

*All organizations, processes, and systems are transaction interfaces. The design skills of these determine the amount of transaction costs incurred.*

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## 2.1 Enhancement of Organizational Competitiveness Corresponds to Establishment of Interfaces

Improvement of the efficiency and effectiveness of transactions by fixing interfaces is the essence of managing organizations.

### 2.1.1 The Organization Is a Nexus of Interfaces

Any exchange of information in the organization is a transaction, and the organization functions to issue transaction interfaces.

The preceding chapter described how transaction costs are incurred at transaction interfaces. This chapter will illustrate that organizational functions are essentially synonymous with transaction interfaces. From this perspective, both strategy and IT can be handled identically as organizational issues. Modularity, standards, and innovation management are also included and discussed in the following chapters. In this book, new universal management methodologies to deal with organizational and strategic issues are proposed applying this perspective.<sup>1</sup>

Most of the transactions within organizations are exchanges of information. Intercompany commerce or transactions in the market are much simpler; therefore, information exchange within companies, the more complicated case, will be mainly

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<sup>1</sup>“Organizational competitiveness” in the title corresponds to the productivity of an organization. The efficiency of communication in an organization is improved by applying the methodologies of transaction cost management, and, as a result, effectiveness and productivity improve.

addressed in this chapter. In all individual exchanges of information within companies, the elements of transaction—that is, *connection*,<sup>2</sup> *presentation*, *negotiation (adjustment)*, *agreement*, *exchange*, and *ex post processing*—are the same as those in intercompany commerce, which was described in the previous chapter.

Transactions of information incur huge transaction costs. For example, what kind of information do transaction partners need? What kind of information do the partners have? How should information be edited and modified to satisfy the partners? How should the information be delivered? How should it be confirmed that the information has been delivered appropriately and completely? How is the value of the information evaluated? How is a reward decided? When a problem occurs, how is it solved? And there are much more. If all these are not fixed, it will be very costly to execute the transaction, even within an organization. All those incur transaction costs.

It is often misunderstood that most of those have already been addressed well in rules, norms, or customs in companies. However, the reality is that most of them are determined on an ad hoc basis. Arguments and negotiations between the transactors occur during those determinations, sometimes leading to quarrels and hard words, which are also transactions incurring transaction costs.

Two aspects of transaction interfaces are analyzed throughout this book: *interfaces determined on a case-by-case basis (on an ad hoc basis)* and *interfaces agreed upon and fixed a priori*. The distinction provides significant perspectives that lead to substantial comprehension of an organization.

For example, if data formats on a document form are fixed a priori for transactions of information, communication becomes very efficient, providing great value to both providers and receivers of the information. Furthermore, the transaction costs decreases greatly if a database is established in which data are archived according to formats and procedures of access are shared across users. On the other hand, there is a disadvantage when information that is not prescribed in the provided formats is needed. As long as the formats and forms are designed appropriately for all cases, the cost benefit is significant. If not, very crucial information may not be transferred. The problem is that effectiveness can decrease even when efficiency increases.

Another example is that an employee of a company who is not in charge of sales may receive an inquiry about a big order from his/her acquaintance. Without a

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<sup>2</sup> The only difference between transactions within companies from ones in the market is that the transactors are usually determined a priori, as responsibilities and appointments are designated in companies, and, consequently, the volume of activities of *connection* becomes much smaller than in the market. However, the search for transactors in other departments and creative collaboration is increasing these days as power becomes more delegated to autonomous entities. For example, when an autonomous Google group plans a new business, and when a Kyocera amoeba group proposes company-level *Kaizen* (improvement) activities, they are supposed to search other units to ask for collaboration through internal presentations. This trend is growing rapidly as individuals' and small groups' initiatives and autonomy and, consequently, collaborations increase the significance of strengthening competitiveness. In addition, market-driven transactions increase even within companies, resulting in increased intracompany commerce.

direct pathway of such information, the information will be reported to his/her boss and subsequently to the person in charge of sales from the boss. More persons may need to intervene in this process. As it is quite possible to end up with just troubling all the related persons without gaining any benefit, the employee may hesitate to execute such a transaction. If there is a database and a procedure established to input such information about the prospect, it is much easier for him/her to initiate the transaction.

If a bonus were provided for the contribution, the chance of challenging the transaction increases greatly. However, if an evaluation procedure for the reward is not fixed, it must be argued and agreed at each occasion, which is very troublesome. If fixed procedures were established regarding what kinds of information are required, whom the information should be reported to, how it will be rewarded, and how all those activities should be processed, the transaction would be much easier to conduct.

### 2.1.2 Fixing Transaction Interfaces That Are *Seemingly Irrelevant*

The efficiency of a transaction improves drastically by fixing interfaces.

A key factor in successfully fixing and standardizing an interface is focusing on an interface that is *seemingly irrelevant*. The effectiveness of a *seemingly irrelevant* interface does not deteriorate by fixing. The quantitative evaluation of benefits is always significant, of course, and it will be discussed later in this chapter. However, intuitive judgment and proactive challenges for fixing should be appreciated so that the design and evaluation capabilities will be developed in companies.

An interface constitutes agreements on the contents, conditions, and procedures of transaction that are supposed to be shared with all concerned transaction parties. It does not involve personal proprietary expertise such as production activity. If an interface can be fixed without diminishing value added, effectiveness, and individual motivation, then the efficiency improvement is purely valuable. The transaction costs decrease further when it is shared by a larger number of people.

In order to elaborate *the interface that is seemingly irrelevant*, agreements in activities that should be conceived as *irrelevant* will be listed below:

#### (1) Forms of sales activities daily reports

Fixing formats and documents of reporting activities improves efficiency greatly on both writers' and readers' sides by avoiding omission and misunderstanding of information. It is a typical advantage of fixing interfaces and certainly not limited to sales activities. However, at the time of the introduction of the interface, issues such as fixing data entry procedures, complaints, rejections, and dissatisfaction regarding the positions of lines and font styles are sometimes expressed, and reaching a consensus takes a long time. The introduction of fixing interfaces unavoidably raises minimum changes and inconvenience to the users. It should be noted that the individual losses are

much smaller than the gains brought to the whole, which are made by mutual concession.

(2) Databases (CRM, SCM, ERP, PDM, etc.)

Databases such as customer relationship management (CRM), SCM, enterprise resource planning (ERP), and product data management (PDM) contain data formats and functions similar to those of paper documents. The only difference from paper documents is that database processes are electronic and automatic. Complaints, rejections, and dissatisfaction are expressed quite frequently about fixing the formats in the same way as the sales reports. This should be deemed as an interface that is seemingly irrelevant.

(3) Filing indexes/Directories

Many organizations have filing indexes to manage an enormous amount of documents. Creators of documents store them according to an index, and users of the documents search out and use the documents also according to the same index. Indexes function as interfaces between creators and users of documents, which dramatically reduce the time needed to search out documents from a huge pile of files. The purpose of an index is to fix a framework to classify information. It should be shared and used by creators and users. This concept of a directory has been applied to information management on computers (the “tag” system is becoming more popular these days as it enables people to manage information more flexibly).

As the advantages of sharing information by an index are enormous, even if uncomfortableness with the wording of an index exists, it should be conceived as an interface that is irrelevant instead of denying them emotionally.

An index is an interface used not only between creators and users of documents but also for personal use. That is, it functions as a system for individual information management, and it is a transaction interface between oneself in the past (at the time of making the document) and in the future (at the time of using the document). Individuals with higher performance are likely to construct a personal index to manage information for both work and study. Experiences in making efficient indexes for personal use become valuable for making indexes for organizations.

(4) Fixing time, venue, and participants of meetings

It is inefficient to decide time, venue, participants, and so forth for every meeting on an ad hoc basis. Holding meetings periodically and routinely avoids redundant discussions that are seemingly irrelevant interfaces; these exist in large quantity, and the transaction costs can be reduced enormously by fixing.

(5) Definition of terminologies, codes, and work flows

If a coding system differs from department to department, it will be extremely inefficient to process activities across departments. Similarly, errors, omissions, and misunderstandings will arise frequently between departments if there is no unified definition of terms; communication cannot be established. In the course of orders processing, for example, if formats of documents such as a quote, a purchase order, an order confirmation, a delivery confirmation, an inspection certificate, and a receipt are designated and fixed, and if the data

input procedures and submission dates are standardized, the paperwork becomes much more efficient. Differences in processes of such back-office administrative work are unlikely to influence any performance or effectiveness.

Fixed interfaces have various names such as “systems,” “business processes,” “work flows,” “manuals,” “procedures,” “protocols,” “rules,” “structures,” “routines,” “norms,” and so forth. It is impossible to describe the differences between those precisely, and, in fact, those are essentially identical. IT computerizes and automates all of those. Although its physical form is different, IT can be included in the list above.

The phrase “business processes” has obtained popularity in the business society these days, but the definition of “processes” is ambiguous and the difference from conventional “systems” or “management systems” is unclear. The phrase “management control systems” is widely used in the academy of management. Both phrases are used without clear distinction.

Eventually, all of these, even with the various names, are tools to manage an organization for the same goal and with the same approach—that is, to fix ways of transacting *a priori* in order to reduce the cost and time. In this book, all of these devices will be generalized by the concept of a transaction interface, emphasizing that these functions are essentially identical.

The term *fixing* has been used intentionally in this section, but it nearly corresponds to the concept of standardization. The term *standard* has various meanings and is often misunderstood to have negative meanings. Although there are many disadvantages, obstacles, and issues in standardization, it is a crucially significant concept in management. It is not an overstatement to say that managing organizations corresponds to using standards appropriately, which is going to be examined throughout this book.

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## 2.2 What Is Transaction Interface?

Cooperation and collaboration become possible when there are interfaces to unify people’s activities.

### 2.2.1 Interface Between Organizations/Departments/Individuals

The organization is a nexus of interfaces between departments and individuals.

#### 2.2.1.1 Reduction of Transaction Costs by Fixing Interfaces

An overview of the concept of a transaction interface was given in the previous section. This section outlines a detailed discussion of the concept.

To facilitate communication within an organization, various transaction interfaces must be created, including natural languages, media (e.g., telephones, emails, videophones, and paper documents), formats of information, information

specifications, dates and venues for delivery, and methods for confirming acceptance. If the interfaces for exchanges are not determined a priori, these must be negotiated and agreed on an ad hoc basis. That is to say, an interface is set either in advance or ad hoc. If it causes little problem by being predetermined, efficiency increases greatly; opportunity loss can be also avoided that may otherwise have occurred as necessary transactions were obstructed due to huge transaction costs.

Fixing interfaces corresponds to fixing ways of transacting. If an interface is irrelevant, it is unnecessary to repeat the argument and expend extra time and effort for the determination. It incurs an enormous amount of cost if the argument repeats at every transaction. If it is repeated every day in every department, the amount of time wasted increase immensely. If it is an interface that is *irrelevant*, it should be fixed appropriately a priori, and communication can be started and completed more promptly at much lower cost. As described previously, if all parties accept the small inconveniences caused by the changes, this would ensure improvement in the overall efficiency.

Hereinafter, interfaces of a transaction that are predetermined or fixed in advance will be referred to as *fixed interfaces*. On the other hand, ways of transacting that are determined on a case-by-case basis, with agreement or by force, will be referred to as ad hoc *interfaces*.

An organization is a nexus of fixed interfaces, in a manner of speaking. Many of the individual transactions are determined as rules, norms, protocols, and regulations in the organization. These collectives form a system or an institution such as an accounting institution, a reporting system, and an assessment system in companies. Rules of conventional organization are used to address roles, responsibilities, or missions of each department/section/individual, but these days they have been changed to describe how to deliver or exchange outcomes among departments/sections/individuals instead, which literally means *interfaces*. Often when roles or missions are addressed, problems may arise between departments due to ambiguous description of responsibilities, but the possibility decreases greatly if interfaces are set explicitly. The interface is meant to designate both parties' roles while simultaneously defining the organizational structures.

All the discussions regarding interfaces can be put into manuals, which can also be defined as transaction interfaces between managers and staffs. Accordingly, subordinate staffs complete and report outcomes to managers, who, in turn, act by comparing the outputs against the instructions prescribed in the manual. If the outcome is not as described in the manual, the managers will manage, assist, instruct, or educate the subordinate staffs according to the manual. Costs of communication, management, instruction, education, and evaluation between managers and staffs will be reduced greatly by the manual. The advantages in developing a manual, fixed interface are huge, as it eliminates the repetitive need for managers to instruct staff members on their tasks or for staffs to inquire about how a certain task should be done.

Organizations such as companies have been improving efficiency by forming innumerable fixed interfaces like those described above for strengthening their competitiveness. This has opened doors for more transactions to be executed within

organizations, which can utilize fixed interfaces flexibly, rather than in the market, which hardly provide fixed interfaces. This concept was first noted by Ronald H. Coase, a Nobel Prize economist.

The origin of an organization is the establishment of the most basic and most significant fixed interface: allocation of authorities to determine interfaces. If no fixed interfaces (rules or manuals) are provided, it becomes inefficient and difficult to make every decision by ad hoc arguments, which often result in confusion and conflicts. The first fixed interface determines who makes the decisions and whose decisions are always prioritized. This is a very simple and basic interface that covers most of the transactions in organization. It is the most primitive interface by which all interfaces are decided in a dictatorship manner (enforcement by power is used instead of negotiation and agreement). In modern organizations, authority typically is hierarchically distributed. When this fixed interface is introduced, just an aggregation of people forms an organization with higher productivity.

In addition to the hierarchical structure above, another basic fixed interface in an organization is allocation of functions such as production, sales, and accounting. The development processes of interfaces and organizations will be elaborated in Chap. 5.

### 2.2.1.2 Improvement of Autonomy by Fixing Interfaces

As described above, the biggest advantage of fixing transaction interfaces is the cost reduction by preventing redundant transactions to execute a transaction. The more transaction costs are spent in a transaction, the higher the effectiveness of the transaction; therefore, the most objective and reasonable approach to productivity improvement is to reduce activities that are clearly of no or less value to the transaction.

There are many more advantages to fixing interfaces. Fixing makes each entity (i.e., department, section, or employee) function as an independent and autonomous module. This will be elaborated in detail in Chap. 4; therefore, the points are only briefly described in this section regarding increase in independency and autonomy for each entity or the advancement of modularization as one of the key advantages of fixing interfaces.

#### (1) Enhancing motivation

One of the key advantages of capitalism over socialism is attributed to the difference in thought about proprietary rights. The fundamental thought of capitalism that protects the proprietary rights of asset owners leads to enhancement of individual motivation and, consequently, productivity. An explicitly defined interface between a manager and a staff clarifies their responsibilities, the authority, and also the attribution of outcomes. If a manager has the power to set interfaces arbitrarily and freely, he/she can easily exploit the outcomes. By means of the fixed interface, the staffs can assert their ownership of their outcomes and become independent, and consequently their motivation will be enhanced.

(2) Encouraging competitive culture

Because fixing interfaces enables comparison of individual outcomes, competition among entities (e.g., individuals, departments, or companies) is encouraged, which can lead to productivity improvements.

(3) Promoting improvement and innovation

Fixed interfaces between entities clarify individual responsibilities, which promotes improvement and innovation of outcomes. If the responsibility for improvement is ambiguous, then the activity will hardly be executed. Moreover, encouraging competition will result in further improvement.

(4) Improving resource efficiency by coordination among entities

When a fixed interface is shared by multiple entities, it is possible to add and remove resources more easily, which enables organizations to enjoy the following advantages:

(a) Resource efficiency improvement by adjusting the quantity of input resource

Because the transaction costs for adding and removing input resource is smaller, it is easier to adjust the volume of input resource (e.g., human resources, equipment, or facilities) depending on demands. As a result, utilization rates and, subsequently, overall efficiencies of resources increase.

(b) Input resource efficiency improvement by functional specialization

With a transaction interface of adding and utilizing heterogeneous resources, functional specialization can be embodied easily, which makes respective operation simple, easy, and repetitive. It consequently enables the substitution by lower wage labors or by IT and decreases the operation costs. Productivity improvement is achieved through economies of scale and learning curve effects with the simpler, easier, and repetitive tasks.

(c) Resource efficiency improvement by sharing resources

Because resources of special functions and capabilities (e.g., facilities, equipment, and professionals) are rarely used, when they are shared by multiple entities instead of individually owned, it will increase usage frequency and improve resource efficiency.

### 2.2.2 Interfaces Between Mechanical Parts

Interfaces set between parts also separate and designate human operations.

The term *interface* is usually applied to physical objects such as mechanical parts and electrical signals. Physical interfaces regulating exchanges of information by electric voltage/current and mechanical interactions by mechanical specifications (e.g., size, weight, and shape) are set between electrical and mechanical parts, respectively. For example, in a watch, the functions are allocated to springs, gears, and needles with the interfaces, which determine each mechanical specification so that each part performs its function and at the same time interacts to work as



a whole synchronously. If there is inconsistency with the interfaces, the watch does not function.

The interfaces between mechanical parts and between electric parts are not negotiated or decided by the parts themselves spontaneously. It should be noted that human designers determined them artificially—that is, those physical interfaces function to determine the tasks and responsibilities of workers who are in charge of designing and fabricating each part. In the production procedure, the section in charge of component A will produce it according to the interface of prefixed design specifications and deliver it to the section that uses component A. Regardless of whether the required transaction is a component or information, this interface determines the interaction of tasks between humans eventually. Mechanical production guidelines, electronic design diagrams, software flowcharts, information-sharing rules, and service manuals at restaurants are all transaction interfaces between people in organizations.

Software programs as artifacts can be used to illustrate this discussion most distinctively. The term *interface* in software engineering refers to the regulation for interconnecting programs. For a computer program, the outcomes developed in the past can be reused repetitively without any reproduction cost (very little cost), thus remarkably increasing the efficiency of the development. A development methodology emphasizing this reusability is called “object-oriented programming,” which was developed in the 1970s and has been gathering attention recently.

For example, OSs in computers are developed by necessity so that various systems, devices, and application software can be created without developing programs with duplicating functions. The OS facilitates not only a smooth operation but also the reuse and substitution of each module. It also functions as an interface for communication between the developers of the OS and the developers of the modules.

Because the reuse of programs is prioritized, the programs are designed to be applied to various applications, instead of custom-made for one application, a result of which possibly deteriorates the performances in individual applications. This has been a long-term obstacle in adopting the object-oriented approach in software development. In the case of software, processing speed decreased. Today, various speedup technologies have been developed, including technology advancements in CPUs, and they have managed to solve the problem. In the current business environment where the significance of program development has been increasing, the efficiency of software development is becoming relatively more emphasized and the object-oriented methodology is getting attention.

When an interface is fixed for reducing transaction costs, various needs in various application cases should be considered, rather than a single specific application. In general, it causes inevitable deterioration of the performances compared with the method that focuses on only one specific need. This is a severe structural problem; a methodology must be developed to design interfaces appropriately so as to minimize the problem and to enhance the advantages of the interface. This topic will further be discussed comprehensively in Chap. 6.

## 2.3 Examples of Transaction Interfaces in Organizations

Issues regarding the organization correspond to processing of transaction interfaces.

### 2.3.1 Interfaces for a Cross-Functional Team

Management rules for a cross-functional team are an aggregate of interfaces.

In order to illustrate more clearly the basic concept of a transaction interface, a number of simple examples such as filing indexes and business processes have been cited in the preceding sections. In this section, several examples of more complicated interfaces will be explained to deepen the comprehension of the concept.

Establishment, management, and operation of a cross-functional team (CFT) are great examples of fixed interfaces that predetermine and describe very complicated practice procedures.

A purpose of a CFT is to plan, implement, and promote/enforce necessary company-wide innovations that go beyond individual functional departments. It is one of the most complicated activities in companies because it is aimed at company-wide, large-scale innovation. Companies with the capabilities of managing the fixed interfaces become superior in power for innovation. Needless to say, the capability leads directly to competitiveness in the turbulent and uncertain business environment of these days. It is the management technology that has been developed widely among leading-edge companies, including the ones in Silicon Valley. Carlos Ghosn, the CEO of the Renault/Nissan group, deployed it during the time when he led Nissan's reformation, which made CFTs widely known even in Japan.

Specifically, the following interfaces are predetermined explicitly for a CFT:

(1) Proposal and selection of innovation plans

Procedures for proposing an innovation plan when an employee acknowledges needs of cross-functional changes; the processes of evaluation, selection, and adoption of the proposal; and the responsibilities (of a committee or an executive) are fixed explicitly. Consequently, these encourage employees to make proposals.

(2) Team formation

It is important that multiple departments participate in the solution of cross-functional issues. Because each department usually regards ordinary business routines inside departments as its primary concern over the cross-functional projects, it is quite difficult to collect capable team members. In the procedures, it is ruled to prioritize the project and to assign the most suitable persons.

(3) Processes of handling the project

The team members are not accustomed to such activities related to initiating and driving changes, especially with the large scale. Guidelines of handling tasks are prepared to assist all team members to execute the unfamiliar activities. This also encourages employees to make proposals.

(4) Allocation of tasks in the project

Allocation of tasks and responsibilities are designed and prepared in advance so that the project is easily managed.

(5) Presentation of project outcomes and its evaluation

Procedures are provided regarding to whom and where outcomes of the project are presented and how the outcomes (e.g., an innovation plan) are evaluated, selected, and adopted.

(6) Promotion and enforcement of the changes

It is very common to find that the innovation recommendations remain unimplemented without prepared processes of promoting and enforcing the changes. In order to avoid this waste, responsibilities and schedules for the implementation and monitoring and modification processes should be determined in the form of an action plan.

(7) Evaluation and rewarding of the team

Costs and risks of forming, executing, and implementing the plan are largely reduced by the preparation of those interfaces above. In addition, rewarding the team will enhance their motivation. Experienced companies, for instance, are likely to hold formal dinner parties for the team members and their families instead of providing financial incentives as a part of a reward mechanism.

### 2.3.2 Design Concept

The design concept ensures consistent decision making for each design activity and reduces transaction costs.

The previous examples such as rules, regulations, and processes can be easily recognized as interfaces. In this section, some abstract interfaces that are difficult to identify will be exhibited hereinafter.

In design activities, if targeted customer segments, applications and conditions of the customers' usage, and a pricing range, or even outlines of those, are designated, the transaction costs incurred among designers is largely reduced. If all of these are to be negotiated instead, an enormous amount of time and cost will be required. However, if such ad hoc adjustments (transactions) are omitted just to avoid the cost, the decisions reached become inconsistent because of chaotic activities. It is no exaggeration to say that the value of a product depends greatly on the quality of the prefixed foundation of activities.

The more precisely and properly the foundation is fixed a priori, the higher probability of success. The philosophy, concept, and policy of the design rule every activity as transaction interfaces: they drastically reduce transaction costs and improve effectiveness eventually.

### **2.3.3 Strategy and Policy**

Strategy ensures consistent decision making inside and between departments and reduces the transaction costs.

There are various definitions of strategy, but perhaps the most widely accepted one is “common guidelines that ensure consistent decision making of each entity to achieve a goal.” This implies that a product is developed and produced with a common understanding and is then marketed to an identical customer segment based on the shared guideline. The more consistent activities are, the stronger concentration in power companies obtain. Consider, for example, a product designed for elderly women but appealing to young men with emphasis on characteristics suitable for children: no success can be accomplished in marketing of such a product. This example shows that the roles and responsibilities of each entity should be assigned and managed consistently under the strategy shaped and shared in advance.

The more precise and concrete these interfaces are, the stronger organizations become. Under a well-planned strategy, a manager is able to work with his/her subordinates easily, the subordinates can satisfy the manager certainly, and they can collaborate effectively. That is, a strategy acts as a rule or a guideline for decision making and activities in an organization. Fixed interfaces avoid repetition of argument and confirmation that arise ad hoc and individually, hence reducing transaction costs in an organization. When the description is more abstract or implicit, it becomes a policy rather than a strategy.

### **2.3.4 Mission, Corporate Philosophy, and Shared Values**

Mission and philosophy facilitate communication in an organization.

Mission, corporate philosophy, and shared values function as guidelines of conduct for all members of an organization. These guidelines are more abstract than those comprising a strategy.

For example, if a corporate philosophy by which innovations are prioritized over ordinary business routines is indicated as an interface, it is easier for the entire company to form CFTs and collect the highest-caliber members. The consulting firm McKinsey & Co., for instance, has a corporate philosophy of “clients’ interests first,” meaning their employees should prioritize clients’ interests over those of the firm if they do not converge. Accordingly, the philosophy guides the employees into making decisions that will ensure they deliver the best recommendation for their clients despite emotional or political implications that might result in cancellation of their contracts. Consequently, such a philosophy ensures an increase in the company’s lasting value and brand image. However, such recommendations may bring short-term failure or weakness for the company’s business, wasting time in recurring arguments on whether or not to make the recommendations, which will consequently incur massive transaction costs.

Also consider the case of a venture startup that needs more organizational controls, even though it has been growing rapidly through self-initiated efforts. When new rules are introduced in the company, rejections are likely to occur, such as claims that “we have been growing successfully without rules, unlike large companies, which are failing, and so we do not need them. That is our strength.” This kind of argument will repeat with every single challenge to introduce rules, causing extensive strain for the whole company. In a company, such a problem could be resolved by the introduction of a new management principle such as “activating our internal communications/transactions in line with the introduction of our processes.”

It is widely known that successful companies utilize philosophies and shared values appropriately, even though the majority of them set meaningless mottos such as “coexistence and coprosperity” or “contribution to the prosperity of our society.” Too reasonable philosophies make no contribution to solving internal conflicts or facilitating communications. Therefore, it is important to note that philosophies and principles should be carefully designed to reduce unnecessary transaction costs.

### **2.3.5 Customs and Tacit Knowledge**

Customs also function as fixed interfaces, but their management is difficult.

Customs and tacit knowledge also function as interfaces, although these are more implicit than philosophies and shared values. Those of Japanese companies in particular were analyzed as their competitive source by many researchers during their high growth period. Japanese companies have created homogeneous human resources through a lifetime employment system; as a result, the employees can understand each other tacitly. As they were excellent in prompt coordination ad hoc, efforts to develop interfaces were not necessarily required. They spent many hours together, even outside the office, which deepened their mutual understanding. In that way, fixed interfaces of presentation, coordination, and negotiation had been established as customs or tacit knowledge. This capability contributed to the manufacturing of high-precision products and explained satisfactorily the success of Japanese companies before 1990.

Western companies were struggling with reducing transaction costs among diversified employees and in open business relationships at that time. They had started trying to find means to reduce transaction costs, such as utilization of IT, much earlier than the advent of the Internet. As long as they pursued open relationships, they struggled with transaction costs. The fixed interfaces of Japanese companies, however, had proven to be a competitive advantage, as their transactions could be completed much more readily.

The Internet revolution, which started in the 1990s, became the turning point, and the situation has changed completely. The transaction costs in the open business relationships decreased drastically. Many obstacles to transactions between the USA and China as well as the USA and India disappeared, and many

similar attempts occurred, as described in Chap. 1. Japanese companies were trapped in their past success and were not able to utilize the new technologies. Rather, they denied and rejected the essential changes necessary for the new global open economy before consideration and missed out on the wave of digitalization. Consequently, the “Lost Decades” of Japan, the stagnation era after the 1990s, started and continue to this day. Customs and tacit knowledge showed a crucial problem that the establishment of interfaces necessitate an enormous amount of time and cost because those are spontaneously generated in grass-roots style, not artificially controlled. It is impossible to wait a few years to establish one interface of tacit knowledge or to educate new employees about one interface in this fast-changing, global environment. Interfaces should be planned and managed artificially.

### **2.3.6 Trust**

Trust functions as fixed interfaces, but it is also difficult to manage.

Trust is more implicit than customs but also functions as interfaces based on a mutual tacit agreement. It obviously decreases transaction costs of authentication, accreditation, and monitoring (such as performance assessment). For example, if a business order is accepted only by a telephone call without much effort to exchange a contract, the transaction costs decreases. Trust can also adjust conflicts of profits in the short term from perspectives of a long term and enables handling uncertainties in the relationship flexibly. A breach of trust will collapse existing interfaces with not just the present transactor but as well as future transactors, the prospects, which will definitely increase the transaction costs in the long term. On the contrary, if both entities do not break their mutual trust, the transaction relationship will be further strengthened and be maintained continuously. When trust is established in communities such as regions and industrial clusters, it is called “social capital,” which functions as a strong and stable platform. In the USA, for example, Chinese, Koreans, and Indians have been establishing strong social capital, which has grown to supplement their adverse social situations.

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## **2.4 Examples of Transaction Interfaces in Markets**

The market is also a nexus of transaction interfaces.

Interfaces in an organization (company) have been discussed mainly in this chapter, but all those previous discussions regarding organizations can also be applied to the market. In fact, transaction interfaces in the market are easier to understand intuitively.

Besides proprietary interfaces owned by organizations, there are also an enormous number of interfaces shared publicly in markets and societies. If there are no rules of transactions in the market, everyone would argue and determine all the

interfaces at every transaction. Interfaces in the market and those in companies coexist, and they function integratively as a consistent collection of transaction interfaces as a whole.

(1) Trading rule

Trading rules of financial products are regulated by laws such as commercial law and the Securities Exchange Act; additionally, each security exchange market (private company) also has individual transaction rules. Besides trading rules and procedures of stocks, there are many rules regarding the listing of products (stocks) on the markets from the perspectives of social responsibility and investor protection, which include application processes and criteria of examination.

If a listed company does not comply with the rules, the security exchange market may delist it. As the laws of a society and the proprietary rules of private companies jointly form an aggregate of reliable transaction interfaces, consumers can execute transactions securely with minimum transaction costs.

A good practical example is a World Heritage shrine near our university that holds flea markets regularly in its large garden. Even the flea market in the shrine has rules of trading under which exhibitors apply for the registration, goods for sales are regulated, fees for transactions are charged, and so forth. Exhibitors comply with physical interfaces with next-door exhibitors to line up their goods. Needless to say, there are business laws and common sense in societies as a foundation of transaction interfaces.

(2) Specification of standardized product

When a product specification is standardized, such as a product that is regulated by the government and for which only cost and delivery time can be differentiated, the product is called a commodity. As standardization bodies such as International Organization for Standardization (ISO), American National Standards Institute (ANSI), and Deutsche Industrie Normenausschuss (DIS) determine specifications and certify products or suppliers when they comply with the specification, customers need not investigate the specifications during transactions. In addition, companies may set their own specification standards that are less flexible in terms of qualitative specifications but more competitive with cost and delivery time due to economies of scale by mass processing.

(3) Vocational license and skill certification

There are more than 4,000 licenses and qualifications in Japan, including the licenses of lawyer, accountant, medical doctor, financial planner, chef, pet trimmer, language proficiency test, mathematics proficiency test, Microsoft Office Specialist, and Oracle Certification. The licenses guarantee customers that the licensees have a certain level of capabilities and knowledge, and the transactions with them are supposed to be satisfactory. That is, the licenses and the qualifications function as transaction interfaces between the professionals and their clients. The interface omits activities in a transaction such as investigation of expected service quality, evaluation of their capability, and confirmation of their credibility, thus reducing the transaction costs.

#### (4) Telecommunication protocol

These are not interfaces for commercial exchanges but types (protocols, formats) of data, packets, and files that must be fixed for the transmission. Examples include TCP/IP,<sup>3</sup> PDF,<sup>4</sup> HTML,<sup>5</sup> CVS,<sup>6</sup> and SQL. The Internet is a nexus of interfaces by which an enormous volume of data can be transmitted every second. ISO, ITU, and others of international standard bodies have been established to set telecommunication standards, but there are also an increasing number of proprietary standards (de facto standards), such as Microsoft's own protocols, as a result of market competition.

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As described above, there is no essential difference of function between organizations and the market from the perspective of transaction. The only difference is who designs, develops, manages, maintains, and owns the interfaces.

In markets, governments and their international aggregates have authorities to determine, manage, and enforce interfaces. These days, however, private companies and NPOs are more active in standardizing products and technologies, and they are desperately competing for standardization in markets. As the great example of Microsoft showed, if a company acquires a proprietary standard, it is extremely valuable. Proprietary interfaces increasingly become standards as the result of market competition; it is so intense that product prices come down even to zero these days.

Interfaces in markets are likely to be called *standards*. In the next chapter, "Standard as Interface," the increasing value in marketing strategies will be discussed from the perspective of strategy.

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## 2.5 Layered Structure of Transaction Interface

It is significant to acknowledge and conceive the hierarchical structure of the interface.

As discussed thus far, various interfaces in organizations and the market are intertwined to establish aggregates of interfaces to complete transactions. If the existing layered structures are acknowledged, it is much easier to comprehend the deceptive complexity.

There exist two kinds of layered structures in the aggregates of transaction interfaces.

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<sup>3</sup> Transmission Control Protocol/Internet Protocol.

<sup>4</sup> Portable Document Format.

<sup>5</sup> HyperText Markup Language.

<sup>6</sup> Comma-separated values.



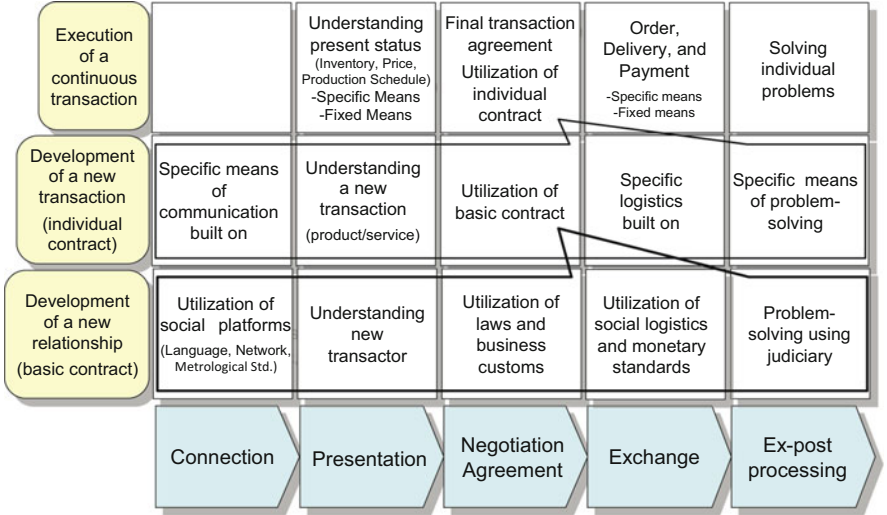
(1) Layered structure of ad hoc interfaces on fixed interfaces

Interfaces are classified into two categories: *fixed interfaces* and *ad hoc interfaces*. Without exception, those two function in integrative ways when a transaction is executed. Fixed interfaces form the foundation for processing basic activities in transactions, and ad hoc interfaces are built on the fixed interfaces to process details and exceptions ad hoc and flexibly. The reality, however, is that those are confusingly mixed, not structured systematically, frequently resulting in obstructing efficient transactions.

(2) Layered structure of general and specific fixed interfaces

Fixed interfaces are also decomposed into general interfaces and specific interfaces. As general interfaces are frequently used for general purposes, they are likely to be corporate-wide or social platforms. Specific interfaces are built on top of general interfaces for specific purposes. The reality is again that they are unstructured and confused. Especially in developing countries or companies, the infrastructures, the general interfaces, which will be described in the following, are not yet well established and become obstacles to economic growth. When interfaces are general and basic, the usage frequencies become higher. Specific interfaces should be built up on top of the general interfaces for specific purposes. In addition, ad hoc interfaces described in (1) are consolidated on those fixed interfaces to deal with any kind of transactions. Examples of the most general fixed interfaces include:

- (A) Laws: Laws are the minimum rules regulating how citizens behave in the society and the most basic interfaces with which all individual entities must comply. People can organize their social lives assuming that they are protected from homicides and robberies by the interfaces. As laws enforce people to honor contracts, they can conduct the business activities placing credit in contracts. Without laws, there must be conflicts, fights, and wars everywhere, which are the transaction element of *ex post processing* incurring a large amount of transaction costs. When those costs are eliminated, the economy grows. In contrast, in societies where corruption is widespread, transaction costs of *negotiation/agreement* and *exchange* (bribe cash delivery) are so high that development of the economy is restricted.
- (B) Natural languages: English, French, German, Japanese, Chinese, and so forth are shared interfaces. Transactions across borders with non-English-speaking companies are very costly. However, once people become used to the interface, the transaction costs are no longer incurred. Computer languages also function similarly.
- (C) Customs/habits: Existing business customs should not be neglected as interfaces. Transactions across borders necessitate learning of customs in different business environments or assistance from third persons who play the roles of the interfaces.
- (D) Problem solvers: Normally, the court that has jurisdiction over the location is designated in advance. As trials require costs and time, there is an option to ask a third person for problem solving privately. In societies that are not ruled by law, fixers and masterminds play active roles.



**Fig. 2.1** Layered structure of transaction contract

- (E) Communication infrastructures: The postal system, telephone, fax, mobile phones, the Internet, and so forth are established as widespread interfaces to support communication with low transaction costs.
- (F) Payment infrastructures: Bank transfers, checks, credit cards, online payment, and so forth are established as widespread interfaces to support payments with low transaction costs. Standardization of currency must be established first.
- (G) Transportation infrastructures: Public transportation such as railways, high-speed railways, aviation, highways and subways, sharing systems of bicycles and automobiles, and port facilities should be established with high-level security, reliability, and safety.

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On the socially available interfaces above, various proprietary interfaces (both fixed and ad hoc) have been built up accumulatively.

A layered structure of transaction contracts is explained below according to Fig. 2.1 as an example of the layered structure of general and specific interfaces. Although three layered levels are shown for a simple illustrative purpose, the number varies depending on the case. In business transactions, for example, companies conclude basic contracts first in which the most basic transaction interfaces, such as terminologies, definitions, applicable scopes, and durations, and basic transaction conditions are determined, avoiding transaction costs for repeated discussions related to those basic issues.

In the second layer, individual contracts are signed for such as individual products. Specifications and qualities, prices, deliveries, conditions for payment, conditions for returning, and so forth are agreed and fixed.

In the third layer, quotations, purchase orders, acceptances of order, certifications of inspection, invoices, receipts, and so forth, which contain specific product names, model numbers, prices, quantities, and delivery dates, are exchanged. Final agreements on transaction conditions at the moment of the transaction (e.g., the most recent inventory availability, production schedules, and the present prices) are described in those documents.

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As described above, interfaces are built up accumulatively from basic ones to specific and individual ones to shape the layered structure. The ROI of basic layers is improved due to their frequent use. Socially fixed and standardized interfaces contribute substantially to nations' competitiveness. The same holds true for business organizations. Companies that can utilize the layered structures enjoy higher efficiency and effectiveness. The ROI of an interface strongly correlates to its standardization (i.e., the increases of users in number), and this is going to be a main subject of the next chapter.

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