Chapter 2
Process Identification

Things which matter most must never be at the mercy of things which matter least.
Johann Wolfgang von Goethe (1749–1832)

Process identification is a set of activities aiming to systematically define the set of business processes of a company and establish clear criteria for prioritizing them. The output of process identification is a *process architecture*, which represents the business processes and their interrelations. A process architecture serves as a framework for defining the priorities and the scope of process modeling and redesign projects.

In this chapter, we present a method for process identification that is based on two phases: designation and evaluation. The designation phase is concerned with the definition of an initial list of processes. The evaluation phase considers suitable criteria for defining priorities of these processes. After that, we discuss and illustrate a method for turning the output of this method into a process architecture.

2.1 Focusing on Key Processes

Few organizations have the resources required to model all their processes in detail, to rigorously analyze and redesign each of them, to deploy automation technology in order to support each of these processes, and finally to continuously monitor the performance of all processes in detail. Even if such resources were available, it would not be cost-effective to spend them in this way. BPM is not free. Like any other investment, investments in BPM have to pay off. Thus, it is imperative in every organization engaged in BPM to focus the attention on a subset of processes.

Some processes need to receive priority because they are of strategic importance to an organization's survival. Other processes might show striking problems, which should be resolved for the sake of all involved stakeholders. In other words, the processes that an organization should focus on are found in areas where there is either great value created or significant trouble present (or both). To make things more complex, the subset of high-priority processes in an organization is subject to the dynamics of time. Some processes may be problematic at one point, but once

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the issues have been identified and resolved by a process improvement program, an organization can do with only periodic inspections for some time. For example, an insurance company suffering from high levels of customer dissatisfaction will naturally tend to focus on its customer-oriented processes, say its claims handling process. Once this process has improved and customer satisfaction is again within the desired range, the emphasis might move to its risk assessment processes, which are important for the long-term viability and competitiveness of the company.

Beyond the dynamics of time, what may be processes that are of strategic importance to an organization at some point may grow less important as time elapses. Market demands may change and new regulations or the introduction of new products may limit what was once a profitable business activity. For example, the arrival of new competitors offering discount insurance policies through Web-based channels may push an established company to redesign its insurance sales processes to make them leaner, faster, and accessible from the Web.

To address the imperative of focusing on a subset of key processes, the management team, process analysts and process owners need to have answers to the following two questions: (i) what processes are executed in the organization? and (ii) which ones should the organization focus on? In other words, an organization engaged in BPM initiatives needs to keep a map of its processes as well as clear criteria for determining which processes have higher priority. We have seen in Chap. 1 that there is a range of stakeholders involved in the management and execution of a business process. Generally, only a handful of such stakeholders have a full overview of all the business processes in an organization. Yet, it is precisely this insight that is required in order to identify the subset of processes that need to be closely managed or improved. Capturing this knowledge and keeping it up-to-date is precisely the aim of process identification.

More specifically, process identification is concerned with two successive phases: designation and evaluation. The objective of the *designation phase* is to gain an understanding of the processes an organization is involved in as well as their interrelationships. The *evaluation phase*, based on the understanding that is established in the previous phase, intends to develop a prioritization among these for process management activities (modeling, redesign, automation, monitoring, etc.). Note that *neither* of these phases is concerned with the development of detailed process models. The key activities that are involved with process identification which we will describe closely follow those as identified by Davenport in [10].

2.1.1 The Designation Phase

If an organization is at the very start of turning into a process-centered organization, the first difficult task it faces is to come up with a meaningful enumeration of its existing processes. One difficulty here arises from the hierarchical nature of business processes: different criteria can be considered for determining which chains of operations can be seen as forming an independent business process and which ones

are seen as being part of another process. There are various views on how to categorize business processes (see the box "Categories of Processes according to Porter"). Some of these support the idea that there are actually *very few* processes within any organization. For example, some researchers have argued for the existence of only two processes: (1) managing the product line, and (2) managing the order cycle. Others identify three major processes: developing new products, delivering products to customers, and managing customer relationships.

CATEGORIES OF PROCESSES ACCORDING TO PORTER

Different categorizations for business processes have been proposed. One of the most influential is Michael Porter's Value Chain model. It distinguishes two categories of processes: core processes (called primary activities) and support processes (support activities). Core processes cover the essential value creation of a company, that is, the production of goods and services for which customers pay. Porter mentions inbound logistics, operations, outbound logistics, marketing and sales, and services. Support processes enable the execution of these core processes. Porter lists infrastructure, human resources, technology development, and procurement as such support processes. As a third category, other authors extend this set of two categories with management processes. For example, the periodic process to assess the strength of competitors is such a management process. The distinction of core, support, and management processes is of strategic importance to a company. Therefore, if such a distinction is made explicit, e.g. at the stage of process identification or while creating a process architecture, it is likely to be a heavily disputed topic.

The question is whether an overly coarse-grained view on processes, without *any further subdivision*, is useful for an organization that strives to become process-centered. Remember that the idea of process management is to actively manage business processes in the pursuit of satisfying its specific customers. If one selects business processes to be such large entities, then the result may be that these cannot be easily managed separately, both in terms of scope and speed of action. Consider, for example, how difficult it would be to model or redesign a process when it covers half of all the operations within an organization. A realistic model of such a business process would take a very long time to develop and could become extremely complex. Also, redesigning such a large process would be a time-consuming affair, let alone the implementation of such a redesign. Depending on the situation, an organization may not have that time.

The main conclusion from this is that the number of processes that are identified in the designation phase must represent a trade-off between *impact* and *manageability*. The smaller the number of the processes one wishes to identify, the bigger their individual scope is. In other words, if only a small number of processes is identified then each of these will cover numerous operations. The main advantage

of a large process scope is that it potentially increases the *impact* one can have with actively managing such a process. The more operations are considered to be part of a process, the easier it will become, for example, to spot opportunities for efficiency gains by rooting out redundant work.

On the other hand, a large scope of a business process brings along a range of issues that make it more difficult to *manage* it as a process:

- the involvement of a large number of staff will make effective communication among them problematic
- it will become more difficult to keep models of a large process up-to-date, and
- improvement projects that are related to a large process are more complex

To balance the advantages and disadvantages of a large process scope, Davenport has suggested that it may be useful to identify both *broad* and *narrow* processes. Broad processes are identified in those areas where an organization feels it is important to completely overhaul the existing operations at some point, for example because of fierce competitive forces. Imagine that an organization may have found that its procurement costs are overly high compared to its competitors. They select procurement as a broad process, which covers all of the services and products the company acquires from other parties. By contrast, narrow processes are not targeted for major overhauls; they do need to be actively monitored and are subjected to continuous fine-tuning and updating. A narrow process may be, for example, how the same company deals with improvement suggestions of its own employees.

Exercise 2.1 Explain how the trade-off between impact and manageability works out for broad and narrow processes, respectively.

Any enumeration of business processes should strive for a reasonably detailed outcome, which needs to be aligned with the organization's specific goals of process management. For most organizations, as a rule of thumb, this will boil down to a dozen to a couple of dozens of business processes. Very large and diversified organizations might be better off with identifying a couple of hundred processes. To illustrate this: Within a multi-national investment firm, which employs close to 3,000 staff and holds assets in the range of € 300 billion, 120 different business processes have been identified. To each of these business processes a process owner is assigned, who oversees the performance of the process and monitors the achievement of its objectives in terms of customer satisfaction, profitability, and accountability. Detailed process models are kept up-to-date, both as a means for documenting planned changes to any process and for satisfying the requirements of financial authorities. By contrast, for a small medical clinic in the Netherlands, which employs medical specialists, nurses, and administrative staff, 10 different treatment processes have been identified. A few of these have been mapped in the form of process models and are now in the process of being automated with a business process management system. For all other processes, it is sufficient to be aware of the distinctive treatment options they can provide to different patient categories.

Exercise 2.2 What are the potential drivers for the described investment firm to identify a large number of processes?

In addition to a rather detailed view on what business processes exist, an understanding must be developed about the *relations* between the various processes. In a situation where organizations define both narrow and broad processes, to avoid confusion, it is important to map how narrow processes relate to broader processes. A broad process like order management, for example, can be related to the more narrowly defined processes of order booking, billing, shipment, and delivery. All of these can be considered sub-processes of order management. We can call this an example of *hierarchical* relations between processes. Processes may also be related to one another differently. Billing, in the example we just used, is an *upstream* process compared to shipment: for the same order the bill is sent out usually *before* the ordered goods are shipped. Another way of expressing this relation is, of course, that shipment can be considered a *downstream* process in comparison to billing. This illustrates how processes can be *sequentially* related.

Exercise 2.3 Discuss in how far order management might be sequentially related to booking, billing, shipment, and delivery.

Most of the time, the insight into the relations between processes may be less than strictly exact. The most important goal of capturing dependent relations is to gain an understanding of how the performance of a process is related to that of another. If one would, for example, redesign an existing process it is useful to understand which processes depend on the outcomes of such a process. Such downstream processes may need to be prepared for receiving information or goods in another frequency or form than before and measures should be taken to prevent any disruptions.

Exercise 2.4 At this point, we discussed hierarchical and sequential relations between business processes. Can you think of other types of relation that are useful to distinguish between processes? As a hint, you might want to think about the purpose of identifying the relations between business processes.

While the designation of business processes and their inter-relationships is subject to different design choices and preferences, some general guidance is available. First of all, several so-called reference models for business process identification exist. These are developed by a range of industry consortia, non-profit associations, government research programs and academia. The best-known examples are the Information Technology Infrastructure Library (ITIL), the Supply Chain Operations Reference Model (SCOR) by the Supply Chain Council, the Process Classification Framework (PCF) by the American Productivity and Quality Center (APQC), the Value Reference Model (VRM) by the Value Chain Group, and the Performance Framework of Rummler–Brache. Reference models standardize what can be seen as different processes, with unique characteristics and delivering distinguishable products, and how their performance can be measured. Their largest value is in the identification of regulatory or highly industry-specific processes, or when performance

benchmarking against peers and competitors is the issue that a process-centered organization is after. In other cases, these reference models may still be useful in identification exercises in the form of a checklist. For example, an organization can use the APQC's PCF to inventory the processes in the framework they use, flag those they do not use, and add its own unique processes. We will take a closer look at the PCF in Sect. 2.2.

A second stream of support is available in the form of specific design approaches to develop a so-called *process architecture*. A process architecture is an organized overview of the processes that exist within an organizational context, which is often accompanied with guidelines on how they should be organized. Design approaches for business process architectures use a certain logic to arrive at an identification of business processes. In Sect. 2.2, we will go into more detail with respect to a specific design approach.

Finally, what is worth noting with respect to the designation phase is that processes change over time, deliberately or not. This naturally implies that process identification is of a continuous nature. To avoid the situation that one becomes bogged down in the stage of process identification, the activity should be considered as an exploratory and iterative endeavor. When a certain stable overview is created it may very well be usable for a period of two to three years.

2.1.2 The Evaluation Phase

As stated before, not all processes are equally important and not all processes can receive the same amount of attention. Process management involves commitment, ownership, investment in performance enhancement, and optimization. Therefore, processes that create loss or risk demand for consolidation, decommissioning, or outright elimination. Various criteria have been proposed to steer this evaluation. The most commonly used ones are the following.

Importance This criterion is concerned with assessing the strategic relevance of each process. The goal is to find out which processes have the greatest impact on the company's strategic goals, for example considering profitability, continuity, or contribution to a public cause. It makes sense to select those processes for active process management that most directly relate to the strategic goals of an organization.

Dysfunction This criterion aims to render a high-level judgment of the "health" of each process. The question here is to determine which processes are in the deepest trouble. These processes are the ones that may profit most from process-centered initiatives.

Feasibility For each process, it should be determined how susceptible they are to process management initiatives, either incidental or on a continuous basis. Most notably, culture and politics involved in a particular process may be obstacles to achieve results from such initiatives. In general, process management should focus on those processes where it is reasonable to expect benefits.

Note that all of these criteria assume that there is certain information available. For example, to assess the strategic *importance* of a process it is of the utmost importance that an organization has an idea of its strategic course. It is sufficient if such strategic considerations are defined at a very abstract level. At this point, for example, many organizations see the strategic benefit of being able to change the kind of products it provides to the demands of customers. Zara, the Spanish clothing retailer, is a prime example of an organization that follows a measure-and-react strategy. It sends out agents to shopping malls to see what people already wear for determining the styles, fabrics, and colors of the products it wants to deliver. Such an organization may look with specific interest at the production and logistic business processes that are best able to support this strategy.

Similarly, to determine the *potential dysfunction* of a business process an organization needs information. Here, we do encounter a "chicken and egg" problem. Many organizations that are not working in a process-centered way do not have a good, quantitative insight into the performance of their individual processes. One of the process-centered initiatives that such an organization may be after would exactly be to put the systems and procedures in place to collect the data that are needed for a performance assessment. In such cases, an organization will need to use more qualitative approaches to determine which of their processes do not perform well, for example depending on the impressions that management or process participants have about the efficiency or effectiveness of the various processes. Another approach would be to rely on customer evaluations, either gathered by surveys or spontaneously delivered in the form of complaints.

The criterion of *feasibility* needs some attention too. It has become common practice for organizations to undergo a continuous stream of programs to improve their performance in one dimension or the other. Consider Philips, the multinational electronics company. It has gone through an intermittent range of improvement programs since the 1980s to boost its performance. The same phenomenon can now be observed within many telecommunications and utility organizations. Since the profitability of products sharply changes from one year over the other, this requires continuous changes to product portfolios and market priorities. In these kinds of volatile context, it may happen that managers and process participants become tired of or outright hostile towards new initiatives. This kind of situation is not a good starting point for process management initiatives. After all, like other organizational measures, such initiatives also depend on the cooperation and good intentions of those directly involved. While we will not deal with the subject of change management in much detail in this textbook, it is important to realize that political sensitivities within an organization may have an effect on the success rate of process management efforts too.

BPM MATURITY ASSESSMENT

A more detailed approach to look at the evaluation phase is based on maturity. BPM maturity assessment is a body of techniques to determine the level

of systematic process thinking in an organization. A BPM maturity assessment essentially involves two aspects. The first aspect is to assess to what extent a given organization covers the range of processes that are ideally expected from it. The second aspect is to assess to what degree these processes are documented and supported. Therefore, a maturity assessment is aimed at establishing a baseline for discussing the completeness and the quality of the set of processes executed in an organization.

One of the most widely used frameworks for maturity assessment is the Capability Maturity Model Integrated (CMMI) framework. This framework distinguishes a number of so-called process areas. Several of these areas are specific to a particular domain in the various CMMI specifications. The domain-independent areas include: process management, project management, and support.

The coverage of process areas and the degree of their support provide the basis for a maturity assessment in terms of the five CMMI maturity levels:

Level 1 (Initial): At this initial stage, the organization runs its processes in an ad-hoc fashion, without any clear definition of these processes. Control is missing.

Level 2 (Managed): At this stage, project planning along with project monitoring and control have been put into practice. Measurement and analysis is established as well as process and product quality assurance.

Level 3 (Defined): Organizations at this stage have adopted a focus on processes. Process definitions are available and organizational training is provided to enable stakeholders across the organization to be engaged in process documentation and analysis. Integrated project and risk management are in place. Decision analysis and resolution are also in place.

Level 4 (Quantitatively Managed): At this stage, organizational process performance is tracked. Project management is performed using quantitative techniques.

Level 5 (Optimizing): At this stage of maturity, the organization has established organizational performance management accompanied with causal analysis and resolution.

The assessment of an organization in terms of these levels leads to a so-called *appraisal*. Appraisals can be conducted internally within an organization (also called self-appraisals) or by an external organization with expertise in maturity assessment. Different types of appraisal are distinguished and defined in the Standard CMMI Appraisal Method for Process Improvement (SCAMPI).

Question Given all the discussed criteria, does an assessment of the importance, dysfunctioning, and feasibility always point me to the same processes to actively manage?

No, there is no guarantee for that. It may very well be that a strategically important process is also the process that can be expected to be the most difficult one to manage, simply because so many earlier improvement efforts have already failed. An organization may not have a choice in such a situation. If a strategic process cannot be improved, this may turn out to be fatal for an organization as a whole. Think of a situation where the process to come up with new products creates much turmoil and conflicts within an organization: If the issues cannot be sorted out, the company may stop functioning quickly. In other settings, it may be more important to gain credibility with process management activities first. This can be accomplished by focusing on problematic processes of milder strategic importance but where there is a great desire to change. If successful, an improvement project at such a place may give credibility to the process management approach. These are not choices that can be easily prescribed without taking the specific context into situation. The various evaluation outcomes should be balanced to reach a list of those processes that should receive priority over others.

Question Should all processes that are dysfunctional, of strategic importance, and feasible to manage be subjected to process management initiatives?

The general answer to this question is that for most organizations this is not feasible. Recall again that process management consumes resources. Even when there is a clear incentive to, for example, redesign various existing business processes, most organizations lack sufficient resources—people, funds, and time—to do so. Only the largest organizations are able to support more than a handful of process improvement projects at the same time. A good case in point is IBM, an organization known to have process improvement projects going on within all its existing business processes on a continuous basis. Another caveat of carrying out many simultaneous process management efforts is that these will create coordination complexity. Remember that processes may be linked to each other in various respects, such that measures taken for one process should be synchronized with those taken for other. As Davenport [10] describes:

> Most companies choose to address a small set of business processes in order to gain experience with innovation initiatives, and they focus their resources on the most critical processes. Each successful initiative becomes a model for future efforts.

What *is* happening in some organizations is that widespread efforts are made to at least *model* all important business processes, delaying the decision to make the step to more advanced BPM efforts (e.g. process redesign or automation). The idea is that process models are a cornerstone of any further BPM efforts in any case and that their existence will help to better understand where improvements can be gained. Creating a model of a process leads to the valuable insight how that process works at all, and can provide a good basis for small improvements that can easily be implemented. On the downside, such an approach bears the risk that major improvements are missed and stakeholders develop a feeling of a lack of return for the efforts. It should be stressed here, too, that the actual modeling of business processes is not an element of the process identification stage.

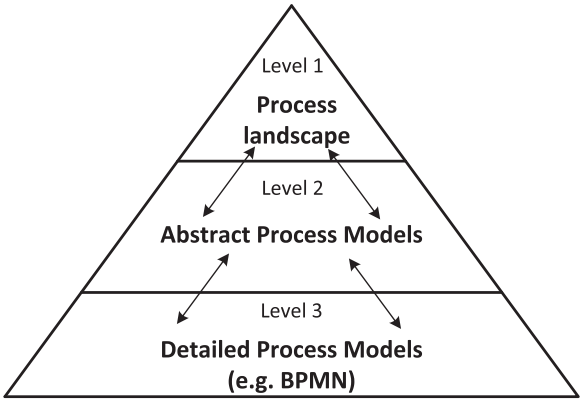

Fig. 2.1 The different levels of detail in a process architecture

In this section, we have described the process designation and evaluation phases on a high level of discourse. Now, we will turn to a specific technique to come up with a process design architecture.

2.2 Designing a Process Architecture

A process architecture is a conceptual model that shows the processes of a company and makes their relationships explicit. Typically, these relationships are defined in two directions. On the one hand, processes can be in a consumer–producer relationship. This means that one process provides an output that the other process takes as an input. In the first part of the book, we distinguished the quote-to-order process and order-to-cash processes. The output of the first one (the order) is the input to the second one. Note that this is the same kind of ordering as the upstream-downstream relation we distinguished earlier. Beyond the consumer–producer relation, a process architecture defines different levels of detail. This is illustrated as a pyramid in Fig. 2.1.

The part of the process architecture that covers the processes on level one is known as the *process landscape model* or simply the process architecture for level one. It shows the main processes on a very abstract level. Each of the elements of the process landscape model points to a more concrete business processes on level two. This level two shows the processes at a finer degree of granularity, but still in a quite abstract way. Each element on level two points further to a process model on level three. The process models on this third level show the detail of the processes including control flow, data inputs and outputs, and assignment of participants, as we will discuss in the modeling chapters.

The most important challenge for the definition of a process architecture is the definition of the process landscape model, i.e. capturing the processes on level one. The process architecture on level one has to be understandable in the first place, showing not much more than approximately 20 categories of business processes of

a company. Furthermore, it has to be sufficiently complete such that all employees of the company can relate to it with their daily work, and accept it as a consensual description of the company. Therefore, it is important to define the process architecture in a systematic way, with a specific focus on the derivation of the process landscape model.

Several perspectives and approaches have been defined for process architecture definition. Here, we will concentrate on an approach developed by Dijkman [14]. This specific approach leads to a process architecture on level one along two dimensions: case type and business function. The *case type* dimension classifies the types of cases that are handled by an organization. A case is something that an organization (or part of it) handles. Typically, a case is a product or service that is delivered by an organization to its customers, such as an insurance (a service) or a toy (a product). Note that, depending on the part of the organization for which the process architecture is designed, the cases can represent products or services that are delivered to the customers of the organization. However, they can also refer to products or services that are delivered by one department of the organization to another department. For example, think of setting up a workplace for a new employee by the facilities department.

Cases can be deliberately classified, using any number of properties. For example, an insurance company handles insurances, which can be classified according to product type (home insurance, car insurance and life insurance), but also according to the channel that the company uses to interact with its customers (telephone, office, and internet). A combination of these properties can also be used to classify cases. In the insurance example, cases would then be classified using both product type and channel (home-insurance via telephone, home-insurance via office, car-insurance via telephone, etc.).

The *function* dimension classifies the functions of an organization. A function is, simply put, something that an organization does. Typically, a hierarchical decomposition of functions can be made: A function consists of sub-functions, which, in turn, consist of sub-sub-functions, etc. For example, a production company performs purchasing, production, and sales functions. The purchasing function, in turn, can be decomposed into vendor selection and operational procurement functions. Figure 2.2 shows an example of a business process architecture for a harbor authority, which uses the case type and function dimensions to structure its processes.

The figure shows an organization of processes by *case type* in the horizontal dimension and by *business function* in the vertical dimension. The function dimension shows what the organization does: handling pre-arrival of sea ships, which involves notifying the relevant parties about the estimated time of arrival of the ship and what the ship is carrying; handling the actual arrival of the ship, which involves guiding the ship to its dock; etc. The case type dimension shows the types of cases that the organization handles: sea ships, trucks, trains, and inland transportation by barge. There are three processes that are created to handle these types of cases, using the different functions. These three are shown as covering the various functions and case types. The inbound planning process is used for handling pre-arrival of sea ships. The inbound handling process is used for handling arrival and trans-shipment of sea

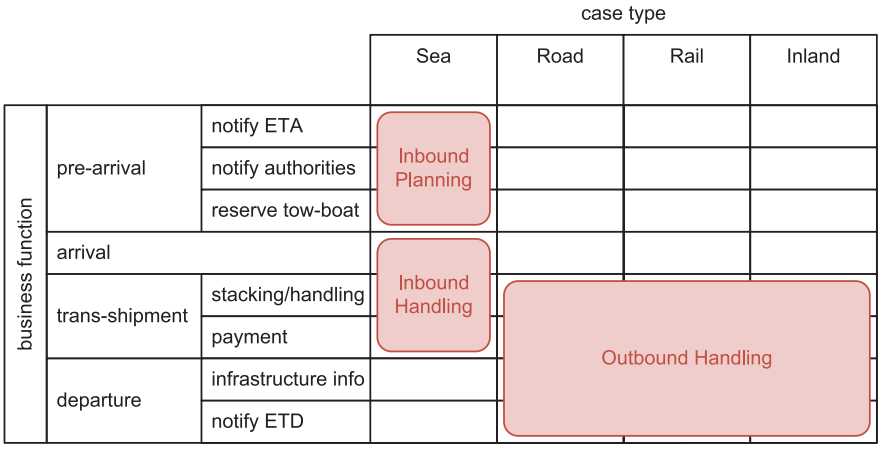

Fig. 2.2 A process architecture for a harbor authority

ships and the outbound handling process is used for handling trans-shipment and departure of trucks, trains, and barges.

To arrive at a business process architecture in a similar sense as we described here, we propose an approach that consists of the following four steps:

1. identify case types
2. identify functions for case types
3. construct one or more case/function matrices, and
4. identify processes

We will now discuss these steps in more detail.

2.2.1 Identify Case Types

In the first step, a classification of case types is developed for the organization. This is done by selecting the case properties that will be used for the classification. The main purpose for identifying different classes in this dimension of the process architecture is to determine the different ways in which (similar) processes are handled in the organization. It is important to have this in mind, because the only properties that should be included in the classification are the ones that lead to different organizational behavior. Properties that may distinguish cases yet do not lead to different behavior should not be included. For example, a stationary store sells many different types of product. However, it sells all these types of product in the same manner. Therefore, 'product type' is not a useful dimension when classifying the cases that are handled by a retail store. An insurance company also sells different types of product (insurances) and, in contrast to the retail store, the products that it sells are handled differently. For example, for a life insurance a declaration of health must be

filled out, but for a car insurance this is not a requirement. Therefore, the 'product type' is indeed a useful property to classify the types of cases that are handled by an insurance company; this is not the so for classifying the types of cases that are handled by a retail store.

A classification of the types of cases that an organization handles can be developed using any number of properties. However, some of the more commonly used properties are:

- Product type: this property identifies the types of products that are handled by an organization. These can be hierarchically decomposed. For example, an insurance company handles damages and life insurance products. In the class of damage insurances, a further decomposition is possible into car insurance and home insurance; similarly, within the class of life insurance a further decomposition is possible into healthcare insurance and accident insurance.
- Service type: if (a part of) an organization handles services rather than products, this property identifies the types of services that the organization handles, similar to the way in which product type identifies the types of tangible deliverables.
- Channel: this property represents the channel through which the organization contacts its customers. We can, for example, distinguish: face-to-face contact (over the counter), telephone or internet contact.
- Customer type: this property represents the types of customer that the organization deals with. An airline, for example, may distinguish frequent flyers from regular travelers.

Note again that, although these are the most commonly used properties to distinguish different case types, there are certainly other properties that can be used. Any property that distinguishes types of cases that are handled differently can be used. For example, if an organization does things differently in North America than in Europe, cases may be classified according to location. Another example: if cases are handled differently depending on the expertise that is required to handle them, they may be classified according to expertise.

Also, note again that the classification can be developed using any number and combination of properties. If a company sells insurances in both North America and Europe and handling of insurances differs on those continents because of local regulations, then a classification of cases according to both product type and location can be used.

Exercise 2.5 Consider the case of a bank and the classification criteria product type, service type, channel, and customer type. In how far are these criteria related to each other?

2.2.2 Identify Functions for Case Types

In the second step, a classification is developed of the business functions that are performed on the different case types. This step requires that each of the case types

is examined in detail and for each case type the functions that can be performed on it are identified. Potentially, the functions that are performed in an organization can be related to existing classifications that are proposed by reference models. We already mentioned a number of these. A small part of APQC's PCF is shown in Table 2.1. Such reference models can serve as a starting point to develop a classification of business functions and may be adapted to the specific needs of the organization.

Whether this identification of functions starts with a reference model or not, it requires interviews with different people in the organization. These interviews serve to either identify the functions directly, or to check to which extent the functions from a reference model apply to the organization. The interviews must both be held with employees that are involved in the different cases that the organization handles and with product (and service) managers of the different products and services that the organization handles. It is, therefore, important to observe that the different people involved may very well use different terms for similar business functions. Homonyms and synonyms are problematic in this context. For example, what is called 'acquisition' in one part of the organization may be called 'market survey' in another (synonym). At the same time, two functions called 'implementation' may represent different activities: one may represent the implementation of software, while the other represents the implementation of new regulations in the organization (homonym). Apart from being aware of the various terms that are being used, an intricate understanding of the operations of an organization is important to sort these issues out. Frameworks like APQC's PCF can help to avoid terminological issues right from the start.

In addition, functions may be organized differently. Consider, for example, Fig. 2.3. It is taken from a real-world case and shows parts of the functional decompositions of two departments from the same organization, one in Europe and one in North America. The European department distinguishes between purchasing and sales, where both purchasing and sales are split up into operational functions. These functions concern sourcing and order-to-pay for purchasing on the one hand and marketing and sales operations for sales on the other. The North American department distinguishes between sourcing, marketing, and order handling. Here, order handling involves both order-to-pay and operational sales activities (but is not decomposed any further).

Clearly, in the example of this organization, a negotiation step may be required between the different people involved to unify the functional decompositions across its European and North-American parts. This is particularly called for if the functional decomposition is more than just a modeling exercise. It may also represent actual organizational properties. In the case that is illustrated in Fig. 2.3, managers are in place for the different functions at the different levels of decomposition. In Europe, a manager is appointed for sales, another for procurement, and lower-level managers for sourcing, order-to-pay, marketing, and operational sales. In North America, there are managers in place for sourcing, marketing, and order management. Therefore, when the functional decompositions of the departments needs to be harmonized, the management structure also must be subjected to harmonization.

A functional decomposition should not be confused with a decomposition according to case type. It is possible that an organization is structured according to

Table 2.1 Level one and level two of the APQC process classification framework

1.0 Develop Vision and Strategy
1.1 Define the business concept and long-term vision
1.2 Develop business strategy
1.3 Manage strategic initiatives

2.0 Develop and Manage Products and Services
2.1 Manage product and service portfolio
2.2 Develop products and services

3.0 Market and Sell Products and Services
3.1 Understand markets, customers, and capabilities
3.2 Develop marketing strategy
3.3 Develop sales strategy
3.4 Develop and manage marketing plans
3.5 Develop and manage sales plans

4.0 Deliver Products and Services
4.1 Plan for and align supply chain resources
4.2 Procure materials and services
4.3 Produce/Manufacture/Deliver product
4.4 Deliver service to customer
4.5 Manage logistics and warehousing

5.0 Manage Customer Service
5.1 Develop customer care/customer service strategy
5.2 Plan and manage customer service operations
5.3 Measure and evaluate customer service operations

6.0 Develop and Manage Human Capital
6.1 Develop and manage human resources (HR) planning, policies, and strategies
6.2 Recruit, source, and select employees
6.3 Develop and counsel employees
6.4 Reward and retain employees
6.5 Redeploy and retire employees
6.6 Manage employee information

7.0 Manage Information Technology
7.1 Manage the business of information technology
7.2 Develop and manage IT customer relationships
7.3 Develop and implement security, privacy, and data protection controls
7.4 Manage enterprise information
7.5 Develop and maintain information technology solutions
7.6 Deploy information technology solutions
7.7 Deliver and support information technology services

8.0 Manage Financial Resources
8.1 Perform planning and management accounting
8.2 Perform revenue accounting
8.3 Perform general accounting and reporting
8.4 Manage fixed-asset project accounting
8.5 Process payroll
8.6 Process accounts payable and expense reimbursements
8.7 Manage treasury operations
8.8 Manage internal controls
8.9 Manage taxes
8.10 Manage international funds/consolidation

9.0 Acquire, Construct, and Manage Assets
9.1 Design and construct/acquire nonproductive assets
9.2 Plan maintenance work
9.3 Obtain and install assets, equipment, and tools
9.4 Dispose of productive and nonproductive assets

10.0 Manage Enterprise Risk, Compliance, and Resiliency
10.1 Manage enterprise risk
10.2 Manage business resiliency
10.3 Manage environmental health and safety

11.0 Manage External Relationships
11.1 Build investor relationships
11.2 Manage government and industry relationships
11.3 Manage relations with board of directors
11.4 Manage legal and ethical issues
11.5 Manage public relations program

12.0 Develop and Manage Business Capabilities
12.1 Manage business processes
12.2 Manage portfolio, program, and project
12.3 Manage quality
12.4 Manage change
12.5 Develop and manage enterprise-wide knowledge management (KM) capability
12.6 Measure and benchmark

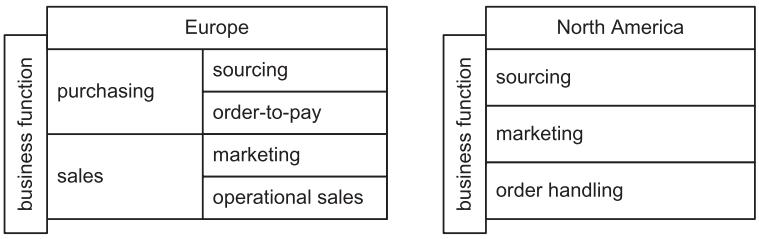

Fig. 2.3 Different functional decompositions within the same organization

both business function and other properties. It may then be tempting to develop the functional decomposition further according to these other properties. However, these other properties should be reflected in the case type dimension rather than the function dimension. For example, an organization can be structured according to business functions into a sales and a procurement department with managers leading each of the departments. It can be further structured according to location, having both a sales and a procurement department in Europe as well as in North America. In this situation, the functional decomposition ends with the decomposition into sales and procurement. Should a further decomposition according to location be relevant, then this decomposition should be reflected in the case type dimension, not in the function dimension.

An important decision that must be made when developing the functional decomposition is to determine the appropriate level of decomposition at which the functional decomposition ends. In theory, the functional decomposition can be performed up to a level that represents the tasks that are performed by the individual employee (fill-out form, check correctness of information on form, have colleague check correctness of information on form, etc.). However, for a process architecture a more coarse level of decomposition is usually chosen. Two rules of thumb that can be used to choose the level of decomposition at which the functional decomposition ends, are the following.

1. The functional decomposition should at least be performed down to a level at which functions correspond to different organizational units (with corresponding managers). For example, if an organization has both a sourcing and an order-to-pay department and both have their own managers, this is a strong indication that the functional decomposition should contain the functions that are performed by these departments.
2. The functional decomposition should include different functions for the different roles in each department. For example, if the sourcing department has buyers, who do requirements analysis and vendor selection, as well as senior buyers, who do vendor relationship management and contract management, this may lead to a decision to include requirements analysis, vendor selection, vendor relationship management and contract management as functions.

		Private Customers	Corporate Customers	Internal Customers
Management	Process			X
	Line			X
	Project			X
Operations	Savings	X	X	
	Loans	X	X	
	Checking	X	X	
Support	HRM			X
	ICT			X
	Finance			X
	Marketing			X

Fig. 2.4 A case/function matrix

Observe that these are rules of thumb, which leave room for handling them flexibly. They merely provide an aid for determining the lowest level of decomposition that should be used.

Exercise 2.6 Consider the case of a university and the level one processes listed in the APQC's PCF. What kind of more specific functions does a university typically cover in categories 2.0 Develop and Manage Products and Services and in 5.0 Manage Customer Service?

2.2.3 Construct Case/Function Matrices

The previous two steps of the described approach lead to a matrix that has the different case types as columns and the different functions as rows. A cell in the matrix contains an 'X', if the corresponding function can be performed for the corresponding case type. Figure 2.4 shows an example of a case/function matrix. The matrix shows a decomposition of case types by customer type, resulting in three case types: one for private customers, one for corporate customers, and one for internal customers. The figure also shows a functional decomposition into three main functions and a subsequent decomposition of those main functions into ten sub-functions. Management and support functions are only performed for internal customers, while operational functions are performed for private and corporate customers.

A case/function matrix can be split up into multiple matrices for the purpose of improving readability. We would typically split up a case/function matrix in case a partition of the matrix' functions and case types is possible such that all X's are

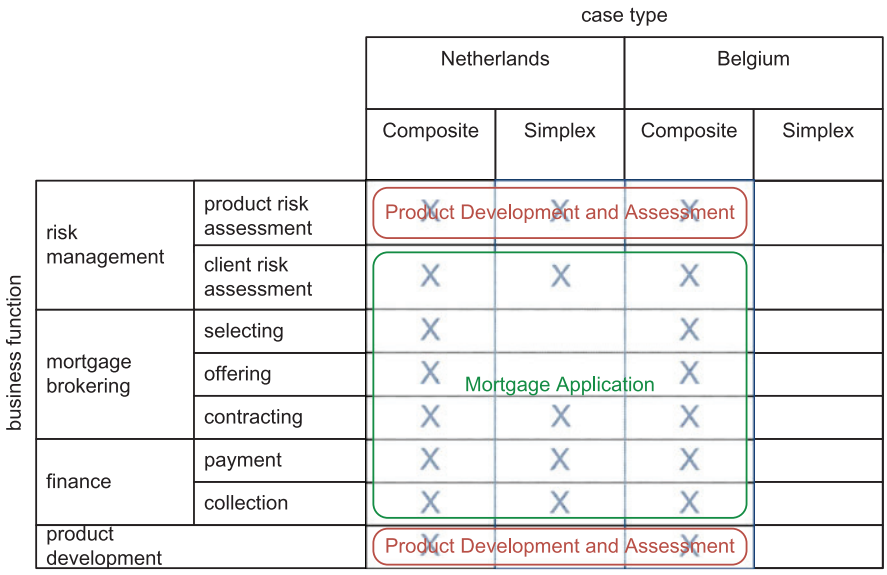

Fig. 2.5 A case/function matrix evolving into a process landscape model (applying Guideline 1)

preserved. For example, the matrix from Fig. 2.4 can be partitioned into, on the one hand, a matrix that contains the management and support functions and the internal customers and, on the other, a matrix that contains the operational functions and the private and corporate customers.

2.2.4 Identify Processes

In the fourth and final step of the proposed approach, we determine which combinations of business functions and case types form a business process. To determine this, we need to find a trade-off between two extremes, one in which the entire matrix forms one big process and one in which each single cross in the matrix forms a process. We establish this trade-off by the use of the general rule that, in principle, the entire matrix forms one big process which will only be split up in case certain rules apply. These rules can be formulated as eight guidelines. When a guideline applies, this may lead to a separation of processes between rows (a vertical split) or to a separation of processes between columns (a horizontal split). Some of the guidelines (Guidelines 5, 6, and 8) can only lead to vertical splits, while others (Guidelines 1–4) can only lead to horizontal splits. Note that the guidelines are not absolute: they may or may not apply to a particular organization and they are not the only rules that should be considered in specific cases.

Figure 2.5 shows the running example that we will use to explain the guidelines. The figure shows a case/function matrix for a mortgage broker, which brokers mortgages both in the Netherlands and in Belgium. It distinguishes between simplex

and composite mortgages. A composite mortgage can be adapted to the specific requirements of a customer, by composing it from different types of loans, savings accounts, life insurances and investment accounts. A simplex mortgage consists of a pre-defined package of a loan, a savings account and a life insurance. On these different types of mortgages, various business functions can be performed. Risk assessment involves assessment of risk of both individual clients, who are in the process of applying for a mortgage, and mortgage products as a whole. Mortgage brokerage involves the selection of a particular mortgage package based on the requirements of a particular customer and subsequently offering that package to the customer and closing the contract. The financial functions involve paying out the mortgage and subsequently collecting the monthly payments. Finally, product development is the periodic review of the mortgage products and their components.

Guideline 1: If a process has different flow objects, it can be split up vertically. A flow object is an object in the organization that flows through a business process. It is the object on which business process activities are being carried out. Typically, each business process has a single flow object, such that flow objects can be used to identify business processes. Consequently, if multiple flow objects can be identified in a business process, this is a strong indication that the process should be split up.

Figure 2.5 illustrates the application of Guideline 1 to our running example. One flow object for the mortgage brokering process is a mortgage application on which activities are carried out during a mortgage application by a client. These activities include a risk assessment and paying out the mortgage to the client. Another flow object in the mortgage brokering process is a mortgage product on which activities are carried out periodically to assess the risk of the product as a whole and to evaluate and develop the product. Consequently, we can split up the mortgage brokering process into two processes, one that has a mortgage application as a flow object and one that has a mortgage product as a flow object. We call the former the mortgage application process and the latter the product development and assessment process.

Guideline 2: If the flow object of a process changes multiplicity, the process can be split up vertically. This is due to the fact that in a business process a single flow object is sometimes used, while at other times multiple flow objects of the same type are used. This is typical for batch processing, in which certain activities are performed for multiple customer cases in batch at the same time. If, in the same process, the number of flow objects that is processed per activity differs this may be a reason for splitting up the process.

Have a look at Fig. 2.5, where the mortgage application process is performed for a single mortgage application. By contrast, the collection of payments happens for all mortgages in batch by the end of each month. Using Guideline 2, this may be taken as the reason for splitting the process and having Mortgage Collection as a separate process.

Guideline 3: If a process changes transactional state, it can be split up vertically. According to the action-workflow theory, a business process goes through a num-

ber of transactional states. In particular, we distinguish: the initiation, the negotiation, the execution and the acceptance state. In the initiation state, contact between a customer and a provider is initiated. In the negotiation state, the customer and the provider negotiate about the terms of service or delivery of a product. During the execution state, the provider delivers the product or service to the customer and during the acceptance state, the customer and the provider negotiate about the acceptance and payment of the delivery. A transition in a process from one state to another is an indication that the process can be split up.

To illustrate this guideline, consider again Fig. 2.5. Suppose that during the negotiation state the mortgage broker and the customer negotiate about the selection of mortgage products, ultimately leading to a contract being signed by both parties. Only during the execution state the mortgage is paid out to the customer and the monthly payments will be collected. By the logic of Guideline 3, we therefore split up the process into a mortgage application process and a Mortgage Payment process.

Guideline 4: If a process contains a logical separation in time, it can be split up vertically. A process contains a logical separation in time, if its parts are performed at different time intervals. Intervals that can typically be distinguished include: once per customer request, once per day, once per month and once per year.

To clarify Guideline 4, consider Fig. 2.5 again. Mortgage selection, offering, and contracting are performed once per mortgage application, while payment and collection for mortgages is performed once per month. By the logic of Guideline 4, it would make sense to split up mortgage selection, offering, and contracting from mortgage payment collection. Note that the passing of time in itself is not a reason for splitting up a process, because within each single process, time passes. For example, between the activity of entering mortgage details into a computer system and approval of the mortgage, time passes, but the unit of time remains the same: both activities happen once per mortgage application. Therefore, we would not split up the process between these activities. Another way of looking at Guideline 4 is that the process can be split up, if it must wait for a time trigger or a trigger by a new flow object. For example, the approval of a mortgage can be performed directly after the mortgage details are entered, without having to wait for a trigger. However, after having processed the mortgage application, the process must wait for the payment collection date trigger to continue with payment collection. Therefore, we would split up the process between these functions by the same logic of Guideline 4.

Guideline 5: If a process contains a logical separation in space, it can be split up horizontally. A process contains a logical separation in space, if it is performed at multiple locations and is performed differently at those locations. It is important to note that it is not sufficient for processes to just be separated in space. The separation must be such that there is no choice but to perform the processes differently for the different logical units.

To clarify this guideline: in case a process is performed at different locations within the same country, there is not necessarily a reason to perform it differently

at those locations. Consequently, there is no reason to split it up. In fact, organizations should strive to make their processes as uniform as possible, to benefit from economies of scale. Indeed many organizations nowadays started projects in which they aim to make their processes more uniform across different locations, where processes became different purely for historic reasons or because the different locations did not share information about their process flow. As another example, the processes from Fig. 2.5 are performed at two different locations in different countries. However, still not all of these processes should differ at these two locations. For example, mortgage payment and collection may be the same in Belgium and the Netherlands. However, risk assessment, mortgage brokering and product development may differ between the Netherlands and Belgium, due to country-specific rules and regulations.

Guidelines 6 and 7 are more straightforward and can be described as follows.

Guideline 6: If a process contains a logical separation in another relevant dimension, it can be split up horizontally. Like with the separation in space, it is not sufficient for processes to just be separated. The separation must be such that there is no choice but to perform the processes differently for the different logical units.

Guideline 7: If a process is split up in a reference model, it can be split up. A reference process architecture is an existing process architecture that is pre-defined as a best-practice solution. It structures a collection of processes. For example, if a reference financial services process architecture exists, its structure can be used as an example or starting point to structure your own process architecture.

Figure 2.6 shows the results of applying Guidelines 2 through to 7 to the case/function matrix from Fig. 2.5, which itself resulted from applying Guideline 1 to our running example. Figure 2.6 shows that after applying Guidelines 2 through 7 as discussed above, there are six processes: Product Development and Assessment Netherlands (PD NL), Product Development and Assessment Belgium (PD BE), Mortgage Application Netherlands, Mortgage Application Belgium, Mortgage Payment, and Mortgage Collection.

The final guideline that we discuss here is the following.

Guideline 8: If a process covers (many) more functions in one case type than in another, it can be split up horizontally. The application of this last rule depends upon the current decomposition of processes. If applied, it is necessary to look at the current decomposition of processes and check if, within a process, (many) more functions are performed for one case type than for another, i.e.: whether a process has many more crosses in one column than in another. If so, this is a strong indication that the process should be split up for these two case types.

For example, when looking at Fig. 2.6, we see that the Mortgage Application Netherlands process has many more function for composite mortgages than for simplex mortgages. By the logic of Guideline 8, we would split up this process for composite and simplex application. The application of all of these eight guidelines yields a process architecture for level one. The result can be seen in Fig. 2.7, which is the finalized process landscape model for our example.

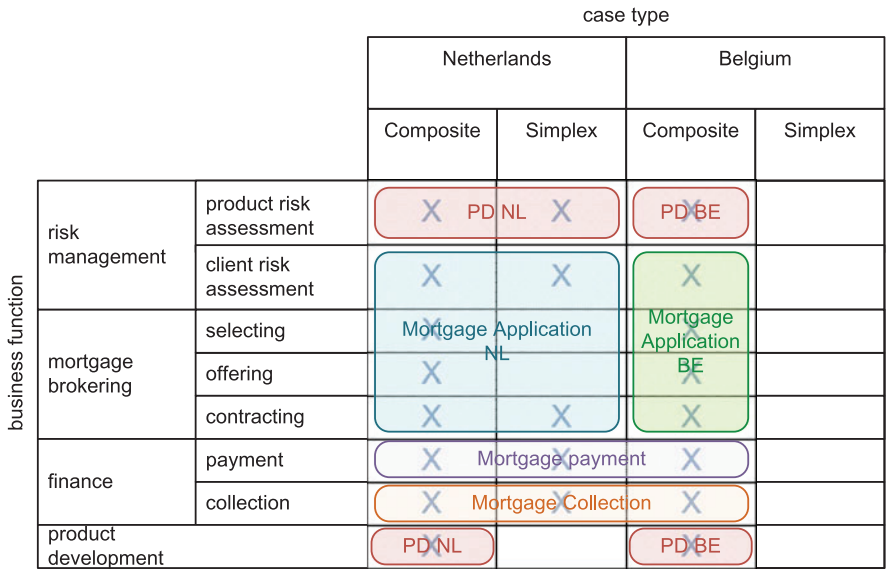

Fig. 2.6 A case/function matrix evolving into a process landscape model (applying Guidelines 2–7)

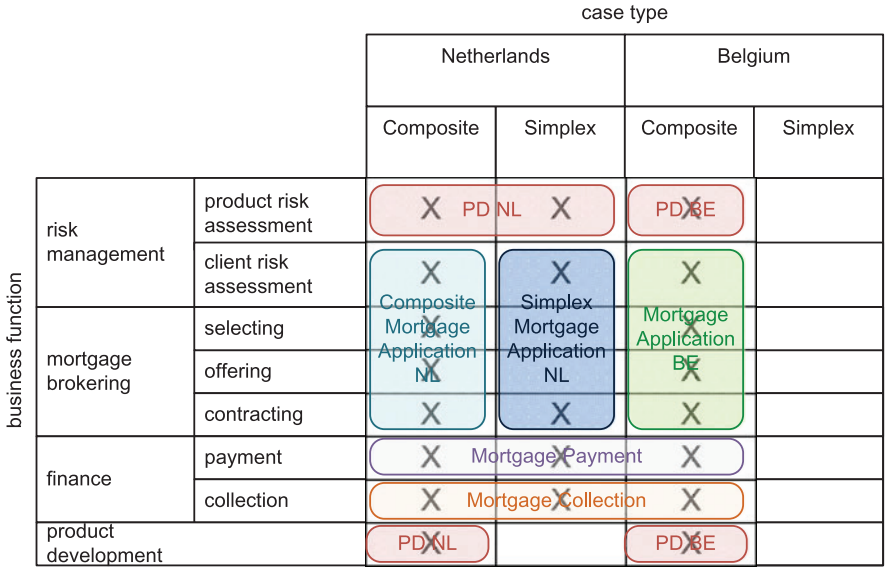

Fig. 2.7 A case/function matrix evolving into a process landscape model (applying Guideline 8)

Table 2.2 Consumer–producer relationships between processes

Consumer	Producer
Mortgage Payment	Composite Mortgage Application NL
Mortgage Payment	Simplex Mortgage Application NL
Mortgage Payment	Mortgage Application BE

2.2.5 Complete the Process Architecture

The approach that we discussed previously and which we emphasize in this part of the book leads to a process landscape model that covers the processes on level one of the pyramid in Fig. 2.1. As stated, this level only provides a very abstract insight into each process within the process landscape: It mainly shows how processes differ from each other in terms of the cases and functions they cover.

There are two things that are missing with respect to the general, encompassing characteristics of a process architecture as we discussed in Sect. 2.2: (1) the consumer–producer relationships between the processes, and (2) the levels of detail as provided by the pyramid in Fig. 2.1.

With respect to the consumer–producer relationships, we can take a broad or narrow perspective on the use of an output from one process as the input of another. For our running example, it may be that the product development process uses aggregated figures about how the mortgage application process is carried to determine what the needs of clients are and, in this way, what attractive new products may be. This would be a rather broad interpretation of the consumer–producer relationship.

What is often most important to know stems from a narrower perspective, namely which consumer–producer relationships exist between processes with respect to the *same* flow objects. In Fig. 2.7, it can be seen that mortgage application (both in the Netherlands and Belgium) and mortgage payment are split up, which was done following the logic of Guideline 3. This is a situation where the flow object of one process is consumed piecemeal by another; the only difference is the transactional state that the flow object is in. Specifically with respect to redesign initiatives these relations are most important to remember and make explicit, since changing one process has direct implications for the performance of the other. We can capture this narrow interpretation of consumer–producer relationships for our running example as is done in Table 2.2. Each row in this table provides a single consumer–producer relationship, where the consumer process continues to work on a flow object that is the output of the producer process.

Let us now focus on the other aspect that makes a process architecture for level one rather restrictive in comparison to our general notion of a process architecture. This concerns the high level of abstraction of the processes that are distinguished by the process landscape model. To focus on the other levels of the pyramid of Fig. 2.1, the question is what kind of additional detail they should offer. We focus here on the missing insights into (a) the *various steps* that are taken within each process and (b) the *organizational units* that are involved in carrying these out. These two elements should be added to obtain the models for level two of what we mean by

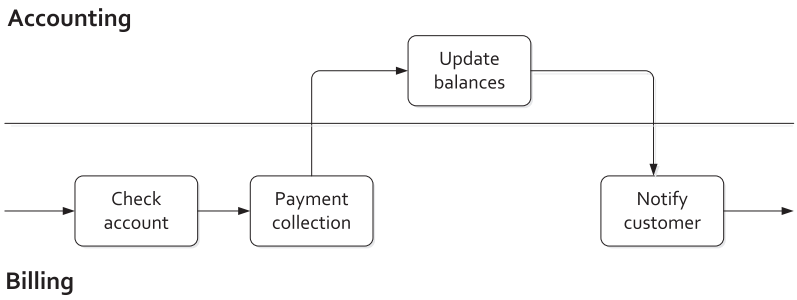

Fig. 2.8 A process map for the mortgage payment process

a process architecture. It is common to refer to a model on this second level as a *process map*.

To provide an example of a process map, we focus on the mortgage payment process that is identified in the process landscape model of Fig. 2.7. The related process map can be seen in Fig. 2.8.

As this figure shows, the identified mortgage payment process from the process landscape model has been decomposed into four main steps that can be associated with this process. Moreover, two organizational units are identified that are associated with these steps, i.e. Accounting and Billing. In other words, a process map provides more detail about the control flow and includes additional information with respect to the involved resources for a process.

Even a process map can still be said to provide an abstract view on a process. First of all, we can still see that the flow throughout the steps in a process map is highly simplified. It is common, like in Fig. 2.8, to only show a linear progress along the various steps in a process map: alternative paths, potential exceptions, iterations, etc. are all left out. For the organizational information that is added in a process map, too, the information is abstract: we can only see references to units but not the specific kind of participants that are involved.

Exercise 2.7 Give an example of an alternative path, a potential exception, and an iteration that would show up in a more detailed model of the mortgage payment process.

Secondly, there are many aspects beyond control flow and resource information that are not covered in *any* level of detail in a process map. Think about the data that are being handled in the process, the reports and files that are passed on, the systems that support the various steps, the time that is involved with carrying out these steps, etc.

In practice, process maps have turned out to provide a deeper level of insight into the processes from the process landscape *regardless* of the goals one pursues for the specific processes. In other words, an insight into the steps and involved organizational units has its value for any type of process-oriented initiative. By contrast, a further insight into, for example, the data that are being processed within each step

would only make sense if someone pursues to automate the process or when the evaluation phase has identified quality issues.

In this textbook, we will not focus on the development of process maps. Instead, we will turn to the more detailed level of models, i.e. those on level three of a process architecture. As will be shown, these models are developed following specific rules and provide the insight that are ideally closely tied to what one likes to achieve with a specific process management initiative. This will be the subject of the following chapters.

2.3 Recap

In this chapter, we have discussed process identification. First, we distinguished and described the phases of designation and evaluation. The designation phase aims at enumerating the major processes within an organization, as well as determining the boundaries between those processes. An insight into the major processes that are being carried out in an organization is important to set up any process management activity. The evaluation phase is dedicated to prioritizing process analysis and redesign efforts. It is good practice to base priorities upon the importance of processes, their potential dysfunction, and the feasibility of improvements.

The designation phase may be used not only to enumerate the most important processes, but also to design a consistent overarching process architecture. A process architecture defines the relationship between the different processes. Often, different levels of detail are distinguished. We discussed a specific approach for the definition of level one of the process architecture. This approach builds on the identification of case types, of the functions for these case types, the construction of a case/function matrix, the identification of processes based on guidelines, and the eventual completion of the architecture.

2.4 Solutions to Exercises

Solution 2.1 Explain how the trade-off between impact and manageability works out for broad and narrow processes, respectively. A broad process has by definition a large scope. Managing it actively potentially can have a large impact on an organization's performance. The flip side is that it is more difficult to actively manage such a broad process or the improvement projects that are related to it. For a narrow process, this is exactly the other way around: given its smaller scope, it is more easily managed but it will probably have a lesser impact on an organization's performance as a whole.

Solution 2.2 The description of the investment firm points at large financial holdings, which may be related to the employment of many different products (investment instruments) for many different customers, both private and institutional. Both