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Business Strategy for Oracle Applications An Integrated Application Package

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Abstract:

In the autumn of 1995, Nippon Steel's Electronics and Information Systems Division began sales of Oracle Applications, an integrated application package prepared by Oracle Corp., and launched a new business constructing consultation systems. As the future business direction of its industrial systems business, the Company is aiming to extend information systems, based around corporations' key inhouse systems, in conformity with the integration of business processes inside and outside corporations. Against this background, integrated application packages with sophisticated business models, a good probability of future development, and advanced computer technology are attracting widespread attention because of growing demand in response to developments in business process re-engineering and information computerization technology. Focusing on such integrated application packages, the Division will provide strategic information systems by reinforcing key functions and developing solutions for various businesses and business conditions.

1. Introduction

Since 1986, the Electronics and Information Systems (EIS) Division of Nippon Steel Corporation has offered a wide range of services in the field of electronics and information systems, and has established the foundations of its system solution business.

Drawing on Nippon Steel's manufacturing know-how and utilizing the engineering base it established through its own systems development, the Division provides industrial systems solutions centered on production management systems and distribution control systems. The scale of the target systems has expanded from single-factory systems, to company-wide systems and integrated solutions encompassing overseas applications. The extremely rapid progress of information technology in recent years and diversification of customer needs have created new business opportunities.

Over many years, Nippon Steel has established a strategic partnership with Oracle Corp. of the United States. With an eye to expanding its industrial system solutions, in the autumn of last year, Nippon Steel began sales of Oracle Applications, an integrated application package prepared by Oracle, and launched a new consultation systems construction business. Oracle Applications is a package composed of sub-modules and an integrated database indispensable for core company business.

This paper will specify business targets and types of solutions in terms of the information strategy and solution of corporation, a prerequisite for the development of integrated application package solutions. In addition, this paper will describe the background and necessary conditions for integrated application packages, summarize the characteristics of Oracle Applications, and outline steps and development toward industrial solutions.

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2. The Future of Industrial Systems

This chapter will discuss the future of corporate computerization from the viewpoint of systematization, and will clarify the authors' business targets. In addition, we will also examine the future of computerization solutions from the viewpoint of corporate strategy-based information systems, and specify types of solutions.

2.1 The future of corporate computerization

The shared future options of corporate computerization can be summarized under the following three headings.

2.1.1 Integration of target business (business processes)

Conventionally, systematization centered around core businesses. Later, however, the range of businesses requiring inhouse computerization to integrate design, manufacture, and sales grew. A typical system developed was CIM (computer-integrated manufacturing).

At present, many companies are trying to reform their business systems and are actively integrating various internal or external business processes, using such systems as CALS (commerce at light speed) and EC (electronic commerce).

That is, regular businesses are becoming integrated, and based on this, trends favor the integration of non-regular businesses, strategic cooperation between different business categories, and company alliances.

2.1.2 Decentralization of forms of processing and systems

Forms of processing have shifted from batch-type to dialogue-type (on-line type). Front-end processing has shifted from a CUI (character- user interface) to GUI (graphical-user interface) processing. Mainstream systems have moved from over-centralized to decentralized processing using networks or groupware, as typified by client/server processing. Based on these forms, in the future, processing will shift to more portable forms such as mobile computing and the Internet.

2.1.3 Diversification of computerization technology

Data storage has shifted from file systems-based systems to database systems such as DBMS (database management system) and, in particular, RDB (relational databases). Hardware has shifted from mainly mainframes or office computers to downsized hardware such as UNIX (which refers to a TSS-type multiprocessing OS) and PC servers. In addition, companies are utilizing data warehouses for decision-making support, mobile computing for sales support, intranet for improved white-collar productivity, groupware, and the Internet for external advanced information services.

Constructing a system based on the future of information strategy of corporation requires an information system with an integrated main business system supported by inhouse regular business. Moreover, this system must reflect the integration of internal and external business processes. In addition, corporate information systems must be strategic weapons able to respond to the speed of reform of business processes. **Fig. 1** shows the future directions of company computerization.

Users now have great expectations of SI or solution providers who provide such integrated company information systems.

2.2 Direction of information strategy

The following are computerization solutions for the company management environment:

2.2.1 Flexible response to changes in the external environment

The solutions in this category are mainly information-oriented and support decision-making. For example, the solutions include data warehouses that analyze enormous volumes of data for new

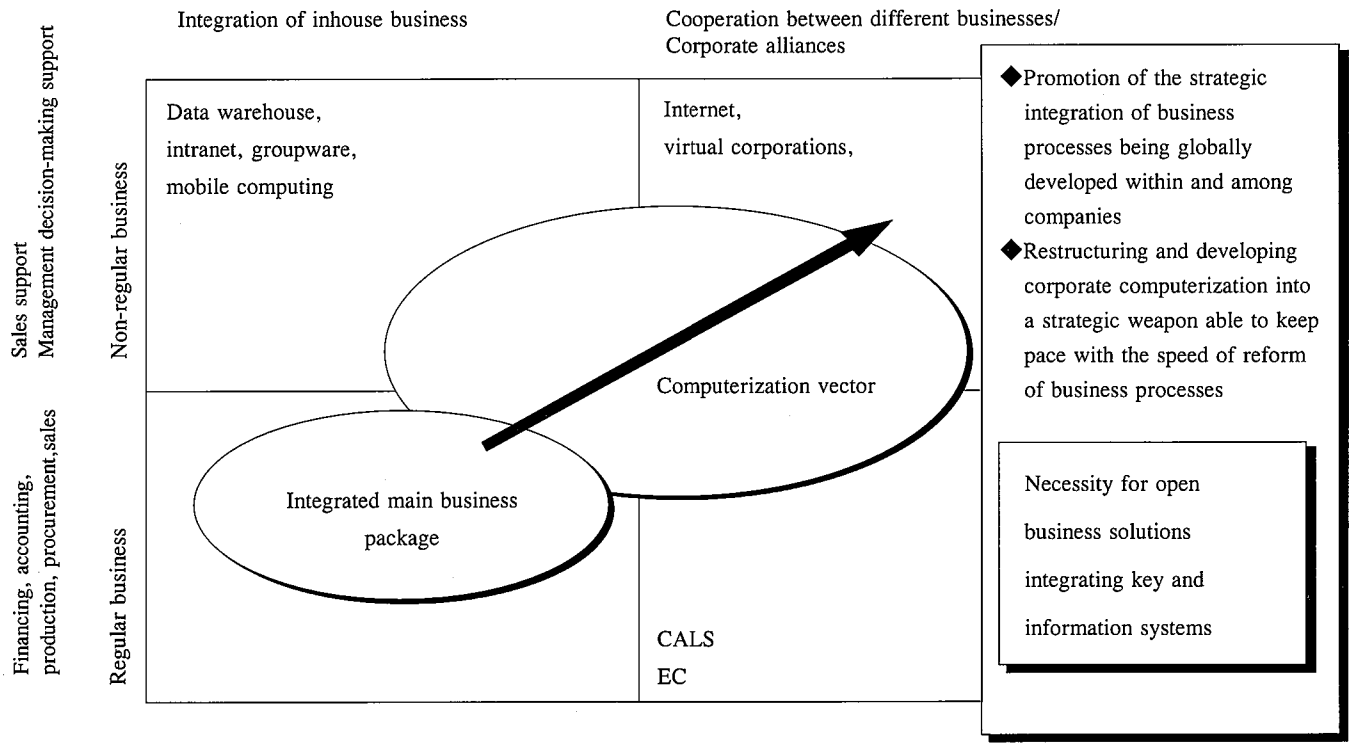

Fig. 1 Direction of corporate computerization

business opportunities or improving services, and scheduling engines for quickly reviewing plans and keeping up with market trends. Tools based on computerization technology can be used, but without a thorough grounding in their use, such solutions will surely result in failure. It is therefore necessary to clarify introduction objectives or targets based on business goals. American companies whose central information systems are now complete invest aggressively in such computerization.

2.2.2 Linking multiple business processes

Linking multiple business processes means linking up information among individual businesses. An example of this is the construction of an integrated database. However, it is necessary to organize relationships through an integrated wide-area business model rather than just haphazardly linking information. Another solution is to use an organically connected information network within company organizations. Multiple business process linkage includes workflow management for salespersons or sales support systems based on mobile computing.

2.2.3 Improvement and reorganization of business channels

This includes realizing the optimum linkage of information from the viewpoint of the overall business model of a company. Good examples are the realization of EC based on the Internet or EDI (electronic data interchange), and the construction of global supply chains. Such solutions use computerization technology to realize ECR (efficient consumer response), QR (quick response), or BPR (business process re-engineering), and many technical factors are involved.

When constructing an information system, objective and method should not be reversed. The base or tool to achieve a fixed business goal is the information system. In other words, the introduction of a computer or package is not the objective. The achievement of the management goal is the final objective. Simply providing information technology without understanding the client's strategy clearly invites being left behind in the market.

Fig. 2 shows an example in which the relation between general key words and a company's business processes provide a computerization solution. By clarifying the positions of a wide range of business processes and individual key words, it is possible to realize computerization solutions that meet user needs.

3. Outline of Integrated Application Package Solutions

3.1 Structure of an integrated application package

An integrated application package is the general term for a package with key function modules, an integrated database, and the ability to realize a standard business model. Integrated application packages are essential for corporations. In terms of functions, package modules include accounting, production control, order reception and purchase management, inventory control, and personnel management modules for the company's key system, and a standard business model for the package itself. The package also has an integrated database for the integration of data, which is a departure from conventional packages based on single functions (see **Fig. 3**).

3.2 History of integrated application packages

From the viewpoints of platform, development methodology, and target business, this section outlines the history of the development of integrated application packages.

3.2.1 Platform

Originally, mainframes were used as the platform. Many of the integrated application packages now on the market were originally developed on mainframes. Structurally, a platform was

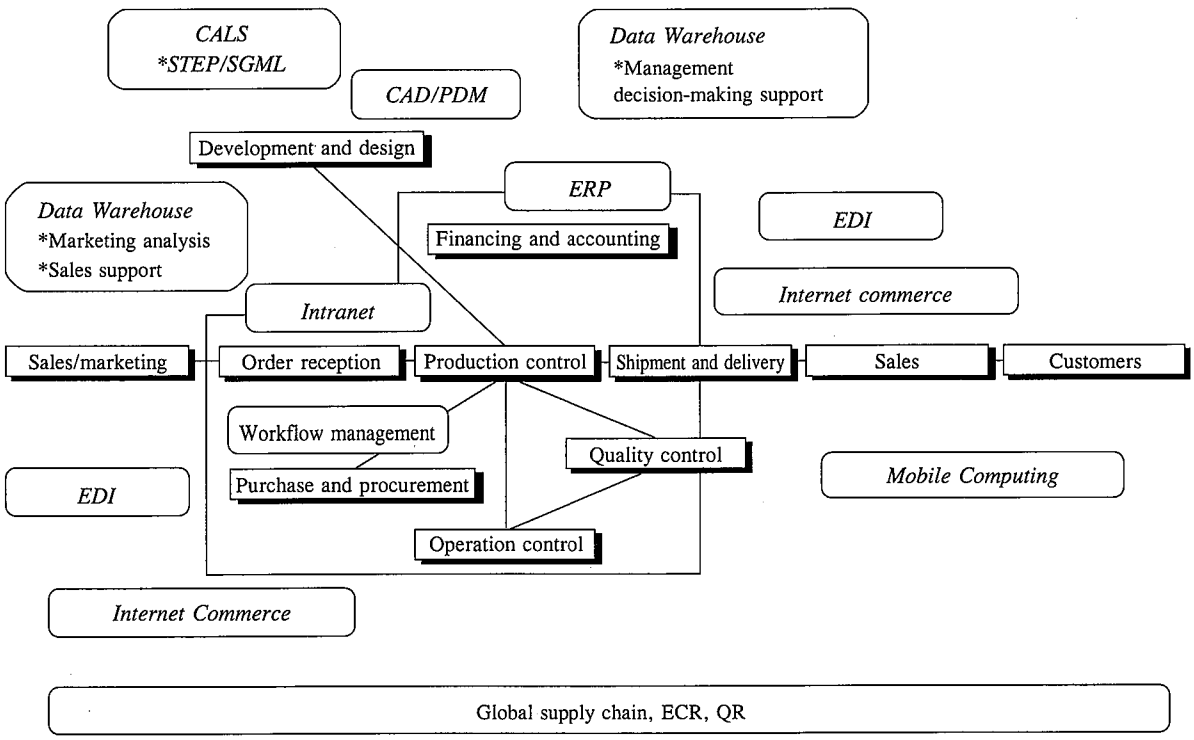

Fig. 2 Company business processes and core technology for information computerization

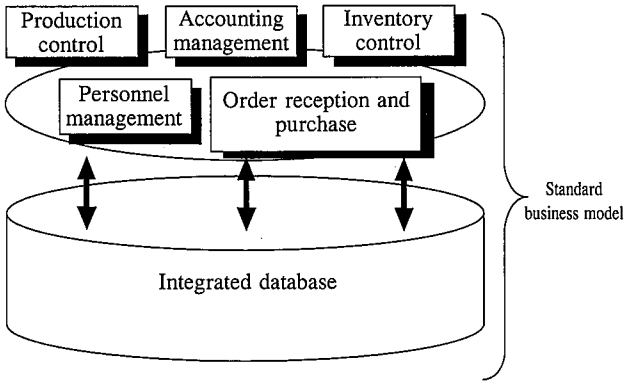

Fig. 3 Integrated application package concept

constructed around a file system, and thus had a comparatively complicated structure.

As hardware technology progressed, minicomputers or office computers became the next platform. Since many of the packages in this period were realized by combining modules with single functions, such functions as data integration and data normalization were poor. Later, systems were downsized because of the trend toward open systems.

Current integrated application packages are mainly client/server type packages. UNIX or Windows NT are used as the server and a PC as the client. The most common type of data storage is RDB, and linkage with other tools or packages is also possible.

3.2.2 Development methodology

Development methodology is divided into structuralization and overall system construction. Structuralization has shifted from process-oriented structures to data-oriented analysis (DOA), and to object-oriented structures. Overall system construction has changed from waterfall-type construction to RAD- (rapid application development) type construction. Integrated application packages, which have an integrated database and modules based on data-oriented designs, are mostly developed in 4GL (4th-generation language). Moreover, thanks to parameter setting and the construction of a 4GL prototype, an operating image can now be realized quickly, and RAD-type development of overall systems is also possible.

3.2.3 Target business

Conventionally, single-function packages modified for individual businesses were used. Later, because of the need to link businesses and for business integration, an accounting management package and a production control package appeared. Integrated application packages integrate key business and offer more advanced merger between businesses. The integrated application package allows linkage with information systems, and the merger of such inter-corporate business processes as CALS, EC, and global supply chains.

3.3 Demand for integrated application packages

The following describes how integrated application packages became popular.

3.3.1 BPR, global supply chains, and ERP

Because of demand for the implementation of BPR or construction of global supply chains, customers' computerization strategies are shifting from conventional zero-base or custom-built-type development to package integration for business reform. In other words, customers are seeking to implement business reform using the standard business model offered by the integrated application package rather than just relying on system construction. This is because the review of inflexible legacy systems is now necessary, not as part of a system, but as a corporate strategy. The concept at the root of BPR is the strategic combination of information and information technology with business. In other words, the key difference here from conventional theories or concepts is the clarification of corporate or business goals, and the linkage between business models and information technology. One concrete method for the realization of BPR or a global supply chain is the integrated application package.

Moreover, a concept employed by the integrated application package is ERP (enterprise resource planning). ERP is defined differently depending on one's position or viewpoint. However, to summarize briefly, ERP integrates modules packaged by conventional MRP (material requirement planning) with MRPII-type modules, and regards all resources (personnel, materials, funds, and information) as optimization targets. To realize ERP, computerization technology, which has made remarkable strides recently, is essential. ERP will provide the information base for the "resource optimization" required by companies moving into the 21st century.

3.3.2 Responding to rapid change in computerization technology

Conventional system development cannot keep pace with the changes in the business environment, and systems are already obsolete at their point of construction. The aims of systematization can be roughly classified as remodelling/new system construction in response to changes in business processes, and improving services by new technology. In both cases, changing the existing system presents technical limitations to systematization. If systematization is implemented through individual functions, it becomes difficult to integrate these functions at the final stage.

To solve this problem, there is a strong trend to construct information infrastructure on the basis of various functions and to embrace the advanced information technology of the integrated application package.

3.3.3 Developing large-scale business models and improving functions

Compared with Europe and the United States, leading Japanese corporations do not employ packages aggressively in their key systems. This is because the business models of the conventional packages are generally designed mainly for medium- and small-sized companies, and because process models are not integrated but organized to satisfy outside specifications.

The integrated application packages now attracting attention are adapted to the business models of major corporations. These can meet the functional requirements of Japanese business practices and offer full functions.

3.4 Conditions necessary for integrated application packages

The following three headings summarize the conditions required of integrated application packages.

3.4.1 Sophisticated business model (Business process/data model)

Sophisticated business models incorporate two models. One horizontally integrates all the business functions within the company, while the other is designed to meet special requirements based on business category and conditions.

A sophisticated business model supported global business

development and such system construction as supply chains.

3.4.2 DOA/RAD applicability

DOA and RAD applicability is essential for the early realization of high-quality systems. Although ideally, data models should search and legitimize all data, this is physically impossible because of the enormous amounts of data involved. However, by arranging data according to the data model of the integrated application package itself, it is possible to produce a data design based on a business process model. In addition, by comparing a standard business model of the integrated application package to an actual business model, it is possible to evaluate highly unified business processes. Based on the difference between the existing business process and the package's standard business process, it is possible to determine whether a process will be useful in differentiating a company from its competitors or whether a process can be rationalized.

For this, a prototype system is constructed using RAD and is evaluated by physically verifying it with a user at an early stage. RAD applicability not only improves system accuracy but also offers great advantages in project management, such as a greater sense of participation by users.

In the future, object-oriented packages will be increasingly popular.

3.4.3 Advanced computerization technology

It is also important for a system to keep up with continuously advancing information computerization technology. No matter how many functions and sophisticated business models a system may have, if its structure is fixed, it will be unable to adapt to advances in computerization technology and will eventually fall by the wayside. The ability of a system to adapt to advances in informization largely depends on the structure of the integrated application package. The package should have excellent openness as a system base. This openness should extend not only to the operational environment, but also to ease of linkage with other vendors' packages.

4. Characteristics of Oracle Applications

When selecting an integrated application package, the authors chose Oracle Applications because of its functions and easy expansibility, its advanced information computerization, and its established development and introduction methodology.

This chapter summarizes the characteristics of Oracle Applications.

4.1 Outline of Oracle Applications

Oracle Applications is an integrated application package developed by Oracle Corp. of the United States. Oracle Applications is used by 2,354 companies in approximately 60 countries around the world (1995 figures). Oracle Corp's main product has basically been RDBMS and the Company is proud of its dominance of the RDBMS market in the United States and elsewhere. Oracle Corp. has devised a strategy to focus on Oracle Applications-centered business while maintaining its vision in its core technologies.

Oracle Applications consists of submodules and an integrated database to support corporations' essential core business. The package is constructed by productive development tools provided by Oracle Corp.

The target users of this package are medium- and large-sized companies covering a wide range of businesses and conditions. Oracle Applications has positive linkage with other vendors' software and supports Oracle-centered package integration.

4.2 Functional characteristics

This package horizontally integrates all companies' essential basic business, and its application to information systems is progressing. In addition, it allows the construction of sophisticated business models for different manufacturing categories and conditions.

Oracle's functions can be roughly classified as follows:

4.2.1 Integrated accounting

This function consists of management of the general ledger, preparation of financial statements, consolidated and other general accounting, credit sales management, management of accounts payable, and fixed assets management.

4.2.2 Ordering and inventory control

This function consists of ordering and purchasing control (where orders are placed and accepted) and (company-wide) inventory control.

4.2.3 Production control

This function is for various types of manufacturing. At present, assembly-oriented manufacturing is used as the model but in the future, the function will be expanded to project-type production control and applied to process-oriented manufacturing through linkage with other packages.

4.2.4 Personnel and wages

This function centers on organization- and employee-focused personnel management, and various rule-based salary and wages management.

4.2.5 Information system

This is related to the development of an information system function centered around basic business functions, described individually below.

(1) Sales support

This function consists of customer management, incoming order management support, and service record management. Mobile data access is realized through mobile computing. This function predicts incoming ordering based on the progress of business negotiations and manages and analyzes the materials needed for sales promotion.

(2) Internet commerce

This function handles non-regular business transactions with individual customers or traders through the Internet and realizes full-scale Internet business, enabling the development of global business.

(3) EDI

This function, which flexibly integrates routine business transactions by module, conforms to such industry standards as EDIFACT (an international standard in EDI-based trading).

Functions (1) and (2) above support the full realization of EC (electronic commerce).

(4) Data warehouse linkage

The integration of RDB and OLAP (online analytical process) engines enables seamless data warehouse access. Efforts are being made to realize strong drilldown by metadata mapping. Using various kinds of analysis tools at the front end allows multidimensional analysis of sales information and financial data.

(5) Workflow

This function strongly supports improvement in business processes by flexibly defining, managing, and changing those processes, and facilitates the identification of bottlenecks based on records of each business process.

4.3 Structural characteristics

Since the package itself is constructed with standard tools, this package is more open than other integrated application packages. The package realizes various business models by setting parameters. Customized solutions are provided for each level.

Oracle Corp. itself uses advanced computerization technology to keep its technologies up to date.

The following describes the structural characteristics of the Oracles Application package.

4.3.1 Multiplatform

The Oracles Application package can be applied to multiplatforms. Plans are under way for its application not only to various manufacturers' UNIX servers but also to Windows NT servers. The package can also be applied to Windows 3.1 and Windows 95 clients. Free data processing can be realized through linkage to various existing tools (worksheet computation, RAD, middleware).

4.3.2 Client/server type

The Oracles Application client/server type has an architecture of three logical and two physical tiers. The three logical tiers consist of a presentation layer, an application logic layer, and a data management layer. Two physical layers means that the package is placed on both a client and a server.

A characteristic of this client/server type is that since the client has an application logic layer, processing can be completed at the client end at high speed without requiring communication, thus reducing the volume of communication between the client and server (see **Fig. 4**).

4.3.3 Flexible realization of user interface

Conventionally, the addition, deletion, and rearrangement of items on the screen has required rebuilding the source on the presentation layer. The Oracle Applications package, however, realizes this by end-user mouse operation. Moreover, the altered screen definition can be registered and used, making it possible to define and use the screen display for each user and business.

4.3.4 Code systems specific to individual companies realized without a program

In the past, realizing a user's own code system has required a change of data model or business. Oracle Applications, however, offers a flex field function to flexibly realize code systems without going to these lengths.

(1) Key flex field

This feature makes it possible to segmentize a company's own code systems, such as its account title codes or parts numbers, by key, and to define them without programming. Analysis and aggregation by segment are simple, and after version upgrading this segmentation can be maintained.

(2) Additional information flex field

This package has the flexibility to meet user needs. The code systems needed for various types of business and conditions can be added without programming. After version upgrading, this addition can be maintained.

4.3.5 Interface table for flexible linkage

The Oracles Application Package has a predefined interface table to guarantee data compatibility with existing systems and third-party software, and to realize flexible integration (see **Fig. 5**).

4.4 Engineering characteristics

The Oracle Applications packages comes with its own methodology, built on the know-how of Oracle's consultants, to support flexible and speedy introduction. DOA/RAD-based introduction is possible.

The introduction steps are as follows:

(1) Introduction strategy

Create an implementation plan reflecting in-process business and technology.

(2) Business analysis

Define business and technology conditions.

(3) Solution designing

Prepare and construct prototypes of optimal business process solutions suitable for future business conditions.

(4) Development/user manual preparation

Develop, test, and verify the overall system. Prepare customized specification documents to support current business conditions.

(5) Moving

Move organizations, systems, and employees to a new environment.

(6) Operation

Monitor and improve the system in operation.

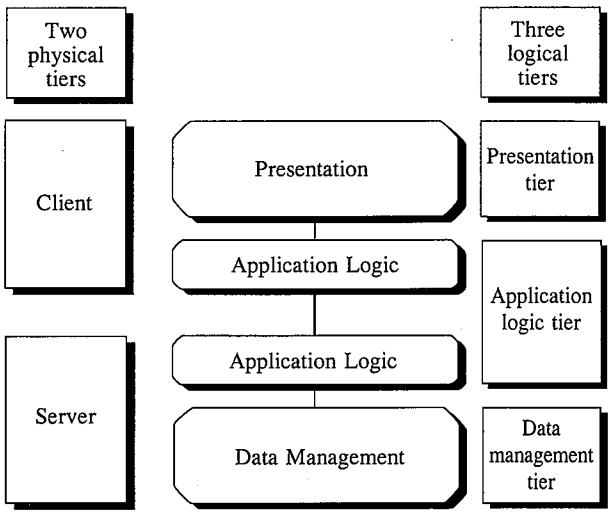

Fig. 4 Three logical and two physical tiers

5. Efforts toward Industrial Solutions and Future Development

5.1 Key factors in industrial solutions

Nippon Steel's Electronics and Information Systems Division seeks to set corporations apart from their competitors by providing the know-how developed by Nippon Steel, itself a user of large-scale systems. The Division's successes cover a wide range of industrial fields such as assembling and processing, food, chemicals, and semiconductors. In system construction, the

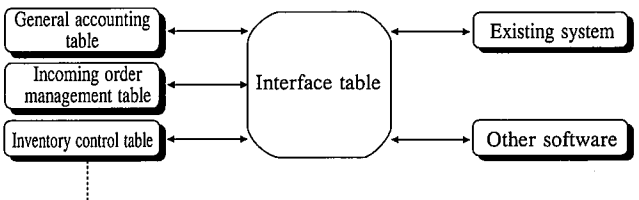

Fig. 5 Interface table concept

Division provides not only conventional zero base/customized systems, but also integrated solutions that flexibly combine packages. It also provides not only packages and systems but a wide range of services, such as consultation when planning system strategy, spanning the overall system lifecycle.

Based on these factors, the key points relating to industrial solutions based on Oracle Applications can be summarized in the following three points.

5.1.1 Knowledge of business categories and conditions

Because integrated application packages are applied to various business categories and conditions, it is very important to understand target customers' businesses and implementation conditions. **Table 1** outlines typical business environments, major tasks by business category, and computerization strategies.

Actual computerization strategies vary depending on whether the business environment and major tasks are production-oriented or sales-oriented. Moreover, strategies differ depending on the merchandise produced and sold, that is, whether the products are convenience products, shopping products, or specialty products. As some types of businesses are active overseas, the Division provides solutions that take account of future overseas development.

5.1.2 Project management and system engineering

When introducing an integrated application package, selection of an optimal partner is important.

Nippon Steel's Electronics and Information Systems Division aims to construct systems quickly with minimum risk and at the lowest cost, using project management ability based on numerous large-scale projects.

5.1.3 Package solutions

For rapid low-cost, low-risk system development, packages are essential. The Division seeks to achieve this system development based on the package integration know-how accumulated to date, and by using Oracle Applications as the core of its integrated application package solution (see **Table 1**).

Because of the above three key factors, the authors selected Oracle Applications as the basis for a practical integrated application solution.

The reasons we selected Oracle Applications are summarized below:

(1) Functions, easy expansibility

The Oracles Application package integrates key business/information functions and offers easy expansibility to keep up with progress in business processes. Moreover, because of its dominance in the RDBMS market, the package can be easily linked with tools and packages provided by peripheral third-party vendors, permitting the construction of an optimum solution.

(2) Information computerization technology that stays up to date

The Oracles Application package incorporates progress made in RDBMS and in information technologies such as multimedia and the Internet. This package can be used as the information base for advanced computerization technology.

Table 1 Business characteristics and computerization strategies by business category

Business category	Business environment and major issues	Computerization strategy
Pharmaceuticals	◆ Reinforcement of corporate structure by M&A ◆ Reinforcement and effective use of MR functions ◆ Thorough and early dissemination of clinical examples and cases of side-effects ◆ Company-wide promotion of successful cases by region ◆ Reinforcement and thorough implementation of production cost control	● Integration of key business systems (between acquired companies, between manufacturer and wholesaler) ● Introduction of strategic sales support system ● Reinforcement of linkage with external databases ● Introduction of process scheduling system ● Acquisition of information on quality and cost
Food and beverages	◆ Diversification of consumer preferences ◆ Increase in convenience stores' (CVS) sales and influence ◆ Quick turnover and greater number of products ◆ Reinforcement of price competitiveness (for exports) ◆ Reduction of total lead time ◆ Reduction of inventory and levelling of production	● Demand-driven production/supply system ● Integration of sales system with production and distribution systems ● Sharing of sales data by retail stores and CVSs ● Introduction of process scheduling system ● Management of information on quality
Automobile and industrial machinery	◆ Establishment of overseas production bases ◆ Increase in rates of local procurement and production ◆ Reduction in the number of parts and their cost ◆ Shorten design and development cycle	● Integration of production line, production planning and procurement systems ● Integration with overseas plant systems ● Integration of sales, design, and production systems ●Reinforcement of linkage with parts manufacturing systems
Machine tools	◆ Meet demand for mass customization + individual specifications ◆ Standardization and commonality of parts and units ◆ Reduction of production costs ◆ Shorten delivery times	● Individual order-type integrated production and sales system ● PDM and integrated product information management ● Individual cost control ● Closer linkage with parts and unit manufacturers' systems
Semiconductors and electronic parts	◆ Establishment of overseas production bases ◆ Shorten construction periods for new plants ◆ Increased scale of business investment ◆ Promotion of intercompany cooperation within the industry	● Early return on investment by short-term development of new plant's key business system ● Integration with overseas plant systems ● Linkage and connection with vendors' and wholesalers'systems ● Process scheduling system
Distribution	◆ Acquisition of initiative among total supply chains ◆ Drastic reduction of distribution cost ◆ Concentration and upscaling of distribution bases ◆ Joint delivery	● Integration of operation and sales and distribution systems ● Linkage of sales analysis with incoming/outgoing order system ● Integration with customer (vendor, wholesaler) systems ● Establishment of distribution bases and improvement of productivity

(3) Well-established development and introduction methodology

Linking the Oracle Applications introduction methodology to authors' know-how ensures reliable introduction. Strong development and introduction methodologies form an essential base for the efficient introduction of the package.

5.2 Future development of industrial solutions

The following outlines the future development of industrial solutions based on Oracle Applications.

5.2.1 Development of functions for all types of business

The developers of Oracle Applications aim to provide functions for all types of businesses. The Division also seeks specific functions from Oracle Corp. While the functions of the package are expanded, the quality of the total solution is being improved by introducing packages from peripheral third-party vendors.

5.2.2 Development tailored to business categories and conditions

Oracle developers seek solutions that incorporate functions specific to segments of each business category. In this vertical development approach, circumstances specific to each type of business receive careful consideration. Currently, the Division conducts consultation and implementation that reflect the different characteristics of each industry, especially in industries where the Division already has considerable experience.

5.2.3 Development of information functions

Utilizing the lead developed by Oracle Corp, the Division seeks strategic information system solutions linked closely to key business functions. Information solutions are developed as tools, though room remains for strong promotion in their application and strategic implementation. By development of information functions, the Division seeks to set itself apart from competitors.

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