3

CLASSIFYING NETWORKED E-BUSINESS

Learning goals

- *Understand the goal of classifying networked e-business scenarios.*
- *Know the main dimensions for classification of networked e-business scenarios.*
- *Be able to classify a networked e-business scenario in terms of participating parties.*
- *Be able to classify a networked e-business scenario in terms of traded objects.*
- *Be able to classify a networked e-business scenario in terms of time scopes.*

3.1 Introduction

The networked e-business domain is a complex field in which many elements and aspects play a role and in which many interrelationships among these exist. To explore e-business scenarios in this domain in a well-structured, systematic way we need an instrument to clearly organize the relevant characteristics of these scenarios. In other words, we need a tool enabling us to clearly classify specific e-business scenarios. In this chapter we introduce such a tool – a three-dimensional classification space of e-business characteristics. In section 3.2 we first have a close look at what exactly we are classifying – and why. In section 3.3 we describe the nature and structure of this three-dimensional space. In the next three sections we go into the details of each of the three classification dimensions identified in the space: parties, objects and time scopes.

In chapter 4 we will see how the three classification dimensions are complemented by a fourth dimension, which is the analysis dimension that we use as the

basis for the structure of the remainder of this book. Further, the classification space of this chapter is an ingredient for the analysis and design approach that we discuss in chapter 9.

3.2 What exactly are we classifying?

Before we start the discussion of the classification space for e-business scenarios, it is good to know what exactly in an e-business scenario we are classifying. As we have discussed before, networked e-business entails dynamic business networks of organizations and/or individuals that collaborate via electronic means. These networks may be simple and consist of a provider and a customer only. But often in modern e-business these networks consist of more organizations. A provider may use the capabilities of other providers (which we call *auxiliary providers*) to construct its offering towards the client. One or more organizations may be used as *intermediaries* between provider and customer to accommodate the collaboration. This is illustrated in Figure 3.1.

Even though all parties in the network of an e-business scenario are important, we classify the scenario only on the basis of the collaboration between main provider and customer – shown as the dotted classification scope in Figure 3.1.

The main reason for this limited scope is the fact that the nature of relationship between provider and customer determines the nature of the rest of the business network to a high degree. It is in the relationship between provider and customer where the actual value of networked e-business is created.

Note that the classification of an e-business scenario therefore can significantly differ from the characteristics of the collaboration between a provider and its auxiliary providers.

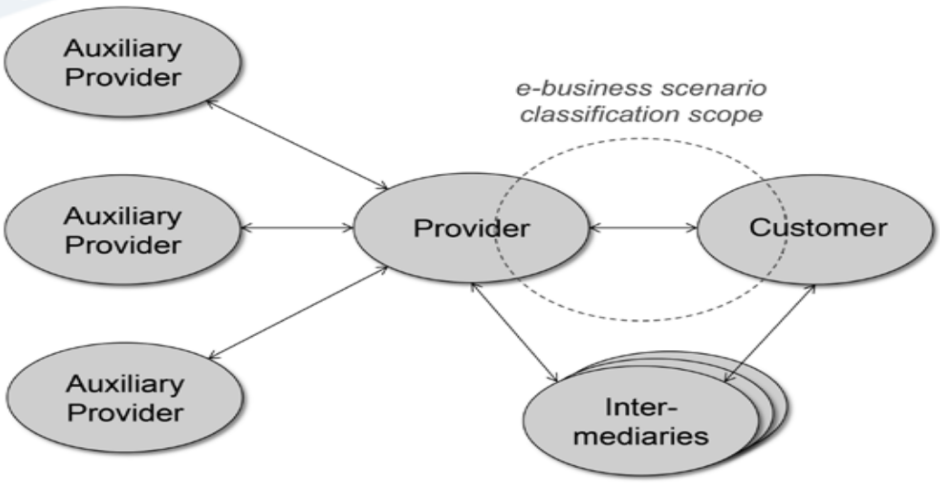

FIGURE 3.1 Scope of e-business scenario classification.

3.3 Structure of the classification space

When exploring the complex field of networked e-business, it is important to distinguish the various dimensions in which an e-business scenario can be described. Having multiple dimensions allows us to use a clear separation of concerns in classifying an e-business scenario. Each dimension describes specific characteristics of a scenario. A proper classification of a scenario is the basis for the subsequent analysis or design of a scenario.

When thinking about the characteristics of e-business scenarios, the questions *who?*, *what?* and *how?* are obvious.[1] These questions pertain to the performers (also called *actors*) of a scenario, the objects that are handled by them and the way they perform the scenario. There are many aspects to the *how*, not all of which can be easily classified. One thing that e-business scenarios have in common, however, is that the *time aspect* is very important in the *how*, as e-business changes the relative importance of time.[2]

Based on the previous observations, we use a networked e-business classification space consisting of three dimensions that describe the basic characteristics of e-business scenarios:

Parties in networked e-business: this dimension contains the options (values) for the combinations of parties that perform the e-business activities; that is, engage together in an e-business scenario. This dimension is elaborated further in section 3.4

Objects of networked e-business: this dimension contains the options (values) for the type of object that is primarily manipulated (traded, for instance) by e-business activities in a scenario. We further discuss this dimension in section 3.5.

Time scopes of networked e-business: this dimension contains the options (values) to classify an e-business scenario with respect to the time scope of e-business activities; that is, the duration of the relationship between the involved e-business parties. The time scopes dimension is discussed in section 3.6.

The three dimensions describe characteristics of e-business scenarios that are in principle mutually independent. In other words, the three dimensions are orthogonal.[3] Consequently, we can depict the e-business classification space that they create as a three-dimensional space, as illustrated in Figure 3.2. Each e-business scenario can be positioned (given a value) along each of the three dimensions (axes), giving it a position in the three-dimensional space. In the figure, this is shown, for example, for an abstract e-business scenario labeled scenario *A*. This scenario has value *p1* in the *parties* dimension, value *o1* in the *objects* dimension and value *t1* in the *time scopes* dimension – hence position *[p1,o1,t1]* in the classification space. These dimension values are abstract here – in the rest of this chapter we discuss the real values.

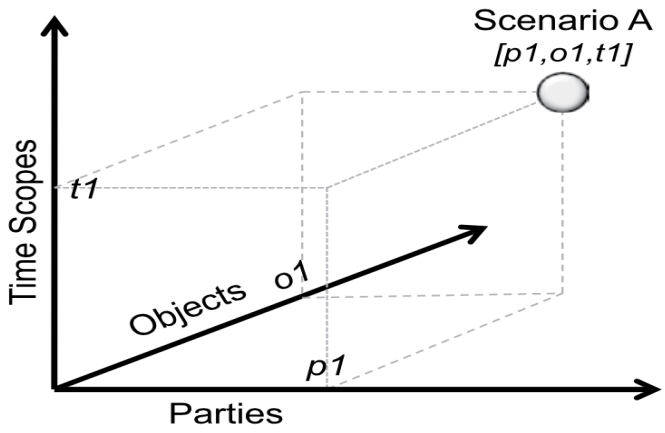

FIGURE 3.2 E-business scenario classification dimensions.

As we will see in the remainder of this book, many developments in networked e-business are related to shifts of e-business scenarios in the classification space of Figure 3.2. For example, market conditions in a business domain may become more volatile, making business relations more dynamic. This means that e-business scenarios in this business domain are shifted 'up' along the *time scopes* axis of Figure 3.2. In the case that a business domain is being 'virtualized', we see that the nature of objects can change from physical to digital objects, such as digital media objects. This means that e-business scenarios in this domain are shifted along the *objects* axis of Figure 3.2.

The *parties*, *objects* and *time scopes* classification dimensions of networked e-business are discussed in detail in the following three sections. At the end of this chapter we apply the classification to our three running cases – POSH, TTU and TraXP – to have concrete examples of the introduced concepts.

3.4 Parties in networked e-business

In the previous section we have seen the three dimensions that are the basis for the networked e-business analysis space. In this section we elaborate the *parties* dimension by analyzing which combinations of parties can engage in e-business relationships. We perform a general analysis of the dimension first and then discuss the most important values in the dimension.

3.4.1 Values in the parties dimension

In general, the following three types of main parties (within a classification scope, as shown in Figure 3.1) can be involved in a networked e-business collaboration:

Business (B) party: a commercial organization of any size and any type, ranging from a multi-national to a one-person company.
Consumer (C) party: an individual acting as a private person (note that this is different from an individual acting on behalf of a business organization).
Government (G) party: (a part of) a government organization (such as a tax office or a municipality office) or a related non-profit organization (such as a public educational organization).

By combining the three types of parties in all possible ways, we get the combinations shown in Table 3.1. In this table the vertical dimension indicates the *initiator* of an e-business activity; that is, the party that starts the activity. The horizontal dimension indicates the *responder*; that is, the party that responds to the initiative by participating in the activity. By having three values along each axis, we find nine pairs of interacting party types that form the values along the *parties* dimension of the networked e-business analysis space.

The most common combinations in the table are shown in bold. Certainly the combinations *business-to-business* (B2B) and *business-to-consumer* (B2C) are coined terms in the e-business world – they form the main classes of networked e-business. Although B2C may be more familiar to many, B2B is by far the most important class when it comes to 'turnover'. *Consumer-to-consumer* (C2C) is the class where consumers perform transactions among one another (we discuss examples further on). Although this class is less important from a large-scale economic perspective (i.e., in financial volumes), it is interesting from an e-business point of view. *Government-to-consumer* (G2C) and *government-to-business* (G2B) are the classes in which government bodies are the main players. These classes get quite a bit of attention in specific circles (often termed *e-government*). We discuss these five important classes in more detail further on. The four less common combinations are printed in italic in Table 3.1. But also of these, examples can be found – we leave this as an exercise for the reader.

Note that for the classification in the parties dimension we focus here on the main parties in a networked e-business scenario; that is, on the main providers and main consumers in a scenario (remember our discussion of the classification scope). We do not include intermediaries or auxiliary providers as parties in the classification, although they can be very important for the implementation of

TABLE 3.1 Overview of e-business types in the *parties* dimension

	Responder →		
↓ Initiator	*Business*	*Consumer*	*Government*
Business	**B2B**	**B2C**	*B2G*
Consumer	*C2B*	**C2C**	*C2G*
Government	**G2B**	**G2C**	*G2G*

e-business scenarios. Typical intermediaries are search engine and catalog providers, payment service providers and transport service providers. Auxiliary providers assist the main provider in supplying its offering; for example, by providing a subservice in a complex service offering. In principle, intermediaries and auxiliary providers can also be of business, consumer or government type. One e-business scenario may include multiple intermediaries for various intermediary roles (payment handler, goods transporter, et cetera). It may also include multiple auxiliary providers. Therefore, including these additional elements in the *parties* dimension would make this dimension overly complex. We address intermediaries and auxiliary providers when we discuss networked e-business organization structures in chapter 6.

3.4.2 B2B networked e-business

Business-to-business networked e-business is from an economic perspective by far the most important form of networked e-business in the parties dimension. On a daily basis, large numbers of transactions worth enormous amounts are conducted between companies through e-business channels in trading all kinds of products and services and in performing all kinds of collaborations.

B2B networked e-business can be found in a wide range of business domains. A few example B2B scenarios are:

- supply chains in industry, where e-business systems are used to orchestrate the operation of the links in the chain;
- complex logistics scenarios, where e-business applications are used to place logistics orders, monitor their progress and synchronize parties involved in transportation – an example B2B logistics application is shown in Figure 3.3;
- industry-level marketplaces through which industrial goods are traded in specific industry domains (such as the electronics industry or the petrochemical industry); and
- inter-bank financial traffic, where e-business is the basis for the execution of business transactions among banks all around the globe.

We discuss more examples in the remainder of this book.

In B2B e-business we often find a certain level of symmetry between participating parties in terms of the complexity of a scenario. This means that the complexity of business processes and supporting automated systems for realizing e-business is divided more or less equally between two business parties. The situation is not necessarily completely symmetric, but it can be so. As we will see further on, this symmetry is not present for all values in the parties dimension.

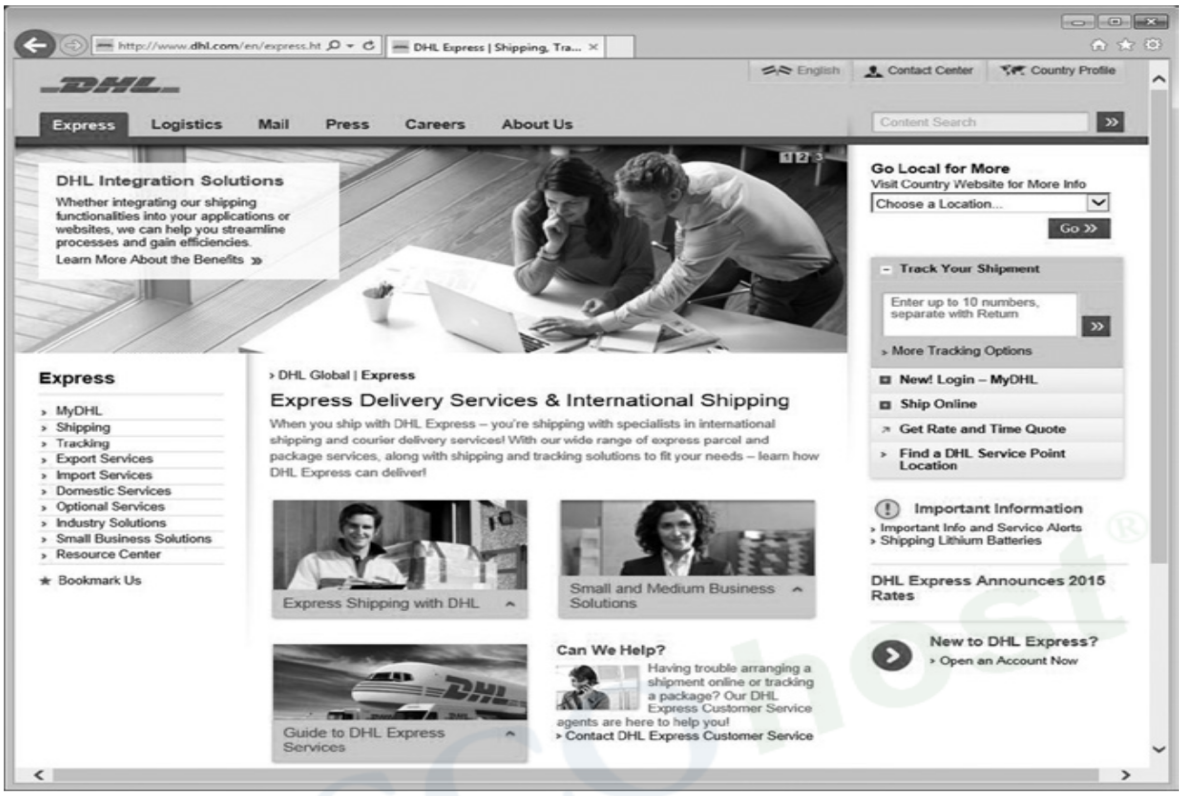

FIGURE 3.3 Example B2B application in the logistics sector.

3.4.3 B2C networked e-business

Business-to-consumer networked e-business is the form of e-business that most of us are familiar with. Many of us use web shops on a regular basis to buy a variety of goods – this is the e-retailing business model (which we discuss in more detail in section 5.6.1). We see an example web shop that grew out of a traditional shop in Figure 3.4.

But networked B2C e-business is more than e-retailing – another B2C application that most of us use on a very regular basis, for example, is e-banking. In personal mobility (public transport, shared cars, trip planning, et cetera) B2C networked e-business is currently emerging fast. B2C networked e-business is actively used in many other domains, such as the travel industry.

Characteristic of the B2C scenario is asymmetry in the realization of the scenario between the B party and the C party. The complexity of the scenario arises within the B party: this is where the main part of the business processes takes place and the complex e-business information systems reside. The C party typically has simple processes and a very limited, general-purpose information system

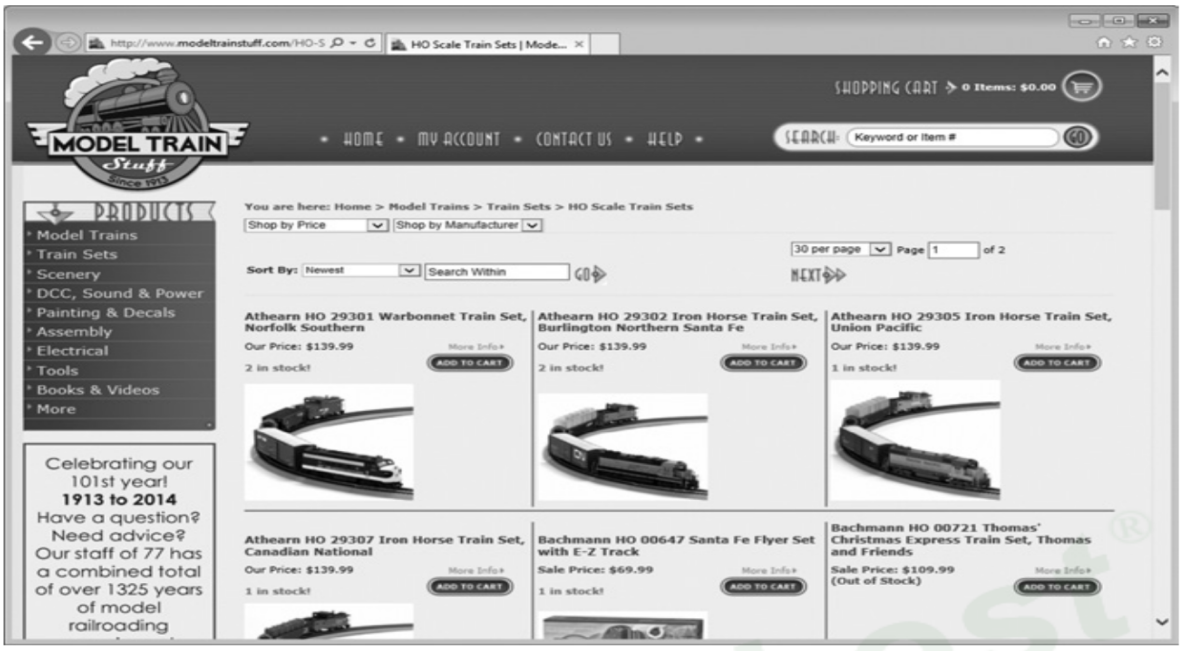

FIGURE 3.4 Example B2C web shop application.

infrastructure (usually, a standard web browser suffices). We revisit this issue when we discuss organization structures for networked e-business in chapter 6.

3.4.4 C2C networked e-business

Consumer-to-consumer networked e-business is the scenario where two customers (individual persons) engage in a business transaction through an electronic channel. Typical examples of the C2C class are electronic marketplaces in which individuals sell or barter[4] (second-hand) goods or offer personal services.

Business networks in C2C scenarios are typically not very complicated, although intermediary parties such as payment and transport providers may be involved. In most C2C scenarios, a third party is involved that facilitates the C2C transactions. This is obvious, as individual consumers do not have the means to realize an e-business information system (and if they do, they typically do not have the volume of business to make this cost effective). The electronic marketplace mentioned earlier is typically set up by such a third party. This third party may have income from advertising or from fees with respect to the transactions conducted through the marketplace. From the third party's point of view, the C2C scenario may also be seen as a B2C scenario – although this also changes the main objects traded (see the next section). A well-known example of a marketplace facilitating both C2C and B2C e-business is eBay (www.ebay.com; see Figure 3.5). Many similar marketplaces exist, often with a regional or national character. Where C2C

FIGURE 3.5 Example marketplace for C2C and B2C e-business.

marketplaces have frequent interactions between traders in a community, they get some of the characteristics of social media (as discussed in section 2.2.1).

3.4.5 G2C and G2B networked e-business

Government-to-consumer[5] and government-to-business scenarios include a government body as one of the parties. Example government bodies are municipality offices, tax offices and bureaus that give out documents, licenses and permits. Typical G2C examples include electronic tax statement handling and the use of electronic portals through which municipalities serve their citizens in various ways. An example G2C e-government service is shown in Figure 3.6, which is part of an e-government portal of a municipality in the United Kingdom (perhaps not the most appreciated part of their portal, as it handles fines). Comparably, G2B examples include digital handling of business taxes and portals through which business organizations can obtain various kinds of permits.

A special case of e-business scenarios that we can classify as G2C/G2B are the scenarios of charity organizations, which commonly use web-based information systems to inform people, attract members, raise funding and sometimes sell goods. A well-known example is shown in Figure 3.7. Although we classify charity scenarios as either G2C or G2B (depending on their focus), they typically also have characteristics of B2C or B2B scenarios (e.g., they often try to make money, be it for non-profit purposes). The fact that the scenarios are controlled by public organizations and have a non-profit character puts them closer to G2C or G2B, however.

FIGURE 3.6 Example G2C e-government service.

FIGURE 3.7 Example charity organization application.

In many respects, G2C and G2B scenarios are like B2C and B2B scenarios when it comes to operational issues – this is the reason why we do not pay them much dedicated attention throughout the rest of this book. Obviously, the objects traded in G2C and G2B scenarios are typically not of a commercial nature. And also

obviously, the G side in these scenarios is often bound to many more regulations than a typical business organization. These characteristics imply that G2C and G2B e-business scenarios are usually not as dynamic as B2B or B2C scenarios.

3.5 Objects of networked e-business

In this section we elaborate the *objects* dimension of the networked e-business analysis space (see Figure 3.2). As with the *parties* dimension in the previous section, we first establish the values in the dimension and then discuss the interesting values in more detail.

3.5.1 Values in the objects dimension

As we have seen, the types of objects that are manipulated (e.g., traded) in e-business are important to characterize an e-business scenario. We distinguish the following basic classes of e-business objects:

- *physical goods* are tangible goods that are physically exchanged between parties in an e-business scenario, such as books, clothing or aircraft engines;
- *digital goods* are intangible goods that are electronically exchanged between parties in an e-business scenario, such as electronic reports or music in MP3 format;
- *services* are activities that one party in an e-business scenario performs for another party, taking relevant characteristics of this other party into account, such as transport or maintenance of physical goods;
- *financial goods* are sums of money or specific forms of guarantees for the later delivery of a sum of money that are transferred between parties in an e-business scenario; and
- *hybrid objects* are combinations of the previous classes; for example, a physical device combined with maintenance services for the device that is exchanged between parties in an e-business scenario.

The boundaries between these classes are not always fully clear. For example, one might argue that a music CD is a hybrid object consisting of a physical information carrier (physical good) and digital content (digital good). The line between digital information and digital services is sometimes hard to establish. An example of an e-business object that fits into these two classes is a personalized holiday weather information service (service) that delivers daily reports (digital goods). These examples are illustrations of the fact that e-business can erase boundaries that used to be clear – proper classification of scenarios thus becomes even more important to keep things as clear as possible.

Note that in e-business scenarios involving trading, typically two kinds of objects are exchanged (each in one direction between the two main parties). Most often, one of the two is a financial good for the payment while the other one is the actual product or service being bought or sold. An exception is when trading has the form

of bartering (as mentioned in the previous section), and non-financial goods are exchanged both ways.

We discuss the first three classes of goods in more detail in the following sections to analyze their characteristics in e-business. Financial goods are straightforward and hybrid objects possess the combination of the characteristics of their constituents.

3.5.2 Physical goods

Physical goods are the kinds of goods that have always been traded in 'traditional' business. When trading them in e-business, we usually get a combination of electronic business and 'physical' business. The electronic business part is focused on the actual selling (or buying) of goods; that is, finding a product, finding a business partner, reaching an agreement on a transaction and making a payment. The physical business part is involved because the goods typically need to be transported in some way from seller to buyer. As we will see when discussing business models, these business parts may be allocated to different organizations (goods logistics may be outsourced, for example).

We can distinguish between the following subclasses of physical goods:

- *discrete goods*: goods that are exchanged on a per-piece basis; for example, books, music CD's, office furniture and aircraft.
- *bulk goods*: goods that are exchanged in large quantities on a per-volume or per-weight basis, such as crude oil or bulk food like unprocessed grain.

Discrete goods (or discrete merchandise) are traded both in B2C and B2B scenarios. They are also traded in C2C scenarios; for example, in second-hand goods markets such as e-Bay (see Figure 3.5). Bulk goods are typically relevant in B2B scenarios only. Physical goods hardly play a role in G2B and G2C scenarios. The development of the *internet of things* (as discussed in section 2.2.5) is very relevant when it comes to automatic monitoring of the progress of e-business transactions involving physical goods.

There is a third special class of physical goods with somewhat different properties:

- *immovable goods*: goods that are bound to a specific geographic location, such as land, houses, apartments and industrial estates (also known as *real estate*); we saw an example in Figure 1.3.

Obviously, there is no physical part of the process here to move the immovable goods. Typically, however, there is transport of physical documents that proves transfer and ownership of the immovable good.

3.5.3 Digital goods

Digital goods are a relatively new class of goods that has actually come into existence through the advent of networked e-business. Digital goods have a number of characteristics that distinguish them from physical goods. First, they can be copied

in arbitrary numbers (almost) without cost by a producer or a consumer (if not protected by some kind of digital rights management mechanism). Second, they can be transported (almost) instantaneously and (almost) without cost from seller to buyer (using the internet). This enables the creation of business models that are simply impossible for physical goods. We will see this when discussing business aspects of networked e-business in chapter 5.

Although digital goods all consist, in the most basic view, of 'bits and bytes',[6] there are differences to be considered when thinking about e-business. We distinguish among the following subclasses of digital goods:

- *digital content*: copies of published and cataloged (multi-media) content[7]; for example, e-books, digital music (often in the MP3 file format) and on-demand movies – examples of digital content providers are the Apple iTunes store (www.apple.com/itunes) and the Amazon Kindle e-book store (www.amazon.com/Kindle-eBooks).
- *digital information*: on-demand produced informational data; for example, electronic weather forecasts, on-demand stock analyses and personalized travel schemes.
- *software*: copies of software products, such as text-processing programs (e.g., the one this book was written with), multi-media players and financial bookkeeping systems; software is often accompanied by a usage license.

The subclasses of digital goods determine the organization of the business that provides these goods. Digital information is often produced in reply to a specific customer request (in an on-demand fashion), where digital content is often produced for entire markets. Software usually requires a service organization to provide support for software users (such as delivery of updates of the software, a help desk for questions), where this is usually less required for digital content and digital information.

The exact lines between the subclasses of digital goods are not always clear. Software may produce digital information, for example, or digital content may be sold with software to access it. Digital information exists that is actually published without explicit request (e.g., on a periodic basis), making it similar to digital content.

Note that the broad distribution and use of digital goods (certainly in the B2C segment) relies on developments in mobile computing and cloud computing, as discussed in section 2.2. Mobile computing makes digital goods accessible in a ubiquitous way. Cloud computing forms a technical backbone for the processing, storage and communication of digital goods (e.g., in media-oriented social media).

3.5.4 Services

Services are different from goods. When services are traded there is no actual product exchanged between two parties; that is, no object (either physical or digital) is sold by one party to the other. Instead, one party performs a process on behalf of the other (or the two parties do this mutually) such that the other achieves a certain goal.

We distinguish between the following subclasses of services, each having its own types of goals for the service consumer:

- *physical services*: activities that involve manipulation of physical objects that are not exchanged goods; for example, air transportation (where the goal is to move someone or something to a specific destination) or car washing (where the goal is to have a clean car).
- *digital (non-physical) services*: activities that do not involve manipulation of physical objects; for example, financial services, shopping advice (where the goal is to be better informed) and agenda management (where the goal is to be better organized).

As with physical objects, physical services require some physical business activities for their delivery. Digital services can in principle be completely delivered through electronic means. An important example of the digital services class is electronic banking, where services are offered for making electronic payments or electronic money transfers. *Cloud computing* technology (see section 2.2.3) facilitates the development of delivery mechanisms for digital services. Clearly, hybrid forms of physical and digital services exist too.

Financial services are a special kind of digital services because they can be used for reimbursement of other e-business objects. Note that direct payment (by plain

Servitization. In the modern economy we see a shift of focus from physical assets to services, a development that is commonly referred to as *servitization*. In the traditional asset-oriented setting, physical assets are acquired (bought) to make use of them. This implies a transfer of ownership of the asset and usually also a change of location. A B2C example is a consumer buying a CD to be able to listen to the music stored on it. A B2B example is a company buying a printer to be able to produce business documents. In the modern service-oriented setting, a service consumer pays a service provider for the delivery of services that involve the use of assets. There is no change of ownership and often no change of location of the assets. A B2C example is a consumer paying a subscription fee for a music-streaming service. The consumer enjoys the music, but does not own it. A B2B example is a company paying for a printing service (e.g., on a per-use basis) to produce its documents. The company will not become the owner of the printer. The location of the printer will depend on the situation: at the premises of the service provider (who transports printed documents to the service consumer) or at the premises of the consumer (but under the control and maintenance of the provider). Servitization typically implies more digital contact between parties; that is, more networked e-business.

money, physical or electronic) is not considered a service but a financial good (as discussed in section 3.5.1). Loan and leasing services can replace direct payments, however. Recent developments (such as digital currency) can blur the difference between financial goods and financial services.

3.6 Time scopes of networked e-business

In this section we elaborate the *time scopes* dimension of networked e-business, as introduced in section 3.3. As with the other two dimensions, we first give an overview of the values we identify in this dimension and then discuss each of these values in more detail.

3.6.1 Values in the time scopes dimension

The time scope of an e-business scenario determines how long a typical e-business collaboration lasts; that is, how long the life cycle of a scenario lasts from first contact between the involved parties until the complete dissolution of the collaboration (note that this can be considerably longer than the execution of the main business transactions in a collaboration).

When analyzing the time scope of an e-business scenario it does not make much sense to use a dimension scaled in absolute time units, such as weeks, days or minutes. Time scales differ immensely depending on the nature of an e-business scenario (and the business domain in which the scenario is positioned). When we are talking about a stock exchange e-business scenario, things have a different scale of time that when we are talking about trading real estate with e-business support (we have seen an example in Figure 1.3). Therefore, we use a relative time scale coupled to the duration of *e-business orders*; that is, the exchange of individual e-business objects as discussed in the previous section. In the stock exchange case, an e-business order is a single transfer of stocks. In the real estate trading case, an e-business order is a single transfer of a unit of real estate (such as a house or an island).

We identify the following values in the time scopes dimension:

A static time scope means that e-business collaboration between the parties in a scenario is of a long-lasting (or even permanent) character, which is not related to individual e-business orders. The selection of parties is performed at a strategic decision level.

A semi-dynamic time scope means that e-business collaborations between business parties are changed periodically, but not on the basis of individual orders. The selection of parties is performed at a tactic decision level.

A dynamic time scope means that e-business collaborations are determined specifically for each individual e-business order. Selection of parties is an operational decision.

An ultra-dynamic time scope means that collaborations are changed even during the execution of an individual e-business order. Selection of parties is a small-scale operational decision.

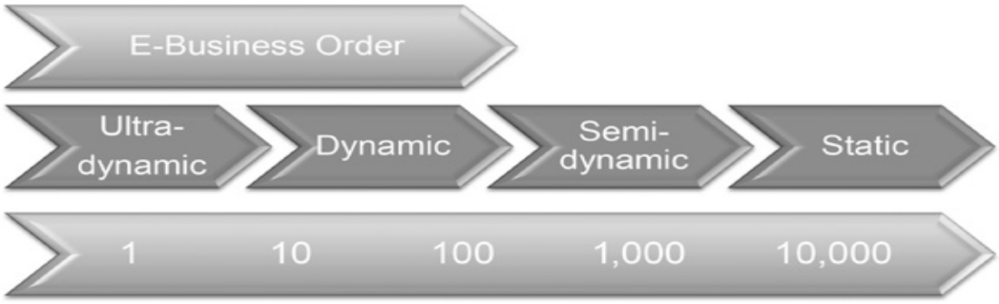

FIGURE 3.8 E-business time scope durations.

The durations of the four time scopes are illustrated in Figure 3.8. The four scopes are shown in the middle row. In the top row we see the duration of an e-business order. In the bottom row we see a very coarse indication of the time periods in abstract time units (as explained, the concrete time unit depends on the application domain). Note that the time scale is logarithmic because the scopes often vary by orders of magnitude.

Given our definition of networked e-business (see section 1.2), it is clear that scenarios with the more dynamic time scopes are the more interesting ones. If a collaboration has a permanent character (the extreme version of a static time scope), it is – strictly speaking – even excluded by our definition of *interesting* e-business.

3.6.2 Static time scope

In the static time scope case, the nature of the collaboration between e-business parties is defined by the long-time relationship between the parties, not by the execution of individual e-business orders. This means that e-business is primarily based on a relational collaboration setting, not on a transactional collaboration setting. The static time scope is typically applicable in three kinds of situations

The first situation is that of very stable markets. This means that the players in a market are well known and don't often change the way they do business. This also means that the objects traded in the market (as discussed in section 3.5) have stable characteristics, both in terms of functionality and price. When nothing changes, there is little reason to change collaborations.

The second situation is determined by the fact that specific parties are tied to each other because of an infrastructure they have invested in (a *lock-in* situation). This can be a business infrastructure (such as a long-lasting contractual relationship), an organizational infrastructure (such as a business process that was very costly to implement) or a technical infrastructure (such as a shared information system or a shared communication facility). A typical example of a technical infrastructure in 'old-fashioned' e-business is a dedicated *electronic data interchange* (EDI) connection between two organizations.

The third situation is determined by the fact that one or more parties in an e-business collaboration are unique in the market, such that there simply is no alternative to choose from for an e-business scenario. A party is unique because it has unique characteristics, such as unique capabilities (e.g., as a consequence of highly specialized production facilities) or unique branding (it is the owner of a trademark with a highly special position in a market). Note that a party that has a monopoly is by default unique.

3.6.3 Semi-dynamic time scope

In the semi-dynamic time scope the nature of the collaboration is defined both by the relationship between parties and current market circumstances. Characteristics of executed batches of e-business orders or predicted batches of orders to be executed may lead to reselection of partners. For example, when the quality of delivered services is unsatisfactory, a service consumer may select an alternative service provider. Characteristics of individual orders do not lead to a need for partner reselection, however.

The semi-dynamic time scope is typically used in scenarios where parties engage in collaboration for some period of time (where the granularity of the period is determined by the business domain, as discussed before). The length of the period can be fixed at a number of time units (e.g., six months) or a number of e-business orders, such that parties reselect their partners on a regular periodic basis. A period may also end because a specific market characteristic reaches a threshold value (e.g., the price of traded products falls below a threshold value).

As partners are selected more frequently than in the static case, effective means for partner selection are important. Examples of these means are business catalogs (such as electronic yellow pages) and business brokers. Efficiency of these means is not of great importance in semi-dynamic networked e-business because the frequency of partner selection is typically low when compared to the frequency of execution of e-business orders.

3.6.4 Dynamic time scope

In the dynamic time scope case, selection of parties is based on the characteristics of a single e-business order and current market circumstances – therefore, an e-business collaboration is based on a single e-business order. Typically, partner selection has a just-in-time character: a partner is selected only at the moment that its activities are actually needed (such that all up-to-date information can be taken into account). Because partners are selected very frequently and at the last possible moment, partner selection mechanisms must both be effective and efficient. This implies that they typically require adequate automated support.

The well-known web shop scenario is a typical B2C example of e-business with a dynamic time scope (this is the e-retailer business model that we discuss in section 5.5.5). Consumers decide per e-business order (i.e., per object to purchase) and at the latest moment where they will buy this object. Comparison websites enable

Dynamic B2B scenarios in the twentieth century. A very explicit example of dynamic networked e-business was already developed in the European CrossFlow research project at the end of the twentieth century [Gref00]. CrossFlow researched the combination of business process management (then called *workflow management*) and networked electronic business (then called *electronic commerce*) [Hof01b]. In this project, two scenarios with dynamic time scopes were constructed and supported by prototype systems for networked e-business. The first scenario concerns logistics for delivery of mobile phones to customers. Here, a telecom operator selling mobile phones can select and contract a logistics provider on a per-order basis (i.e., for each individual mobile phone to be delivered), depending on the characteristics of the delivery and current market circumstances (such as pricing of providers). The second scenario concerns handling damage claim assessment services in car insurances. Here, an insurance company can select and contract a damage assessment expertise provider on a per-claim basis. Both scenarios rely on electronic contracting to enable the required efficiency in collaboration setup [Hof01a]. Even though the technology developed in the CrossFlow project is outdated by now, the networked e-business setting is still state of the art.

this dynamic, just-in-time behavior – they are the automated support for partner selection in this case.

Dynamic time scopes are also considered in B2B scenarios; for example, in the real-time outsourcing of services in highly dynamic markets, such as logistics. We present an example in the sidebar: 'Dynamic B2B scenarios in the twentieth century'.

3.6.5 Ultra-dynamic time scope

In the ultra-dynamic time scope case the setup of collaboration parties may change even during the execution of a single e-business order. Reselection of a business party while an e-business order is being executed can happen for two reasons.

First, a party requesting an e-business object may decide to switch the delivery of part of that object to another provider during the execution of the order for that object. In other words, an e-business order may be chopped up into pieces 'on the fly'. An example is a scenario where holiday packages are sold consisting of several elements, such as flight, hotel and rental car. During an e-business order, a customer may decide not to proceed with the purchase of more elements, complete the part of the e-business order so far with the first provider or obtain the other elements through a second provider.

Second, the execution of an e-business order initiated with one partner may be aborted to be restarted with another partner. This is possible with low or zero transaction cost scenarios; for example, in search engine transactions where a customer may switch to another search engine when search results are not satisfactory (or the engine is simply too slow).

Obviously, the ultra-dynamic time scope is used only in extreme e-business scenarios where there are few or no contractual restrictions to 'partner swapping'.

3.7 Running cases

In this section we revisit the three case studies – POSH, TTU and TraXP – that we have introduced in the previous chapter. Using these cases we can apply the concepts of this chapter to the worlds of online furniture retail, online translation and interpretation and online travel services.

3.7.1 POSH

We classify the POSH scenario using the three dimensions that we have introduced in this chapter.

When we look at the *parties* dimension of networked e-business, we classify POSH as both B2B and B2C: they sell both to individual consumers and to business organizations. Note that we do not include B2G in our analysis of the scenario: even if POSH sells furniture to government organizations, the government organization is a 'regular business organization' in such a transaction to POSH.

The *objects* that POSH trades are mainly physical goods; more precisely, discrete goods (office supplies, equipment and furniture). But POSH also provides services supporting these physical goods, so we identify an aspect of hybrid objects as well. Services include, for example, maintenance to equipment and furniture. In the POSH scenario we also see financial goods, as customers have to pay for bought goods – but these are of the trivial kind, so not very interesting to analyze in this scenario.

In the *time scope* dimension, POSH typically works in semi-dynamic and dynamic scenarios. The semi-dynamic time scope is related to project-based collaborations in which a number of individual but related e-business orders are placed by the same business customer – here, a sequence of business transactions is performed in the context of a longer-lasting business relationship. The dynamic time scope is applicable to individual purchases, often by non-business consumers in the B2C segment.

3.7.2 TTU

We also classify the TTU scenario using the three classification dimensions of this chapter.

In the *parties* dimension, TTU is a typical B2B case: they are a business organization that interacts with other business organizations. They might incidentally

work for consumers as well (e.g., people who want important private documents translated), but this is not the basis for their business model.

In the *objects* dimension, TTU sells digital services. One might argue that TTU sells digital content (translated documents). Producing new content of documents is not their main activity, however. They primarily transform existing content, which is a clear service functionality. Financial goods play a role for the payment of the services provided by TTU, but in a trivial way.

Time scope wise, TTU works in semi-dynamic and dynamic fashions. As customers have to be registered with TTU to use their services, the e-business relationship has semi-dynamic characteristics. But it is also possible to use TTU for individual activities, creating dynamic characteristics. When TTU delivers interpretation services in a real-time fashion, ultra-dynamic elements may slip in: interpretation sessions may be ended (and diverted to another service provider) before they are completed. TTU does not consider this regular business, however, and hence does not adapt its organization to this aspect.

3.7.3 TraXP

We apply the classification in three dimensions to our third case study, TraXP.

In the *parties* dimension TraXP has explicitly chosen to address both the B2C and the B2B traveler markets; that is, private travelers and business travelers. As we will see in the further discussion of this case (in chapter 5), TraXP does handle different classes of customers in different ways. Similar to the POSH case, government organizations are treated like regular business organizations by TraXP, so B2G business is not an explicit segment for TraXP.

In the *objects* dimension, TraXP provides complex digital services. Part of a complex service is based on TraXP resources, but a large part is based on the resources of third parties with which TraXP collaborates. The nature of the e-business objects dictates a highly networked approach to e-business here.

In the *time scope* dimension, TraXP can be classified as semi-dynamic. TraXP tries to build lasting relationships with its customers (i.e., it tries to move towards a static time scope) but is aware that they operate in a market with fierce competition. The basis for the relationship with the customer is a high level of knowledge about a customer's travel preferences, which are recorded in a customer profile. As an aside (as this is not part of the scenario classification scope), with its service providers TraXP typically also has semi-dynamic relationships – partnerships can be changed dynamically if market conditions require it.

3.8 Chapter end

We end this chapter on the networked e-business analysis space with a brief summary of the main observations in this chapter and a few questions and exercises to apply the concepts of this chapter.

3.8.1 Chapter summary

E-business scenarios can be classified using a structured, three-dimensional framework. The three dimensions specify the *parties* that collaborate in networked e-business, the *objects* that are traded or handled in networked e-business and the *time scopes* of networked e-business. An e-business scenario has a value in each dimension. The combination of the three values is the classification of the e-business scenario.

In the *parties* dimension we find combinations of business (B), consumer (C) and government (G) parties. These combinations make for $3 \times 3 = 9$ possible values, of which B2B, B2C, C2C and G2C/G2B are the most important.

In the *objects* dimension we find physical goods, digital goods, services, financial goods and hybrid objects. The physical object class is subdivided into discrete goods, bulk goods and immovable goods. The digital object class is subdivided into digital content, digital information and software. The service class is subdivided into physical services and digital services.

The *time scope* dimension ranges from static to semi-dynamic and dynamic to ultra-dynamic. Values in the time scope dimension depend on the relationship of e-business collaborations to e-business orders – not on absolute time periods.

These three dimensions are summarized in Figure 3.9.

3.8.2 Questions and exercises

1 Are *all* combinations of values in the three classification dimensions (as shown in Figure 3.9) practical? Explain your answer. If your answer is 'yes',

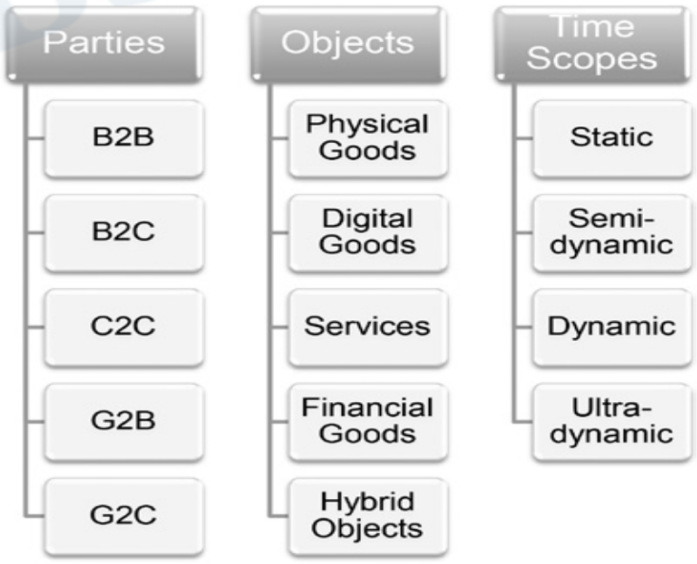

FIGURE 3.9 Overview of e-business classification dimensions.