IT and how it can be used to analyze EGIT implementations.
7. Discuss why boards should report on IT governance and what they could report about in this context.

Acknowledgments We would like to express our special gratitude towards Prof. Dr. Joe Peppard who worked with us on developing a more theoretical view on Enterprise Governance of IT. Special thanks also to John Thorp and Dirk Gemke for their very inspiring thoughts and contributions in the development of the KLM case on enterprise governance of IT. Finally, special appreciation for the joint effort with Dr. Joshi Anant on understanding IT governance transparency.

References

- Andriole, S. (2009). Boards of directors and information technology governance: The surprising state of practice. *Communications of the AIS*, 24(22), 373–394.
- Beer, S. (1979). *The heart of the enterprise*. Chichester, England: Wiley.
- Bünten, S., Joshi, A., De Haes, S., & Van Grembergen, W. (2014). Understanding the association between IT governance maturity and IT governance disclosure. *International Journal on IT/ Business Alignment and Governance*, 5(1), 16–33.
- Caluwe, L. (2014). *IT governance transparency*. Master thesis project submitted for achieving the degree of business engineer in information systems management, supervised by Prof. Dr. Steven De Haes, Faculty of Applied Economics, University of Antwerp.
- Chi, L., & Hollsapple, C. (2005). Understanding computer-mediated interorganizational collaboration: A model and framework. *Journal of Knowledge Management*, 9(1), 53–75.
- Croteau, A-M., Bergeron, F. (2009). Interorganizational governance of information technology. In *Proceedings of the 42nd Hawaii International Conference on System Sciences*, Big Island, HI.
- Croteau, A-M., Dubsky, J. (2011). Uncovering modes of interorganizational governance of IT. In *Proceedings of the 44th Hawaii International Conference on System Sciences*, Kauai, HI.
- De Haes, S., Dirk, G., John, T., & Van Grembergen, W. (2011). KLM's enterprise governance of IT journey: From managing IT costs to managing business value. *MISQ Executive*, 10(3), 109–120.
- De Haes, S., & Van Grembergen, W. (2009). An exploratory study into IT governance implementations and its impact on business/IT alignment. *Information Systems Management*, 26(2), 123–137.
- Gordon, L. A., Loeb, M. P., & Sohail, T. (2010). Market value of voluntary disclosures concerning information security. *MIS Quarterly*, 34(3), 567–594.
- Grant, T. G., Tan, F. (2010). Call for papers European Journal of Information Systems: Special issue on governing IT in inter-organizational relationships. Retrieved October 12, 2010, from <http://www.palgrave-journals.com/ejis/index.htm>.
- Healy, P. M., & Palepu, K. G. (2001). Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature. *Journal of Accounting and Economics*, 31, 405–440.
- Henderson, J. C., Venkatraman, N., & Oldach, S. (1993). Continuous strategic alignment: Exploiting information technology capabilities for competitive success. *European Management Journal*, 11(2), 139–149.
- ISACA. (2012). COBIT 5. Retrieved from www.isaca.org.
- Jones, C., Hesterly, W., & Borgatti, S. (1997). A general theory of network governance: Exchange conditions and social mechanisms. *Academy of Management*, 22(4), 911–945.
- Joshi, A., Bollen, L., & Hassink, H. (2013). An empirical assessment of IT governance transparency: Evidence from commercial banking. *Information Systems Management*, 30(2), 116–136.
- Nolan, R., & McFarlan, F. W. (2005). Information technology and the board of directors. *Harvard Business Review*, 83(10), 96–106.
- Peppard, J. (2005) The application of the viable systems model to information technology governance', in *Proceeding of the International Conference of Information Systems (ICIS)*.
- Raghupathi, W. R. P. (2007). Corporate governance of IT: A framework for development. *Communications of the ACM*, 50(8), 94–99.
- Turel, O., & Bart, C. (2014). Board-level IT governance and organizational performance. *European Journal of Information Systems*, 23, 223–239.
- Van Grembergen, W. (Ed.). (2004). *Strategies for information technology governance*. Hershey, PA: Idea Group.

Enterprise Governance of Information Technology

Achieving Alignment and Value, Featuring COBIT 5

De Haes, S.; Van Grembergen, W.

2015, XIV, 167 p. 116 illus., 60 illus. in color., Hardcover

ISBN: 978-3-319-14546-4