

## 물류정보시스템 통합에 관한 연구 : 한국우정사업본부의 사례를 중심으로

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### A Study on Logistics Information System Integration: in case of Korea Post

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#### 요 약

본 연구는 한국우정의 우편물류통합정보시스템(PostNet)의 구축 사례를 통하여 정보시스템 통합의 단계별 추진과정과 성공적인 실행동인을 살펴보고자 하는데 그 목적이 있다. PostNet은 조직상의 통합(조직구조 개편), 전략적 통합(업무처리절차 재설계), 기술적 통합(데이터통합, 어플리케이션통합, 통합플랫폼 구축)을 상황적으로 고려하여 정보시스템 통합을 수행하였다. 또한 통합과정에서 세 가지 측면의 통합을 목적에 맞게 연계되도록 구현하였다. PostNet은 기존에 물리적 통합 및 하드웨어 통합의 단계에 머물러 있던 정보시스템 통합의 수준을 경영 목표, 운영 목표와 일치시키도록 진일보시켰다는데 큰 의의가 있다. 한국우정은 물류산업 내에서 최대의 물류망, 조직, 서비스를 보유하고 있다. 따라서 본 논문의 결과는 향후 정보시스템 통합의 이론적 근거의 틀을 제시할 뿐 아니라 특히 물류시스템 통합에 대한 가이드라인으로 활용될 수 있을 것이다.

#### Abstract

In this paper, we analyze process of implementing and successful enabler of Postal Logistics Integrated Information Systems(PostNet) through a case study on Korea Post. PostNet was integrated by considering contingently organizational integration(organizational structure redesign), strategical integration(business process reengineering), and technical integration(data integration, application integration, and integrated platform implementation). And also integration was implemented for supporting three aspects. PostNet has implication for advanced integration with business mission and operational efficiency by comparing integration with physical level and hardware level. Korea Post has the biggest logistics network, organization, and service in logistics industry area. The results of this paper will suggest theoretical framework for the future information system integration, and will be utilized as a practical guideline for the information system integration.

▶ Keyword : Information System Integration, Logistics Information Systems, Enterprise Application Integration(EAI), Business Process Reengineering

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## I. Introduction

According to the recent literature about management of information system, the integration of heterogeneous information systems or distributed information system becomes hot issue[1, 2, 14, 16, 30] Also, the information system implementation actively driven since 1960s has been suffered to manage application and data because there are various kinds of information systems within an enterprise.

Although the performance and effectiveness of Information systems in government and private sector is due to various factors, especially organizational factors[11], Many Organizations have been interested in the integration of information systems since 1990s, and integration operation is quantitatively fast growing.

Integration of information systems needs something more than process to investigate and aggregate legacy systems in general[12, 26]. Most companies focus on only the integration of application even though the integration of application and the integration of business process are formed by interrelation [6, 8, 9]. Hence, the integration between heterogeneous systems is generally composed of messaging integration form. However, we need the integration in terms of process to accomplish actual integration[13, 16, 18, 24].

In this paper, we investigate practical methodology of the information system integration through the in-depth analysis about implementation case on PostNet(PostNet is the brand name of logistics integrated information systems of Korea Post). This can be utilized to verify the empirical data for theoretical modeling about the future information system integration.

## II. Theoretical background

### 2.1 The concept of IT Integration

In Nolan's Stage Model[22, 23], integration is a key issue in the stages model and integration involves the use of IT to support business processes and the use of IT to link business processes.

Today, integration of the information system and information technology is a commonly used term that has become synonymous with a practical goal of greater efficiency, effectiveness and competitiveness in organizations.

Dictionaries of computing terms define 'integration' as "the ability of computer hardware or software systems to work with previously incompatible systems". But, earlier research indicates that the term of integration is defined a complex construct in aspects of integration domains.

Throughout a comprehensive review of the literatures in area of IS, technology, operations and production management, organization and system theory, Wainwright and Waring[27] suggested four distinct areas comprising: technical, systems, strategic and organization domains.

In technical perspectives, integration is seen as a goal to make complex software and hardware artefacts communicated utilizing appropriate protocols, conventions and technologies. This can be at the level of basic signal and data message content as well as the communication of shared semantic meaning through representation in database and IS application systems.

In systems perspectives, integration is defined as 'the optimization over time, of all components comprising an organizational system that generates a measurable output. These include all fixed and tangible assets, people, money, information, technology and energy.

Many IS academics[3, 4, 5, 28] argue that business and organizational strategy must be fully integrated with IT/IS strategy. for examples, ERP systems contains sets of 'best practice' that had verified in organization. And e-business is seen as a strategy for addressing competitiveness issues concerned with globalization, partnering and managing collaborative networks of suppliers and customers[25]. Therefore 'integration' is a strategic issue and consequently any definition should have a strategic components.

In organization perspectives, integration is a highly complex process with a number of variables. Organizational integration involves the integration of people, ideas, decision making process.

Also, technical perspectives separates various integration types as a data integration, physical integration which is included server, network, data center, etc. Data integration can be defined as the standardization of data definitions and structures through the use of a common conceptual schema across a collection of data sources [10, 15].

Even though data integration is such a complex task, organizations successfully tackling this issue have derived immense benefits from it[21]. Integrated data will be consistent and logically compatible in different systems or databases, and can use across time and users[17].

Goodhue et al.[7] defined data integration as "the use of

common field definitions and codes across different parts of an organization". According to Goodhue, et al. (7), data integration will increase along one or both of two dimensions: (1) the number of fields with common definitions and codes, or (2) the number of systems or databases adhering to these standards. Data integration is an example of a highly formalized language for describing the events occurring in an organization's domain.

In this paper, we defined 'integration' as a rationalization process of three domains (strategic, technical(system), organization) for a practical goal of greater efficiency, effectiveness and competitiveness in organizations.

## 2.2 The domains of IT integration

The Gartner Group defines three types of consolidation efforts: physical consolidation, logical consolidation and rationalization. Physical consolidation involves consolidating data centers and moving servers to fewer physical locations. Logical consolidation involves implementing standards and Best Practices across IT resources, improving IT staff productivity and reducing TCO by allowing the staff to manage the environment more efficiently and more effectively. Rationalization involves the deployment of multiple applications on fewer, larger servers and in fewer instances of the operating system (OS). Rationalization is the riskiest form of server consolidation, it offers the biggest TCO reduction and return on investment (ROI).

In technical report of hardware vendors, various integration type is defined as Centralization, Data/Storage Consolidation, Physical Consolidation, Application Consolidation. Centralization is a moving distributed servers into centralized data centers. Data/Storage Consolidation is a consolidating data onto large, centralized databases and storage devices. Physical Consolidation is consolidating servers that run the same operating system and application onto larger systems. And, Application Consolidation is a consolidating diverse applications and operating systems onto large, partitioned servers or mainframes.

In addition to the categorization of integration approaches based on a market segmentation of tools and technologies for application integration, There are probably three different forms of enterprise application integration: First, integration between different systems supporting different functional areas of a business. We refer to this as horizontal intra-organizational integration. A typical example of horizontal integration is Supply Chain Management, in which an organization tries to optimize the complete set of activities

of order entry, purchasing, production, shipment etc. in order to minimize the lead-time and costs for production, and at the same time maximize value for the customer.

Second, integration between systems on different control and managerial levels of an organization. We refer to this as vertical intra-organizational integration. Vertical intra-organizational integration is aimed to integrate systems implemented at different administrative levels of an organization. Though it is not uncommon to incorporate the functionality at different levels of an operational system into a single application, the normal is to see different systems implemented to address business functions at different management levels. As an example, a typical function in any company is "production". In manufacturing industry this function may, at the lowest level, be controlled by process control systems and computerized NC machinery using proprietary formats of data and messages

Third, between systems of different organizations. We refer to this as inter-organizational integration. this case is illustrated in Mergers and Acquisitions(M&A) and Exchange Data Interchange(EDI).

Waring, & Wainwright(29) argued that IT/IS integration may be classified into technical, systems, organizational and strategic aspects and Wainwright & Waring(27) suggested a strategic model incorporating three analytical domains which is included technology, strategy, organization.

Table 1. Domains of Integration

Wainwright & Waring (2004)	Gartner Group	Integration Components	This Study
Technical domain (Systems Domain)	Physical Consolidation	Data, Physical (hardware platform, network, etc.) IS Application	Data Integration, IS Application, Platform of Integration
Strategic domain	Logical Consolidation	Purpose, Principles, Attitudes, Functions, Schedules	Business Process Integration
Organizational domain		Structure, Social & Historical, Power & Politics, Culture	organization structure Integration

In above papers, technological domains can be at the level of basic signal and data message content as well as the communication of shared semantic meaning through representation in database and is application systems. Strategic domains is involved a strategic issues. For examples various strategic management(good practice, business process reengineering, etc). Organizational Domains is included structural, social, historical, power, politics, culture. Table 1 summarizes the integration domains.

### III. PostNet Implementation Background

#### 3.1 Business Environment

Korea Post started postal business from 1884. Postal business has been constantly developing and performing roles as a government financial enterprise as well as a mailing service provider.

Surrounding conditions of the postal business has been rapidly changed since 1990s because of slowdown of increasing trend in mail volume according to the diffusion of Internet, getting larger in size through strategic alliance between financial enterprises according to opening financial market, and competition deepening according to the spread of electronic financial settlement system. However, public-centered management structure had limitation in coping with environment change actively and flexibly.

Hence, Korea Post was established in July 2000 to cope with environmental change actively with maintaining the management structure of postal business as national management structure. Korea Post which is organized to generalize postal business provides mailing and financial services of good quality to the people by adding management factor of enterprise and securing autonomy in the operation of postal business.

Korea Post has to decide to invest new IT project. At that time, trend of mail volume for three years indicates that it has continued to increase from 4,517 million pieces in 2000 to 5,537 million pieces in 2002, although after 2002 it is decreased as saws in table 2.

Table 2. Mail Services Statistics in Korea Post

Classification	2000	2001	2002	2003	2004
Mail Volume (unit: million pieces)	4,517	5,056	5,537	5,256	4,975
Total Revenue (unit: billion won)	12,542	14,171	17,082	17,154	17,342
Net Income (unit: billion won)	19.1	35.8	77.9	- 46.1	- 62.2

According to an increase in bulk mail (a large of quantity of mail) by the economy recovery, the mail division saw an increase in net income by 55.3% from 19.1 billion won to 35.8 billion won in 2001, and by 45.9% from 35.8 billion won to 77.9 billion won in 2002[19].

From the rapid increase of alternative communication means such as e-mail by the continuing rise of the Internet's popularity, the increase rate in mail volume is predicted to decrease for the next year even though the increase rate in mail volume for recent five years is 6.1%. Also, the propensity to consume is changed to the multi-item low-volume production, and the relative importance of commercial mail for the trade between companies is on an increasing trend. In addition, the national visiting parcel service market scale and international express market scale rose by 30% (1,690 billion won) and 10% (391.6 billion won) respectively in 2002. However, Korea Post is keenly competing with private visiting parcel service companies, and especially, EMS division of Korea Post is expected to furiously compete with multinational express delivery companies such as DHL, UPS, and FedEx.

#### 3.2 Mail Logistics

The mail (be included package delivery) processing is a simple, repeating, and labor-intensive work, but mail volume is rapidly increased with the growing of the internet market, especially in package delivery services. Hence, the operation load of mailing worker is deepening with insufficient recruit as time goes on, and the mail processing by hand shows a drop in efficiency although labor is secured. To solve these problems, the mechanization and automation of mail processing is seriously required to raise efficiency, reduce labor cost, and improve working environment.

In case of advanced country, mechanization of mail operation has been driven since 1970s. The existing sorting and transportation system between large post offices was changed to the system between processing & distribution centers (P&DCs). Also, P&DCs for small volume and manual operation were changed to P&DCs for large volume and machine operation.

In Korea, mail operation machines and indoor transportation facilities such as conveyor and elevator were supplied to the main post offices to improve productivity of mail operation. However, to raise efficiency of whole mail operation, Korea Post has promoted mechanization since 1985. After Seoul P&DCs was opened on March, 1990, East Seoul P&DCs (March, 1996), Taegu, Kwangju, Daejeon, Suwon, Chungju, and Wonju P&DCs (December, 1999), Jeju P&DC (April, 2000), and Pusan, Puchun, and Jeonju P&DCs (July, 2001) were opened and operated successfully.

Automation plan for mail processing in 1995 was devised

to construct key transportation network centering around P&DCs, and scheduled to construct 31 P&DCs throughout the nation. To cope with slowdown of increasing trend of mail volume according to the rapid development of IT and to maximize investment efficiency by enlarging service area of P&DCs, the plan was modified to the construction of 22 P&DCs in 1998. 22 P&DCs are currently working for the automated dispatching and sorting operation through P&DCs network. It brought about a kind of revolution in postal logistics.

#### IV. The analysis of Integration case: PostNet

##### 4.1 The Integration of Organization Structure

However P&DCs building is a big event in view of mechanization and automation of logistics, it has deficiency to change mail logistics scheme. It is necessary to strategy to change radically logistics process beyond efficiency of each logistics point.

very complex and non-efficient. Therefore, the ratio of labor cost reached to 67% in 1987, 72% in 1997. And these status gave pressure to business.

To radical change in mail logistics, the scheme was redesigned to 1 exchange center and 22 P&DCs. Hub & Spokes system involves that 1 exchange center as hub to transport with 22 P&DCs. The method of logistics shifted rail-road into land-load. In result, the number of delivery post offices reduced down 570, and the number of P&DCs was planned 22. The change of mail logistics scheme is depicted Figure 1.

To support changed mail logistics scheme, it is necessary to implement logistics integrated information systems to consolidate legacy systems. Therefore, during the construction of P&DCs, the establishment of PostNet has been pushed forward to improve the efficiency of automation process for mail. That is, because the postal logistics operation was changed to hub & spokes system based on P&DCs, we have to establish information system to realize the plan-do-see system of postal logistics.

We are currently establishing PostNet i) to build up infrastructure of logistic information which synchronizes the mail from pickup to delivery with its information ii) to

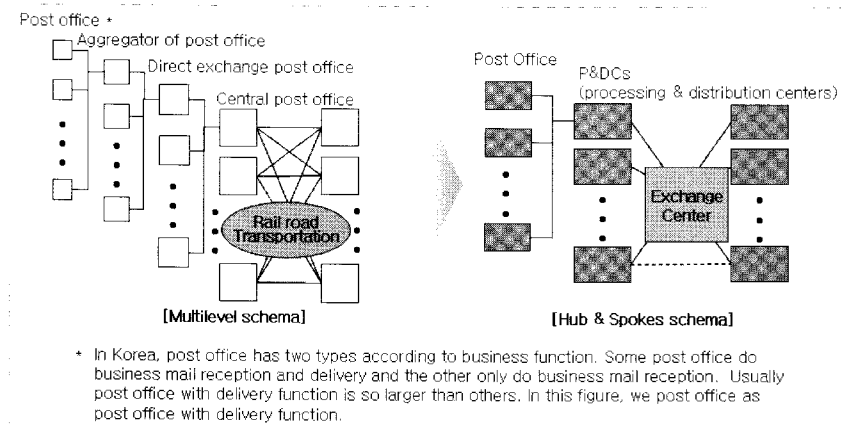


Figure 1. The Integration of Organization Structure

In this respect, hub & spokes scheme is major enabler of integration strategy in mail logistics. However, Seoul P&DCs opened on March, 1990 and East Seoul P&DCs started operation on March, 1996, the scheme of mail logistics was yet operated based on post offices (delivery office: 1,483; aggregate delivery office: 217; direct post office: 105, transportation central office: 45).

And also multi-level transportation based on rail-road is

provide real-time tracking information through Internet iii) to improve customer service by enhancing the acceptance system iv) to diversify postal business. Total budget to establish this system is about 12 billion won for three years from 2001 to 2004. Main contents are as follows.

The first integration phase was processed from 2001 to January 2003. In this period, the establishment of fundamental logistics management systems such as the integrated

acceptance system, the logistics volume management system, the arrival/departure management system through P&DC, the pickup and delivery management system, the track and trace system, and etc. The second integration phase was processed from January 2003 to February 2004. In this period, the establishment of strategic systems for the productivity enhancement in the areas of the operations planning, the transportation planning, postal logistics control, customer relation management, and etc.

If the system is completed by 2004, real-time information management will be possible, and the location and condition of postal matters can be provided to customers. We expect that overall expense for handling postal matters will be reduced by 17.3% with this system. This accounts for 15% saving in collection and delivery expenses, 10% in transportation, and 30% in sorting.

To investigate the process of system integration, two major factors are identified that influence system integration: business process and technology.

### 4.2 The Integration of Business Process

In Korea, the structure of mail logistics is consists of post office, P&DCs and exchange center is depicted in Figure 2. P&DCs manages both ordinary mail and package delivery. Departure P&DCs gather mail from post offices and mail boxes, sort the mail, and send to the other P&DCs or arrival P&DCs. And then arrival P&DCs sort the mail following post man or administrative district. And also exchange center has function to exchange mail among P&DCs and reduce transportation cost. In result, the processes of mail logistics from departure to arrival are reduced to 5 stages from 8 stages.

The business processes of mail logistics was divided into 6 components (reception, sorting, arrival/departure, transportation, delivery, after service) and reformed agendas deduced from these components.

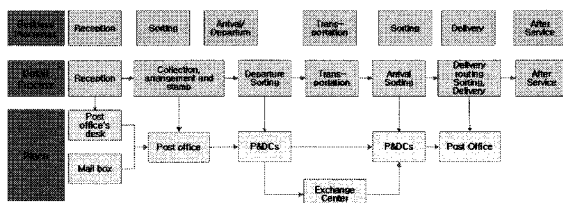


Figure 2. Business Processes of Mail Logistics

each stage. These problems are reduced by analyzing and redesigning of business processes for integration.

Table 3. Summary of Improvement agenda in Business Processes

Classification	Problem agenda	Improvement agenda
Reception	<ul style="list-style-type: none"> <li>• Insufficiency of use of zipcode (④)</li> <li>• Low Use of Barcord with zipcode (①)</li> <li>• Manual job in bulk priority mail (①)</li> </ul>	① Process Reduction
Sorting	<ul style="list-style-type: none"> <li>• Wrong sorting following zipcode (④)</li> <li>• Manual job in issuing dispatch book(①)</li> <li>• Uncompleted sorting mail in peak time(④)</li> </ul>	② Track and trace
Arrival/Departure	<ul style="list-style-type: none"> <li>• Discordance between dispatch book &amp; mail (②)</li> <li>• Long lead time (③)</li> <li>• Discordance between Unit load and dispatch book</li> </ul>	③ Efficiency of Logistics Operation
Transportation	<ul style="list-style-type: none"> <li>• Discordance between Unit load &amp; vehicles (②)</li> <li>• Wrong dispatch, wrong arrival(③)</li> <li>• Arrival delay(③)</li> </ul>	④ Standardization of Information on mail logistics
Delivery	<ul style="list-style-type: none"> <li>• Manual jobs of issuing delivery receipt after delivery(①)</li> <li>• Insufficiency on searching delivery(②)</li> <li>• Hard manual job of delivery routing sort (①)</li> </ul>	
After Service	<ul style="list-style-type: none"> <li>• Insufficiency on track and trace(②)</li> <li>• Difficulties searching in mail number(④)</li> </ul>	

For processes reduction, there are several detail agenda: batch processing of bar cord information, integrate with B2B customer, computerization of mail exchange, automatic issuing delivery receipt, and computerization of delivery jobs.

The typical example of process reduction is delivery process redesign. Before PostNet had been implemented, post man had manual job with issuing delivery receipt and wrote down result when came back post office. Usually post man went to office 6-7 o'clock, worked 2 hours before delivery and also worked 2 hours after delivery to key in delivery information till 20-22 o'clock.

To solve these problem, pre-delivery job was redesigned to support by integrated DB containing with receiver address, name, phone number and etc. Post man used to print delivery book using delivery DB at post office. And post-delivery job was simplified to send delivery information to central server by put PDA on cradle without key in.

Secondly, to improve track and trace, there are several detail agenda: connection between mail and unit load, connection between unit load and vehicles, transaction with information flow on mail logistics, and connection between information and track and trace among logistics points.

The typical example is connection of information among mail, unit load and vehicles. It is possible to connect

Table 3 summarizes the problems of business process in

information in each mail from unit load (mail box, mail pack, trolley, and pallet) and check transportation processing to enhance stage of track and trace to accept customer needs.

The track and trace of mail logistics consists of 11 stages: reception, post office departure, departure P&DCs arrival, departure P&DCs departure, exchange center arrival, arrival P&DC arrival, arrival P&DC departure, post office arrival, post office departure, delivery completeness. It is possible to gain information from vehicles, machine, person handling mail by scanning bar cord and aggregate into integrated control systems. In comparison with competitors, FedEx, international logistics company, supports 12 stages for monitoring and Han-Jin Co. supports 4 stages, and Hyundai Co. supports 8 stages.

Thirdly, to improve efficiency of logistics operation, there are several detail agenda: job scheduling with load balancing, real-time monitoring in operation control, real-time mail volume analysis, transportation plan optimization and resource allocation, and transportation route and resource allocation optimization.

The example is real-time mail volume analysis among points (Post office - P&DCs - Exchange Center). The reason why job was performed in night is that almost sort job, arrival/departure job are operated after mail arrived at P&DCs. Therefore, there are low work efficiency, difficulties of management of operation. Real-time mail volume analysis provide predictive plan-do-see system to solve problems among logistics points.

Fourthly, to improve standardization of mail information, there are several detail agenda: mail information connection among mail logistics entities, bar cord standardization. The core of mail logistics standardization is standardization of real-time distributed information enable to track and trace and mail logistics operation. Improvement of priority mail scheme enable to build information connection infrastructure.

Improvement of priority mail scheme accepts only one bar code type, Interleaved 2 of 5 and adds post office information and mail type to bar cord. This is utilized as information infrastructure supporting track and trace systems and etc. And also customer-made priority mail number system is introduced. It has big implication because of infrastructure standardization by recording correct information when mail is accepted. Before PostNet implemented, mail information is generated by operator at post office desk, therefore missing, typo error are sometimes occurred. From that time, customer replaced operator do some job to improve fundamentally information quality.

To accomplish it, postal logistics process was redesigned during 5 months since June, 2001. As a result, visibility of mail processing could be ensured through extension of track and trace function, and efficient connection among arrival/departure, distribution, and transportation. Also, business process could be simplified with PDA and RF tag.

### 4.3 The Integration of Technology

To investigate technical integration of PostNet, we consider three points: application, data and platform. The first is the processing of application integration. Before PostNet was implemented, the legacy systems with 19 applications including the postal service system and the supporting system had been being implemented and operated by starting with the domestic express system. These are shown in table 4.

Table 4. Major Legacy systems

System name	Description
Domestic express system	Express mails record mgt and payment processing
International post system	International mail's pickup, dispatching, arrival, customs, delivery record
Mail arrival/departure/transportation Mgt. system	Transportation volume statistics outputs, Transportation resources mgt., Transportation operations mgt.
GIS pickup & delivery mgt. system	Pickup & delivery sequence routing mgt., Pickup & delivery resource mgt.
Multi-functional counter system	One-stop postal service systems that efficiently deal with all post office operations at one counter
Electronic mail system	Hybrid mail
ePost	Retailer mgt., Order/sale mgt., Product mgt.
Postage stamp mgt. system	List mgt. issued for stamp and sales status, Receipts & disbursements status mgt., Inventory status mgt

According as the methods of mail processing was changed, it becomes necessary that the operation system (the transportation system) controls the mail processing at a point (between point and point) like P&DC or Exchange Center. These systems are required urgently, and integration of the same applications or the duplicate applications is needed. Legacy systems consist of computerized systems to transact works that took place at acceptance counter in post office that have client-server architecture based on terminal. To connect of these heterogeneous applications, we use message-based middleware and application adapter between them. In result, many applications were classified into Integrated Acceptance System, P&DC/Exchange Operation System, Transportation System, Delivery Management System, Information Integrated Platform, Track & Trace System and Central Control System. These situations are

depicted in Figure 3.

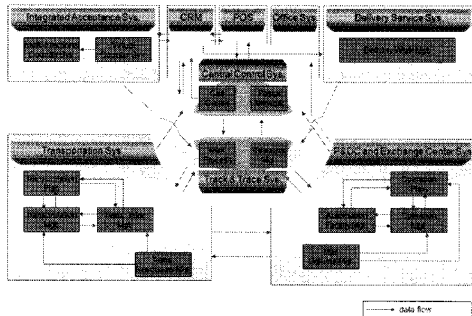


Figure 3. Integration of Applications

The second is the processing of data integration. Before PostNet has been being implemented, data are gathered and analyzed at points such as P&DCs, Exchange Center, Post offices, and etc. and are operated by batch process. As a result, asynchronization phenomenon of data is increased by the distributed and duplicated data management. Also, the differentiation of each version in functional applications and the occurrence of errors in batch processing cause low data accuracy, and the incapability of real-time information inquiry causes low data-timeliness. The data processing schema before PostNet is depicted in Figure 4.

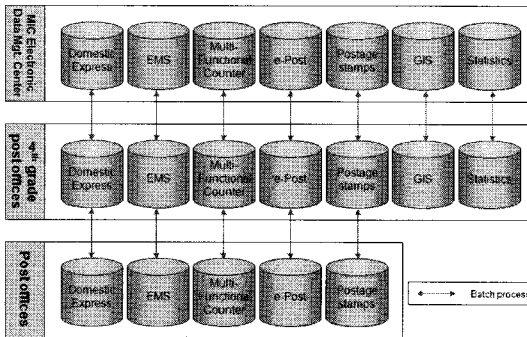


Figure 4. Database Architecture before System Integration

In particular, logistics processing information and tracking information between point and point are insufficient. This phenomenon is increasing due to asynchronization between postal mail and information. Therefore, to solve this problem, server layer and data transmission architecture were simplified, and the information used in whole logistics process from pickup to delivery was standardized. Reliability of information is also increased through information acquisition using IT such as barcode and Radio Frequency Identification (RFID). Therefore, architecture for the data integration is made up for the system.

The Third is the development of integration platform. We now investigate the processing procedure of PostNet. PostNet play a role in i) integrating business and data between internal systems related to the postal logistics ii) supporting establishment of connection system with external systems such as ERP system, ePost, financial system, and etc. iii) providing connection with external network through Internet.

The data required by the systems to be connected within internal systems are integrated to a single DB which minimizes interface necessary to connect the data. The connection between the track & trace system and other systems which can not be composed of a single DB are implemented through the integrated platform. Adapter is also used to connect external systems such as ERP system, ePost, and financial system since it can be connected with EAI server of the existing ERP system. Finally, in order to link various types of data, XML/EDI is applied to connect with external network through Internet. This situation is depicted in Figure 5.

i) Connection scheme of internal systems

Internal connection of PostNet is the connection between the track & trace system and the integrated database of other systems. It is implemented as on-line connection scheme by using load-balancing equality method since two systems are existed in the same LAN and data occurrence frequency and communicational overload are expected to be high.

Also, the connection between gateway and management system to link MDAC that is the facility of P&DC automation saves the system resources necessary to maintain TCP connection by using HTTP communication scheme because these systems exist in the same WAN.

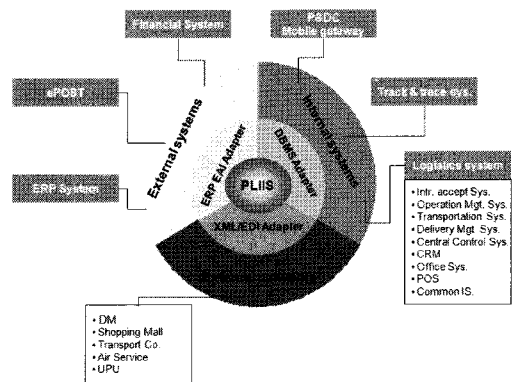


Figure 5. Architecture of Connection between Systems

ii) Connection scheme of external systems  
ii-1) ERP system at MIC connection scheme



The connection between PLIISs and ERP system provides exclusive TIB adapter to link it with ERP EAI server in PostNet platform. The connection scheme is implemented through ERP EAI server which is not directly connected with ERP system.

ii-2) ePOST, financial system connection scheme

The connection between ePost, financial system, and PLIISs uses the connection scheme through ERP EAI server such as ERP connection scheme. This provides exclusive TIB Adapter which can be connected with ERP EAI server in PostNet platform.

iii) External network connection scheme through Internet

Since XML/EDI is easily developed with good transmission efficiency, it supports the connection among business partners using various document standards and communication protocols for the external network connection scheme through Internet. Process automation is accomplished as the external data are connected with the internal system using EAI.

## V. Conclusion

System integration within an organization is a hot issue. However, the actual implementations of system integration across or between organizations are not so prominent yet, though the necessities for those are brought out. This paper concentrates on system integration within an organization and includes a guideline for integration between organizations. And, this paper suggests some critical points to consider in order to plan and execute system integration successfully.

PostNet in Korea Post has big implications by discussing deeply in point view of three aspects. First, there is integration approach in view of strategic aspect. Korea post confronts business environment such as explosive growth of mail volume, mail service diversity, variety of customer needs and etc. So Korea Post attempts strategic approach to solve these problems, and suggests PostNet as critical success factor.

PostNet has capability as strategic necessity by competing to internal and external environments of organization. And it supports as strategic enabler by tightly-coupled relation between business needs and technical support.

Second, there is integration approach in view of business process. Today, company, organization have to consider in respect wide-enterprise about business processes to satisfied

customer needs. The example is track and trace in logistics industry sector. To support job centering customer, the business process re-engineering firstly is completed. In Korea Post case, business process redesigning centered on external customer resulted in value-oriented performance and business processes redesigning centered on internal customer resulted in operation efficiency.

Third, there is integration approach in view of technical aspect. PostNet has insights in three points. First is that efficient strategy of integration/distribution and re-alignment systems based on business function and enhancement of customer service in point of application integration.

Second, there is building of decision support infrastructure and analysis of operation in point of data integration.

Third, there are seamless information flow from point to point by information flow is pre-proceed material flow, and single-sign-on user interface using web based in point of integration platform. In this respect, PostNet is a good guideline of integration in logistics industry sector and also other industry sector.

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