

A Methodology for Construction Information System for Small Size Organization with Excel/VBA

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Abstract. In Korea, many small and medium size companies have introduced information system for their effective management. The Korean government have supported them to set this system. But many of these companies failed to utilize this system. One reason is high maintenance and customization cost. In this research, we developed an effective methodology for constructing an information system by themselves. And they can easily renew their system according to the change of their business process. This methodology cannot support the internet version, but low cost and easy to maintenance will be the strongest point to set up an early version of information system for small size companies.

Keywords: Information system, Small organization, Excel, VBA.

1 Introduction

According to the development of information technology, many companies have tried to introduce information system to improve the productivity, management quality and market share. The ERP system is mainly introduced. But the owner of a small size company (under 50 employees) has a tendency of hesitating to do so. The main reasons of this hesitation can be summarized as follows. (1) Information system developing cost is usually high for them. (2) There is low reliability of ERP dealers or developers. (3) Annual maintenance fee is about 10% of introduction cost. (4) There is no confidence about the effect of ERP. (5) Small size company suffers the lack of operators. (6) The workers feel a fear to learn a new system.

To cope with this situation, the government has supported them to introducing information system, especially small & medium size company (SMC) in financial and technical aspect. But the governmental efforts are centered to companies that have certain volume. The small size companies that show 99.5% share in total number of Korean companies are suffering many difficult problems. Between 2001 to 2003, "Supporting Project for the 30,000 SMCs to Introduce Information Technology" was carried out by government with 739,000 million Won. As a result, there are several desirable effects such as business process improvement and getting better understanding about information system. But it is said that the effect such as productivity improvement, cost down or management efficiency improvement was insufficient [1]. From the result of a survey research for companies that participated in

this government project, the response rate of 'high degree of practical use' was 42.7% and the response rate of 'middle' or 'low' degree of practical use was 33.1% and 22.3%. It is known that small size companies that have under 50 employees cannot use the information system effectively. The reasons of these results are high cost of customization and modification of the information system, lack of excellent users etc.

The target of this research is to show a method for constructing an information system for small size companies that are suffering insufficient fund, lack of manpower. In this research, we use the MS-Excel and Visual Basic for Application tool. These kinds of tools are very familiar to workers of small size companies. It means each company can construct and renew an information system for it with low cost. We applied this method to a small size manufacturer, and we could confirm that this method works well in field.

2 Overview of Information System Application in SMCs

2.1 The Results of Government Project

3 million Korean small and medium size companies have taken a big roll in national economic growth. They shares 86.7% in the number of employee, 42% in the annual amount of export of Korea. But the management circumstances, such as the relationship between maker and vender, domestic market condition, international competition etc, are getting worse.

In case of large companies, the application rate of information system(ERP, SCM, e-business supporting system) are increasing and an amount of investment for information system become larger. But SMCs are in the low level of information system application and also reducing the investment amount for information system. This means that (1) the gap of information system application degree between large companies and SMCs is getting bigger, (2) the cooperation between companies will be getting more difficult[2].

The Korean Government carried out a project that promotes SMCs to introduce an information system for improving its competitiveness(from 2001 to 2003). The supporting fields are (1) pre-consulting for introducing information system, (2) introducing basic information system, (3) introducing ERP(Enterprise Resource Planning), (4) introducing MES(Manufacturing Execution System) and (5) introducing SCM(Supply Chain Management) system. The results are summarized as Table 1. Field (1) : 240 companies, Field (2) : 27,750 companies, Field (3) : 2,592 companies, Field (4) : 39 companies, Field (5) 311 companies.

After this project, a survey for assessing the result and making a basic data for setting a new direction of the supporting project was done. According to the report, (1) the responses to the question of the degree of operation skill for the information system were "high" 42.7%, "middle" 33.1%, "low" 22.3%. This means the degree of application is not so high. In case of small company, this degree will be worse. (2)The degree of PC application is showed in Table 2. Small size company group shows extremely low degree.

Table 1. Result of Government Project to 30,000 SMCs

| Applied Field | Pre-consulting | Basic Information System | ERP | MES | SCM | Total |
|-----------------------------------|----------------|--------------------------|-------|-----|-----|--------|
| No. of company | 240 | 27,750 | 2,592 | 39 | 311 | 30,932 |
| Invested Amount (100 million Won) | 3.3 | 270 | 423 | 6.7 | 36 | 739 |

Table 2. Degree of PC Application

| | No. of Employee | No. of Company | Total | Degree of PC Application (%) |
|--------|-----------------|----------------|-----------|------------------------------|
| Small | 1~49 | 2,932,789 | 2,932,786 | 26.6 |
| Medium | 50~99 | 12,003 | 2,944,792 | 99.1 |
| | 100~299 | 6,731 | 2,951,523 | 98.0 |
| Large | Over 300 | 1,601 | 2,953,124 | 100 |

2.2 Suggested Direction for Improvement

90% of participated companies had introduced basic information system. As a result, such companies could take advantage in management aspect, such as management time saving, delivery time keeping etc. However, the policy of supporting the introduction of information system should be changed from quantity-oriented one to quality-oriented one. To help Korea leap to an economically powerful nation, the introduction of information system of small size companies is essential, and to do that, by continuous education, refreshing the mind of owners and workers about information system has to be performed. For those who are well-grounded with the mind, a process of raising the ability to use the basic information system has to be strengthened[3].

This research is for small size companies that are suffering the lack of human and financial resources. The purpose of this research is to suggest a methodology for developing an information system of small size company.

3 Methodology for Developing Information System

Tools that can be used when developing a software are numerous. However, MS Office’s Excel VBA(Visual Basic for Application)[4, 5, 6] and Access Data Base are mostly used due to the convenience of development and maintenance. The example company of the development is located in Busan and is a company for assembling the parts of automobiles possessing 32 employees, 4 departments, total annual sales amount of 4500 million Won, 15 kinds of 43 machinery. We developed an inventory management system for this company. The time consumed to develop this system was

about 12 days. The developer's knowledge was intermediate level of Excel. Because of not using any other developing tools, we could confirm the convenience of development and maintenance. The program can be developed in a short time period and renewed easily when changing the business process, for VBA is easy to use for any managers.

3.1 The System Structure

In case of introducing the commercial ERP package, a server/client system that needs an expensive DB server is required. This research used a file sharing concept on network. By loading an Access DB in Client PC, there as no need a big DB server. Figure 1 shows the whole hardware structure.

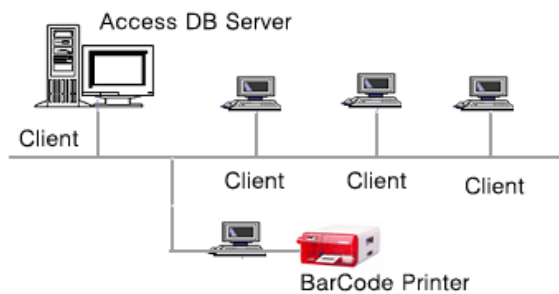


Fig. 1. Hardware Structure

We shortened the time analyzing and designing function model, process model, and data model referring to “The Standard Process Model for Industry[7]” developed by Small and Medium Business Administration. The purpose of this model is to standardize and spread out industry processes of fields with similar production and management in order to propel e-Manufacturing and e-Industry of traditional industry.

- (1) Function Model: It is an integrated process for a company to provide products and services with financial resources.
- (2) Process Model: A process is a lower part of business function divided into performable unit. Process model is to modeling the processes systematically. This includes the form of input and output for documents or reports needed while performing the business.
- (3) Data Model: It is a model systemized in the point of data.

The Figure 2 is the main screen of the inventory management system developed with Excel VBA. Developed system includes several modules. (1) User certification module to make it available for only registered users. (2) User authorizing module is for registering and adjusting users, managing the authorities to use the program. (3) Client management module is concerned about the purchase and sales amount management, outside order management and cooperating company management. In

this module, company codes are utilized for the convenience of management. (4) In material management module(Figure 3), the material number consists of client code number and serial number. Selecting a client and clicking the code creation button can generate the material code automatically. Figure 4 also shows an example of automatically generated program code of this screen. This figure shows that users have no need to learn a special program language. Users are just using Excel Macro function.



Fig. 2. Main Menu for Inventory Management System

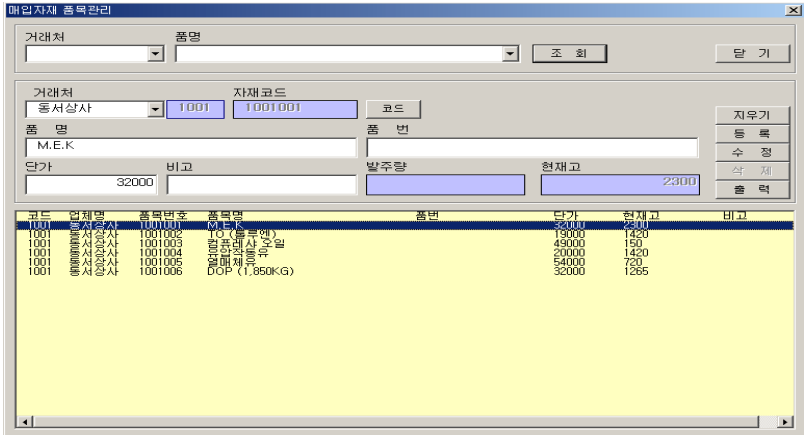


Fig. 3. Material Management Module

(5) Material orders management module processes the order information input and order sheet printing. (6) Warehousing material management module uses the material entry number. This number consists of item number(7 digits) + the date(6 digits) + serial number(2 digits). Totally, 15 digits are used to identify a certain material. It

plays a role of the primary key of entry table. (7) Material handling module controls the issuing of the material from the warehouse. (8) Barcode management module uses the barcode font 39 Code. (9) Order management module controls the outside orders. Figure 5 shows an example of DB connection module to access the DB server.

```
Private Sub btnCode_Click()
Dim MsgStr As String
If CompCodeText <> "" Then SQL = "Select max(ItemNo) as a1 from tblInItem " & _
"where ItemNo Like " & Trim(CompCode.Text) & "*" Set Rst =
DB.OpenRecordset(SQL)
If Not Rst.EOF Then
If IsNull(Rst!a1) = False Then TempItemNo = (Rst!a1) + 1
Else TempItemNo = CompCode_In.Text & "001"
End If
Rst.Close
txtItemNo.Text = TempItemNo
End If
End If
End Sub
```

Fig. 4. Automatically generated Programming codes

```
Public Sub DBConnect()
Dim strPath As String
strPath = "z:\DS\DB\Data.MDB"
If DBState = False Then
Set DB = DBEngine.Workspaces(0).
OpenDatabase(strPath)
DBState = True
End If
End Sub
```

Fig. 5. DB Server Access Module

3.2 Checking Points for Developing

Following is the items to check when constructing information system proper to small size companies.

- DB Size : Access DB Max 2G
- End-Users : used by 13-15 persons at the same time
- Safeguarded Users : Backup and user authority management
- Network : Duality of Data Base and Form
- Managing VBA : Simplifying VBA for managing A/S, Development of mutual supplement between employees
- Business Analysis : Maximizing reduced cost by thorough analysis

4 Discussion

4.1 Easiness of Construction

Excel is the most spread software in the whole companies. And Excel has unique language Macro. This software gives many chances to build up various kind of application software easily. On a computer with MS Office, this software can be developed without any extra cost. Even the workers at small size company can construct his management software by himself. The most important strong points of this methodology are (1) low development cost, (2) short development time period, and (3) quick renewal. If workers continuously learn about the Excel and business process remodeling, then he can control this system more effective.

4.2 Easiness of Maintenance

The commercial ERP users do not satisfy with introduced system, even if it is customized to their business process. It is also possible that users suffer the runtime errors. And basically the business processes have to be changed according to the change of circumstances. Or they have to change the system because of the change in a form or a bill etc. These facts are the essential of the information system and management process. With the proposed methodology, users(workers or managers) can renew their system anytime with low cost and easiness.

5 Conclusion

In this paper, we suggested a methodology that can be adopted to manage the small size companies. We developed an information system as an example of a company for confirming the availability of the suggested method. Developed system includes the main module, user certification module, client management module, item management module, order management module, warehousing management module, bill management module, inspection management module. To develop this system, including these modules, we spent 12 days. Developer has studied Excel and VBA for several months. Considering the fact that almost all company workers in Korea are somewhat expert of Excel, they can build this kind of system within the same time period. This means small size companies can be free from the commercial ERP dealer and maintenance cost.

Eventually, small size company can develop a kind of information system by themselves. And they can renew their system with easy if they want. This methodology can not be applied to Web circumstance. But, by using this system, the hesitation about information system could be reduced and the familiarity to it could be stronger. This effect can be said a big progress at the company management.

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