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Business Process Automation and Managerial Accounting: An SAP Plug and Play Module (FINAL REPORT)

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The Thinkfinity Initiative for Innovative Teaching, Technology and Research

Cornerstone III: Interdisciplinary Programs, including Informatics

Proposal Title: Business Process Automation and Managerial Accounting: An SAP Plug & Play Module

By

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Final Reports:

A) The outline of original goals

The primary aim of our project is to develop an Enterprise Resource Planning (ERP) platform that enables students at Pace to understand how different interdisciplinary areas in cross-unit and/or cross-enterprise decision making are related. ERP can help us do this since it allows a firm to automate and integrate its business processes, share common data and practices across the entire enterprise, and provide and access information in a real-time environment.

The objectives of our project are:

- to enhance interdisciplinary training and courses for students;
- to enhance understanding of process changes and improvement;
- to enhance understanding of the effective use of technology;
- to investigate the process management issues that focus on organizational structures, leadership styles and team empowerment and how they affect technology adaptation, resistance to and management of change, and information management;
- to benefit the Pace community since the results of our project development can help improve training and use of technology in the entire institution - it is not necessarily restricted to student learning, but can also be used for staff training; and
- to identify the factors that affect enterprise resource planning (ERP) outcomes.

B) What progress have you made towards your original goals on your project to date?

Dr. Picheng Lee went to one of SAP University Alliance campuses located in Chico, California for five days from June 22 to June 26, 2009 to go through intensive training on using SAP to configure business processes and accounting systems. We then use the Internet Demonstration and Evaluation Systems (IDES) of mySAP to develop and configure a hypothetical company called Speedwell Motor. Speedwell Motor does not have a production facility, but it purchases finished items from external suppliers and sells them to customers. Following the SAP way, we define its organizational structures, master data files, and rules to support core business processes such as buying (materials management), selling (sales & distribution), and tracking (financial accounting/controlling). The case in point is intended to help prospective users understand the basic concepts of business process automation with a special focus on managerial accounting function. We have documented the entire walk-thru exercises, procedures, and kept revising them to date. We have also had some accounting major students walk through our developed exercises.

C) What activities have been completed to contribute to meeting/progressing toward these goals?

Major activities completed to date towards meeting the listed objectives include (1) the full-scale introduction of our products (see Appendix 1) to the Pace community, and (2) the development of a paper entitled "Exploring ERP Performance factors in the Context of ERP Continuous Improvement" (see Appendix 2).

As stated in our original proposal, it is our belief that the ability of students at Pace to address the following concerns is crucial to the overall success of our project:

▪ How does ERP change the managerial, technical, and sociopolitical responses of the firm in a supply chain setting?

▪ How should we respond to this change and advance the knowledge of ERP in a multi-layered supply chain?

We thus build a learning package. Students are required to analyze and follow through the case in point (see Appendix 1). We also present problematic situations and business scenarios with a technological dimension in the context of information quality and productivity. In this learning package, the emphasis is on the following five areas: strategic information technology planning, accounting information reporting, managerial information reporting, core business processes, and cost of service operation. Further, we develop a learning assessment framework for the development of ERP-based business processes (see Appendix 2, Figures 1, 2, and 3). In our studies of learning assessment, we rely on decision tools such as the Analytic Network Process (ANP). The application of ANP generalizes the widely used Analytic Hierarchy Process (AHP). Both the AHP and the ANP are multi-criteria, multi-level decision models that allow for the development of priority weights for items based on policy/decision makers' professional evaluation. The ANP, however, allows for the possible interdependencies among and between levels of elements along a hierarchic structure. As shown in Appendix 2, seven different factors are considered: managerial aspects, technical aspects, sociopolitical aspects, multidimensional competence, person-job fit, person-organization fit, and job performance. The development of our model is in line with the ERP concept.

D) What activities have not been completed?

None

E) Please outline the outcomes you have received as a result.

The primary emphasis of our participants, initially, is to understand the ERP platform and applications. Our participants, when taking the ERP training class, focus on ERP's ability to (1) automate and integrate a firm's business processes, (2) share

common data and practices across the entire enterprise, (3) and provide and access information in a real-time environment. Hands on exercises on Speedwell Motor provide such an opportunity. At the conclusion of our walk-through exercises, students conclude that there is a need to implement ERP-enabled operations systems.

When joining colleagues in engaging discussions about ERP competence and continuous improvement, students' worldviews are expanded. The follow-up study with a special focus on learning assessment, conducted at the end of our ERP training session, draws our students' attention to vital managerial skills and management knowledge for the efforts of ERP continuous improvement. Our students learn that (1) ERP implementation is vital to the long term competitiveness, (2) ERP competence development is also important, and (3) stakeholders are active participants in the ERP competence development and deployment process. The discussions presented on these issues thus are of value to our students. They conclude that there is a great need to be able to identify and classify core variables from the very beginning of the ERP improvement process to improve enterprise's overall capabilities.

F) Has your project impacted students? If so, how many?

In total, twenty-five students (10 graduate and 15 undergraduate students) have followed through our protocol development in the initial phase of this project. Currently, twenty students taking ACC662: Modeling of Accounting and Information Systems taught by Dr. Picheng Lee are using the SAP laboratory modules in Fall 2010.

G) Has your project impacted other faculty members? If so, how many?

Dr. Picheng has shared his SAP workshop materials with Dr. Kaustav Sen (Lubin School of Business) and Dr. Chienting Lin (CSIS) in the hope that other faculty members will incorporate SAP course materials into their courses.

H) Were there any unintended outcomes achieved?

None

I) Do you outcomes reflect the change or benefit you were hoping to receive?

Although our study cannot be generalized beyond its scope, the walk-through exercises on Speedwell Motor, general frameworks, and deployment procedures shown in both Appendix 1 and Appendix 2 can offer good guidance in effectively managing ERP competence development.

J) How has your project further the Thinkfinity Cornerstone you selected?

The course materials, based on the configuration of a hypothetical company called Speedwell Motor, (1) serve the purpose of using the Internet Demonstration and Evaluation Systems (IDES) of mySAP to integrate ERP applications in the areas of managerial accounting and process change, (2) ensure that faculty pedagogy incorporates the most recent core and mission-critical systems and thinking, (3) help ERP-based organizations expand on the gains made in the previous stages of ERP implementation and development.

The general sequence of our learning assessment framework provides a blueprint for instructors worldwide in developing cutting edge courses to help modern enterprises become more competitive. Organizations of all sizes with the embedded ERP systems will benefit from the results of this project by looking into our proposed step-by-step processes to develop long-term ERP competences.

K) Describe you future plans for sustaining the program or project.

It is important to conduct more future studies to assess experts' worldviews on ERP continuous improvement in a variety of organizational settings. Such studies can help ERP-based enterprises to become more competitive. There are two research directions:

First, in determining the survey items and dependencies in the context of ERP continuous improvement, the views of experts must be considered when developing such a model. This is an important step to improve the quality of the decision-making network structure. A decision support system (DSS) such as SuperDecisions can be used for achieving such a feat. Further, since it would be hard to capture the imprecision in human judgment and obtain crisp data from the experts, we should considering using fuzzy scales in future works. The overall acceptability of Fuzzy decision-making approach, however, needs to be tested to ensure its practical values.

Second, we shall focus on strategic choice and policy deployment using the advanced decision science tools. There is also the problem of other technology management issues and resource allocation problems. Through the use of optimization techniques such as linear programming, goal programming, and data envelope analysis (DEA), these problems can be addressed. Kamvysi et al. (2010), for example, discuss the combination of QFD with the ANP and DEA methodologies in a service context. This hybrid process, if adopted in the context of ERP continuous improvement, will lead to the design of programs and processes that are Kaizen conscious and meet the aspirations of the stakeholders.

Reference:
Charmaz, K., 2006. Constructing Grounded Theory: A Practical Guide Through

Qualitative Analysis, Sage, Thousand Oaks, CA.

Kamvysi, K. Gotzamani, K. Georgiou, A.C. Andronikidis, A. 2010. Integrating DEAHP and DEANP into the quality function deployment. The TQM Journal, 22(3), pp.293-316.

McAdam, R.., D. Leonard, J. Henderson, S. Hazlett. 2008. A Grounded Theory Research Approach to Building and Testing TQM Theory in Operations Management. Omega – International Journal of Management Science, 36, 825-837.

Verville, J, Palanisamy, R., Bernadas, C., Halingten, A., 2007, ERP acquisition Planning: a critical dimension for making the right choice, Long Range Planning, 40, pp.45-63.

Appendix 1

Business Process Automation and Accounting for Planning & Control: An SAP Plug & Play Module

Table of Contents

Note: Please get a CD from the instructor.   In the CD, please open Read Me First.doc and get ideas how to install SAP and to get started SAP.   You have to walk-thru this case by your own and record all required messages or document number.   This is an individual project.   Whenever you see the value XX in the assignment you need to substitute the assigned SAP number, which is based on the last two digits of your SAP user-id on the attendance sheet.   For example, if your user-id were IDES-99, then the value XX of IDES-XX is 99 and the value 0XX of IDES-XX is 099.   The 99 is your assigned SAP number.

Introduction to Speedwell Motor

Speedwell Motor (SM) was started in 1982 by two entrepreneurs who were mechanical engineers from MIT, Boston. The first manufacturing centre was started in Philadelphia in 1982. Later on as Speedwell Motor's customer base expanded, it started its manufacturing division in Denver in 1985. At this point in time Speedwell Motor, also known as SM, produces a wide variety of products for the US market and also has a huge customer base in central and eastern part of United States.

Speedwell's Organization Structure

A variety of products are manufactured and sold using different organizational units with Logistics areas. Some of the products manufactured by Speedwell are :

Product	Process Type
Motorcycles	Make-to-Order Production
Pumps	Sales-Order-based-repetitive Manufacturing
Cars	Make-to-Order Production

External Organizations

As mentioned earlier, Speedwell Motor has two manufacturing divisions located within the United States – Philadelphia (3000) and Denver (1000). The products and services marketed are clearly allocated to one division and reach the customer via different distribution channels.

Sales Organizations

Both locations (Denver and Philadelphia) are production centers of Speedwell Motor. They are also sales centers. Sales organizations 1000 and 3000, in this case

story, are in charge of selling and distributing pumps, elevators, lighting, motorcycles, vehicles, and high tech products.

Sales Divisions

Materials and services sold are allocated to the following product divisions

Division	Description
01	Pumps
02	Motorcycles
08	Services
10	Vehicles

Distribution Channels

The sales of Speedwell Motor's products take place using the following distribution channels:

Distribution Channel	Description
10	End Customer Sales
12	Sold for Resale
14	Service

Sales Areas

The materials that are managed in each organizational unit are determined by the sales area, that is, the combination of a sales organization, a distribution channel, and a division. Sales in Speedwell Motor are carried out on a cross-divisional basis via division 00. Sales documents in Speedwell Motor are processed in one of the following sales areas:

Sales Organization	Distribution Channel	Division
1000	10	00
1000	12	00
3000	10	00
3000	12	00

In this entire document we will be referring to the plant located in Philadelphia. So we use code 3000 where ever we are asked to enter the company code.

Purpose of the document

Speedwell Motor has been following traditional production methods in automobile manufacturing. It owns and operates two manufacturing facilities in the United States. As the company started growing, Speedwell Motor started thinking of going international. Even though Speedwell Motor has been able to build its reputation in some parts of the United States, it hasn't been able to reach the standards of its multinational counterparts Honda, Toyota and GM. Over a period of time, analysts at Speedwell Motor have been trying to identify the loop holes in their manufacturing process which inhibit them from gaining the top spot in the global market. Recently one of the analysts has identified the main reason why Speedwell Motor hasn't gained popularity across the world. He attributes the reason to not following an automated and streamlined production methodology. In today's world of globalization and technological advancement, every organization should stay in line with the technology and make use of it in order to stay competitive in the market. Speedwell Motor finally decided to investigate the various tools available in the market which will help them achieve their goals. From their market research reports, they found that there is a tool called – SAP which can not only satisfy their current needs but also provide additional capabilities. The adoption of this new tool can therefore enhance their business processes to a large extent. The advantages they identified were as follows:

a. Vendor management

b. Customer management

c. Production planning

d. Reporting

e. Sales management

f. Procurement

g. Invoicing

As per Speedwell Motor's market research analyst's suggestions we have successfully migrated Speedwell Motor's entire business process to SAP so that from now on they can use this software to run and support their entire business.

It is a tedious and difficult task for Speedwell Motor's engineers to shift suddenly from their traditional paradigms of engagement to the new one. Hence, in this

document, we are going to help Speedwell Motor's officials to walk through SAP as and when they face certain new requests and challenges.

Step 1 – Login to SAP

The first step in using the software would be to login to the system in order to access all functionalities.

- Click on the SAP icon on the Desktop

- A window appears

- Client = 415

- User Name = IDES_XX (I have assigned you a SAP user-id on the attendance sheet. Whenever you see the value **XX** in the assignment you will substitute your assigned SAP number)

- Password will be given by the system administrator

Password = PASSC375, a window will appear, change the password to your personal password. You will use this password every time you log on to SAP ECC. Remember this password.

Step 2 – Create Material Master

Speedwell Motor has decided to come up with a new car model for the US market. Speedwell Motor will be manufacturing new parts for the new car they are going to build. So here in this step we shall create the material data for this new part-Gear. This step is called Material Master Creation. A Material Master for the product that will eventually be produced must be created. This only needs to be done the first time a new product is introduced. Creating the Material Master is integral to the remainder of the supply chain process, as it is the master file for everything that will occur later. A mistake here (in the Material Master Creation) will create problems along the entire supply chain process. The reason why the Material Master can cause so many problems is because it encompasses every aspect of the material being produced, and requires a number of inputs to be made dealing with everything from where and by whom it is produced to specific pricing information.

The new item, namely, Gear, we are manufacturing is labeled/named as 110-0XX and is copied from an existing item. We shall copy the data from the existing gear (3300-120) produced by Speedwell Motor.   Again, **if your user-id were IDES1-99, then the value XX of IDES1-XX is 99.   The 99 is your assigned SAP number. Therefore, 110-0XX=110-099.**

Menu Path: Logistics → Materials management → Material master → Material → Create (special) → Raw Material

1. Create Finished Product: Initial Screen

   Field Name Input

   Material Number   **110-0XX** (XX = last 2 digits of your assigned SAP number)

2. Industry Sector   **Mechanical engineering**

   Copy from material   **3300-120**   *(Here we are copying existing information for our product)*

3. Click on the Select Views button

4. Select the following views

   Basic Data 1 and 2

Purchasing

Purchase Order Text

General Plant Data/Storage 1 and 2

Accounting 1 and 2

5. Click on the Enter Icon

6. Organization Level pop-up window

Field Name Input Field Name Input

Plant -   **3000**   copy from   **3000**

Storage Location **-   0001** copy from   **0001**

Click on the Enter Icon

7. **Basic Data 1**

Accept the default values

Click on the Enter Icon

8. **Purchasing**

Accept the default values

Click on the Enter Icon

Ignore message by clicking on Enter

9. **Purchase Order Text**

No information is needed here

Click on the Enter Icon

10. **Plant Data/Storage 1**

Accept the default values

Click on the Enter Icon

11. **Accounting 1**

Accept the default values

Save when asked to.

Write down the message on the Status bar._____

Step 3 – View and create G/L Account

Since Speedwell Motor is going international, there is a need to create new accounts as they move on. Since SM is primarily aiming at penetrating the United States Automobile manufacturing market, we'll help them create a new account called Common stock 0XX under Chart of accounts - United States (CAUS), help them verify their newly created account, and also help them know how to post a transaction to their new account.

Create G/L Account

Menu Path: Accounting → Financial Accounting → General Ledger → Master records → G/L Accounting →Individual processing → Centrally
If asked, enter Company Code **3000** and select *Enter*

On Edit G/L Account Centrally Screen, enter

Field	Data
G/L Account	**700XX** (where XX = last 2 digits of your assigned SAP number)
Company Code	**3000**

1. Create Account by using the "with Template" [🗋 With Template] button

    In the pop-up box enter the following account as a reference

Field	Data
G/L Account	**70000**
Company Code	**3000**

2. Select *Enter* ✅

    In the Description Box:

    Short Text: **Common Stock 0XX**

    G/L acct long text: **Common Stock for Group 0XX**

    Select *Enter* ✅

3. Click on "control data" tab and "create/bank/interest" tab

4. Select *Save* 💾

Note: If an error message appears regarding the language, select the green check mark **to continue.**

Record the message displayed in the Status Bar at the bottom of the screen:_____

<div align="center">

Verify Account Creation

</div>

Now you have helped SM to create their General Ledger account. You should also make sure that the account has been successfully created. Please follow the following steps to view the account details –

Menu Path: Information Systems → Accounting → Financial Accounting → General Ledger → Chart of Accounts

Chart of Accounts

Field	Data
G/L Account	**Should be blank**
Chart of Accounts	**CAUS**

Select *Execute*

A list of all of the CAUS accounts is dispayed.

To view the account 700XX you have created just now, use the 'Find ' option. This will enable you to find the specified entry very quickly.

<div align="center">

Post a transaction to the account created

</div>

Now since the account has been created, we need to help officials at SM know how to post a transaction to the new account they have just created.

Here we are transfering funds from the already existing Citibank account (11300) to the new account 700XX.   To do the same please follow the following steps:

Menu Path: Accounting → Financial Accounting → General Ledger → Posting → Enter G/L account document

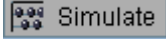If asked, enter Company Code **3000** and select *Enter*

1. *G/L account posting*

Field	Data
Document Date	**Today's date**
Posting Date	**Today's date**

2. In the items menu at the lower portion of your screen enter:

Field	Data
G/L Account	**113100**

D/C	Debit
Amount in Doc. currency	**2000000**
G/L Account	**700XX**
D/C	**Credit**
Amount in Doc. currency	**2000000**

Select *Enter*

3. Select *Simulate* Simulate to review the accounting document that will be

   generated when posting this transaction

4. Select *Save*

5. Record the message displayed in the Status Bar:_____

6. Display the document you just created:

7. In the Drop down menu at the top **Menu Path: Document → Display**

Step 4 – Understand Purchase Order

A typical supply chain begins with purchasing raw materials; this is completed through SAP's Purchase Order Management (POM) system, but before this can be done a vendor must be located and/or created in the system. Vendor master records only need to be set up once (unless something changes with respect to a vendor's status). Please note that the companies of concern are required to do this in order for them to have their own personal vendor. Three types of vendor master records must be setup. They are: Accounting, Purchasing, and an Information record. The Accounting records deal with the vendor's name, address, reconciliation account, and the payment terms agreed upon, etc. The purchasing records define what currencies are used as well as the terms of payment. The Information record assigns the vendor to a purchasing group and defines the price, the quantity of product normally sold, and the minimum quantity.

Create Finished Product

SM is known for its bikes and cars. Until now SM has been producing the bikes in-house. However, SM has learned from their own internal research reports that the in-house production has been too expensive. So they discovered and contacted a new local vendor (Joe's Motors) that would sell them the good in question at a lower price. Since SM's bikes are popular because of their brand value, SM decides to purchase bikes from an outside vendor and sell them in SM's brand name with slight modifications if necessary.

Now our job is to copy the information from the old finished good and create a new finished product that will be purchased externally. The information regarding old finished product from which we are copying is 1300-1400 (this is the bike that SM used to manufacture in-house). F01-0XX is the bike we are purchasing from the new vendor. When we are filling out the product information we also need to mention the product description (i.e. its weight per piece or per carton etc). Specifically, we are specifying the weight of the bike to be around 195 kgs, and the approximate price of each to be around 2000USD and 'standard pricing' to be followed.

1. Menu Path: *Logistics* → *Materials Management* → *Material Master* → *Material* → *Create (special)* → *Finished Product*

2. Enter

Field	Data
Material	**F01-0XX** (XX = last 2 digits of your assigned SAP number r)
Industry Sector	**Mechanical Engineering**
Copy From	
Material	**1300-1400**

3. Click the **on Enter** .   A window will pop-up.

4. Select the following views:

   - Basic data 1
   - Basic Data 2
   - Sales: Sales Org. Data 1
   - Sales: Sales Org. Data 2
   - Sales: General/Plant Data
   - Sales Text
   - Purchasing
   - Purchase Order Text
   - General Plant Data / Storage 1
   - General Plant Data / Storage 2
   - Accounting 1
   - Accounting 2
   - Costing 1

   Click on Continue   icon.

5.   Enter

		Copy from	
Plant	**3000**	Plant	**3000**
Storage location	**0001**	Storage location	**0001**
Sales Org.	**3000**	Sales Org.	**3000**
Distr. Channel	**10**	Distr. Channel	**10**

6.   Click on the Continue   icon**.** You will be on **Basic data 1** screen.

Enter if already not there

Field	Data
Base unit of measure	**PC**
Division	**00**
Material group	**001**

21

Gross Weight	**200**
Net Weight	**195**
Weight unit	**KG**

7. Click on the **Enter** 🗸 icon**.** You will be on **Basic data 2** screen

   • No need to enter any information

8. Click on the **Enter** 🗸 icon.   You will be on **Sales: sales   org.1** screen**.**

   Under Tax Data, enter

Field	Data
Tax Classification	**2 for Brazil and** **0 for other six countries**

   • Accept other values

9. Click on the **Enter** 🗸 icon.   You will be on **Sales: sales   org.2** screen

   • No need to enter any information

10. Click on the **Enter** 🗸 icon**..**   You will be on **Sales: General/Plant Data**

    Under Shipping data, enter

Field	Data
Trans. Group	**0004** (Train)
Loading Grp.	**0001** (Crane)

11. Click on the **Enter** 🗸 icon**.**   You will be on **Sales text**   screen

    • No need to enter any information

12. Click on the **Enter** 🗸 icon.   You will be on **Purchasing**   screen

    • Review the information

13. Click on the **Enter** 🗸 icon**.**   You will be on **Purchase order text**   screen

    • No information is needed

14. Click on the **Enter** 🗸 icon**.**   You will be on the **Plant Data / Storage 1** screen.

- No need to enter any information

15. Click on the **Enter** ![icon] icon**.**   You will be on the **Plant Data / Storage 2** screen.

- No need to enter any information

16. Click on the **Enter** ![icon] icon**.**   You will be on **Accounting 1** screen.

Enter

Field	Data
Valuation Control	**S**
Standard Price .	**2000**

17. Click on the **Enter** ![icon] icon**.**   You will be on **Accounting 2** screen

- No information is needed

18. Click on the **Enter** ![icon] icon**.**   You will be on **Costing 1** screen.

- Review the information

19. Click on the **Enter** ![icon] icon**.**   Save ![save icon] the data when asked to save.

Write down the message on the status bar _____

Create Vendor details

Now that we have setup the finished product (Bike) details, we will help SM create the details of the new vendor in Jersey named Joe's Motor from whom they are going to buy the pumps. The details include the vendor's physical location, account details and the payment terms.

Menu Path: *Logistics → Materials management → Purchasing → Master data → Vendor → Central → Create*

1. On the Create Vendor: Initial Screen:

Field	Data
Vendor	**700XX** (XX = last 2 digits of your assigned SAP number)
Company code	**3000**
Purchasing organization	**3000**
Account group	**LIEF** (vendors)
In the reference section	
Vendor	**3725** (Zebra Supplies)

Company code	**3000**
Purchasing organization	**3000**

2. Hit on the **Enter** ✅ icon to create the basic record.

3. On the Create Vendor: <u>Address</u>

    Vendor's Name: Joe's Motors

    Search term: JP

    Street address: 125 Van Rippen Ave

    Postal Code: 07306

    City: Jersey City

4. Click on the next screen (arrow) icon 📄 bar or enter icon ✅

5. On the Create Vendor: <u>Control</u>

    No Information needs to be entered

    Click on the next page arrow icon 📄 or on enter icon ✅

6.   **On the Create Vendor: <u>Payment Transactions</u>**

    No Information needs to be entered

    Click on the next screen (arrow) 📄 icon or on enter icon ✅

7.   **On the Create Vendor: <u>Accounting Information Accounting</u>**

Field	Data
Recon. act	**160000**
Sort Key	**002** (Doc. No., fiscal year)
Cash Management group	**A1** (Domestic)

8.   Click on the next page arrow icon 📄 or on enter icon ✅

9.   **On the Create Vendor: <u>Payment Transactions Accounting</u>**

Field	Data
Payment terms	**ZB01**
Tolerance group	**3000**

10. **On the Create Vendor: <u>Correspondence Accounting</u>**

    No information needs to be entered

    Click on the page arrow icon 📄

11. **On the Create Vendor: <u>Purchasing Data</u>**

    Enter **USD** for order currency

    Click on the page arrow icon

12. **On the Create Vendor: <u>Partner Function</u>**

    No data needs to be entered

    Click on the page arrow icon

13. Make sure you **save this data by clicking the yes button** at the end of your vendor editing session.

14. Write down the message on the status bar. _____

Create info record

Once the vendor and material details have been created we have to link the new vendor to the new material. We should specify the details such as the price of the item and minimum order quantity

Menu Path: Logistics → Materials Management → Purchasing → Master Data → Info Record → Create

1. Enter your vendor ID # **700XX**

2. Enter your material name for Finished product created in step 1 above ("F01-0XX" where the XX = last 2 digits of your assigned SAP number.)

3. Enter purchasing org. **3000**.

4. Enter plant **3000**.

5. Hit Enter

6. Note: Ignore the message "material F01-0XX mainly procured internally" by clicking on Enter

7. Hit the Purch org data 1 button (on the application tool bar)

8. Make Plnd Dely time = **1**

9. Make the standard quantity (equal to the number you would buy at a time) =
    10

10. Make the minimum quantity (equal to the minimum amount you are allowed
    to buy at a time) = **5**.

11. Net price = **2000**

12. Hit the general data button (on the application tool bar)

13. Save ⊞ (you should have a notification on the bottom of your screen that
    says a purchase information record #xxxxxxxx 3000 3000 has been created.

14. Exit to SAP Easy Access Screen

Create Purchase Order

Once a vendor is setup, raw materials can now be purchased. In order to do this we
must create a Purchase Order (PO). The PO is the Transaction file that runs the POM
process. It contains what materials are being purchased, from whom they are being
purchased, by whom, how many, and on what date.

Menu Path: Logistics → Material Management → Purchasing → Purchase
Order → Create →Vendor/Supplying Plant Known

1. Enter your Vendor Number in the Vendor field (to the right of the word "Vendor")

2. Click on the small icon under Standard PO (it looks like a funnel on its side) (You
    should now be in the Org. Data Tab of Creating a Purchase Order Function)

3. Enter **000** (Chef, H) in Purchasing Group (top left of your screen)

4. The company code and purchasing organization should be **3000**

5. Enter values for Material, PO Quantity, and Deliv. Date as follows:

Field	Data
Material	**F01-0XX**

PO Quantity	**10**
Deliv. Date	**Today's date**
Plant	**3000**
Storage Location	**0001**

Highlight the line items by pressing the button next to the status button on the far left edge of form.   The net price will be copied from the information record

5. Click on Enter ☑ icon.   Ignore any messages by clicking on enter ☑

6. Click on the save 💾 icon. (You have now completed your purchase order. Write down the P.O. number displayed at the bottom of the screen)

7. Note: If the purchase order is incomplete, complete it and save 💾 it.

8. P.O. # _____

9. Exit to SAP Easy Access Screen

<div align="center">**Check stock of Materials**</div>

Once the PO is filed, we should check the status of inventory (please note that no inventory will exist because the materials have not yet been received).

Menu Path: Logistics ➔ *Material Management* ➔ *Inventory Management* ➔ *Environment* ➔ *Stock* ➔ *Stock Overview*

Enter

Field	Data
Material	**F01-0XX**
Plant	**3000**
Storage Location	**0001**

1.   Click on Execute 🕓

2. Double click on plant 3000 & it will show you how many material units are in use and how many are on order. At this point in time, you should have zeroes across the board because you have not purchased any goods yet.

3. Click Cancel

4. Exit to Return to SAP Easy Access Screen

Post Purchase Order

Now we will receive the goods.

Menu Path: Logistics → Materials Management → Inventory Management → Goods Movement → Goods Receipt → For purchase order → PO Number Known

1. Enter your Purchase Order number that you wrote down in a prior step into the third text box.

2. If you forgot to write down your PO number:

3. Click on the drop down button next to the text box.

4. Click on the menu button (located next to the page buttons in the upper right hand corner)

5. Select "purchasing documents for material"

6. Enter your material in the material line, and plant 3000 in the plant line.

7. Click on the Enter icon and the purchase order information will show up.

8. Click on the Enter icon and all the information will be transferred into the goods receipt text box.)

9. Check the **Item OK** box on the bottom of the screen.

10. Click on "where" tab.   Make sure storage location **0001** is there.

11. Click on Post button and record the material document number.

12. Doc. # _____

13. Exit to SAP Easy Access Screen

Check the Stock of Material after receiving the goods.

We should check the status of inventory.

Menu Path: Logistics → Materials Management → Inventory Management → Environment → Stock → Stock Overview

1. Enter

Field	Data
Material	**F01-0XX**
Plant	**3000**
Storage Location	**0001**

2. Click on Execute

3. Click Cancel

4. Exit to Return to SAP Easy Access Screen

Post Invoice

Now you have received the invoice and want to post it so accounting can post the outgoing payment.

Menu Path: Logistics → Materials Management → Purchasing → Purchase Order → Follow-on functions → Logistics Invoice Verification

1. Enter Invoice Date = Current Date (##/##/####)

2. Enter your PO# (from the previous section) in the Purchase Order/Scheduling Agreement field under PO reference area. Press enter

3. (If you've forgotten your PO number, do as follows: Click down arrow button for Purchase Order, Click Creditor & click Green Check Mark. Enter your vendor number and click execute. Click on the document number (your PO number) and then click the choose document button. Click enter .)

4. Type in an amount of the invoice. (Usually you would have the invoice with you, but in this case, we will have to calculate the total manually.

5. Amount =quantity * the price, (10 * 2000) and enter the amount manually.

6. Click Enter .

7. Confirm or enter in the quantity.

8. Press the simulate button which will display the debits and credits related to this account. If the balance = 0 then post (save), if not then go back and re-enter amount.

9. Click the save icon which will post the document.

10. Write down the Document Number _____

11. Return to SAP Easy Access Screen

Show Account Balance for the vendor

Menu Path: Accounting → Financial Accounting →Accounts Payable → Account →Display/change line items

1. For Vendor, enter your vendor

2. For Company Code, enter 3000

3. Select **Open items**   radio button under line item selection

4. Click the Execute button

5. Verify that balance is not zero

6. Exit to SAP Easy Access Screen

Post Outgoing payment

Once we have received the order from the vendor, we'll post the outgoing payment. Here we are making the payment from SM existing Citibank account (113101). And since we are paying them early we are getting a 3% cash discount. So when we enter the payment amount we'll be entering the amount deducting the discount.

Menu Path: Accounting → Financial Accounting → Accounts Payable → Document entry → Outgoing Payment → Post

1. For Document Date enter today's Date

2. In the Bank data section:

a. Enter **113101** for Account (Citibank.)

b. Enter amount on invoice minus 3% (for paying early) in Amount.

3. In the Open item selection section:

a. Enter your vendor number for Account. (700XX)

b. Check the Automatic Search check box

c. Click on Process open items button. This will take you to a new screen with a line that shows your open items. The Assigned box at the bottom right will show 0.

d. Click Enter . Now the Assigned box will show the amount to be assigned, which should match the open item amount. "Not Assigned" should equal 0.

e. Post (i.e. save - Gives Document ID # and the company it was posted in) _____

4. Exit to SAP Easy Access Screen. (A screen may pop up that states "Data will be lost, do you want to exit editing?" Click Yes)

Verify Account Balance.

Menu Path: Accounting → Financial Accounting → Accounts Payable → Account → Display/change line items

1. For Vendor, enter your vendor
2. For Company Code, enter 3000
3. Select **All items** radio button under line item selection
4. Click Execute
5. Verify that debits equal credits and balance is zero
6. Exit to SAP Easy Access Screen

Step 5 – Understanding Production planning

Production Planning is SAP R/3's heart and soul. It is one of SAP's greatest systems, but also is the most complex in the system. Speedwell Motor (SM) does not lend itself to just mass production techniques. SM also allows customers to customize their bikes with higher quality components. So they assemble the bikes from various existing parts like engines, powertrain etc. Here in this section we will demonstrate a way to create the finished goods (a bike with material number A1-0XX, XX = last 2 digits of your assigned SAP number) with other raw materials and semi-finished goods. We'll first create material master records for the component goods:

Create Material Master Data for Finished Product

Menu Path: *Logistics→Production → Master Data → Material Master → Material → Create (special) →Finished product*

1. **Create Finished Product: Initial Screen:**

   Enter your material number **A1-0XX** (XX = last 2 digits of your assigned SAP number)

   The industry sector will be **Mechanical engineering**

   Copy from Material **1300-1400**

   Click the **Enter** 🗸 icon

2. Select views pop-up screen:

   Select **Basic data1, MRP1 and MRP2 views**

   Click the **Enter** ✔ icon

3. Organizational levels pop-up screen:

   In the Organizational level Section go to Plant field and enter **3000** copy from **3000**

   Storage Location **0001** copy from **0001**

   Click the **Continue** ✔ icon

4. **Create Finished Product: Basic data 1 screen**

Change the Material description to **Product-A1-0XX**

Click the **Enter** ![icon] icon

5. **Create Finished Product: MRP1 screen**

Go to the MRP type field and enter **M1**

Lot size key **EX** for Lot-for-lot order quantity as its lot-sizing method

Click on the MRP2 tab ![MRP 2]

6. **Create Finished Product: MRP2 screen**

Procurement type **E**

In-house production **5** days as its lead time

Safety stock as **0**

Click the **Enter** ![icon] icon

Last data screen has been reached, so save your data. Click on **Yes.**

Write down the message on the status bar

_____

Create Material Master Data for Semi finished product

Path: *Logistics → Production → Master Data → Material Master → Material → Create (special) → Semi finished product*

Screen Name	Field Name	Input Data	Go to Next Step
Initial Screen	Material	B1-0XX	
	Industry sector	Mechanical Engineering	
	Copy from--Material	2300-101	ENTER ![icon]
Select view(s)	Basic Data1	Select	
	MRP1	Select	
	MRP2	Select	ENTER ![icon]

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Organizational levels	Plant, Storage location	3000, 0001	
	Copy from	3000, 0001	ENTER ☑
Basic Data	Material description	SUB-ASSY-B1-0XX	ENTER ☑
MRP1	MRP Type	PD	
	Lot size key	EX	
MRP2	Procurement type	E	
	In-house production days	5	
	Safety stock	0	ENTER ☑
Last data screen reached	Do you want to save your data first?		YES

Write down the message on the status bar _____

Create Material Master Data for Semi finished product

Menu Path: *Logistics → Production → Master Data → Material Master → Material → Create (special) → Semi finished product*

Screen Name	Field Name	Input Data	Go to Next Step
Initial Screen	Material	C1-0XX	
	Industry sector	Mechanical Engineering	
	Copy from--Material	2300-101	ENTER ☑

Select view(s)	Basic Data1	Select	
	MRP1	Select	
	MRP2	Select	ENTER ✓
Organizational levels	Plant, Storage location	3000, 0001	
	Copy from	3000, 0001	ENTER ✓
Basic Data	Material description	SUB-ASSY-C1-0XX	ENTER ✓
MRP1	MRP Type	PD	
	Lot size key	EX	
MRP2	Procurement type	E	
	In-house production days	10	
	Safety stock	0	ENTER ✓ ✓
Last data screen reached	Do you want to save your data first?		YES

Write down the message on the status bar _____

Create Material Master Data for raw material

Menu Path: *Logistics → Production → Master Data → Material Master → Material →   Create (special) → Raw Material*

Screen Name	Field Name	Input Data	Go to Next Step

Initial Screen	Material	D1-0XX	
	Industry sector	Mechanical Engineering	
	Copy from--Material	3300-113	ENTER
Select view(s)	Basic Data1	Select	
	MRP1	Select	
	MRP2	Select	ENTER
Organizational levels	Plant, Storage location	3000, 0001	
	Copy from	3000, 0001	ENTER
Basic Data	Material description	RAW MATERIAL-D1-0XX	ENTER
MRP1	MRP Type	PD	
	Lot size key	FX	
	Fixed lot size	300	
MRP2	Plnd delivery time	5	
	GR processing time	0	ENTER
Last data screen reached	Do you want to save your data first?		YES

Write down the message on the status bar _____

Create Material Master Data for raw material

Menu Path: *Logistics → Production → Master Data → Material Master → Material → Create (special) → Raw Material*

Screen Name	Field Name	Input Data	Go to Next Step
Initial Screen	Material	E1-0XX	
	Industry sector	Mechanical Engineering	
	Copy from--Material	3300-113	ENTER ✅
Select view(s)	Basic Data1	Select	
	MRP1	Select	
	MRP2	Select	ENTER ✅
Organizational levels	Plant, Storage Location	3000, 0001	
	Copy from	3000, 0001	ENTER ✅
Basic Data	Material description	RAW MATERIAL-E1-0XX	ENTER ✅
MRP1	MRP Type	PD	
	Lot size key	FX	
	Fixed lot size	500	
MRP2	Plnd delivery time	5	
	GR processing time	0	ENTER ✅
Last data screen reached	Do you want to save your data first?		YES

Write down the message on the status bar _____

Create a Bill of Materials (BOM) for Finished Product A1-0XX

Once the Material Master is completed a Bill of Materials (BOM) must be put together. The BOM specifies what raw materials and sub-assemblies make up the final product. Designing BOM takes substantial amount of time. So most of time when we create a material master we copy the BOM from the existing material and hence reducing the complexity of designing the BOM.

Here we are showing the company officials from SM how to design BOM just in case future requirements demand them to design one.

In our scenario, 1 unit of the final product A1-0XX needs 4 units of B1-0XX

Menu Path*:   Logistics →   Production →   Master data →   Bills of material →
Bill of   material →   Material BOM →   Create*

Create material BOM: Initial Screen

Field	Data
Material	**A1-0XX**
Plant	**3000**
BOM Usage	**1**

- Click on green check mark

Create material BOM: General Item Overview screen:

ICt (Item Category)	**Component**	**Quantity**
L	**B1-0XX**	**4**

- Click on Enter   and SAVE   this single-level BOM

Create a Bill of Materials (BOM) for B1-0XX

Component B1-0XX is made up of 2 units of C1-0XX and one unit D1-0XX. This is

represented as follows:

Menu Path*: Logistics → Production → Master data → Bills of material →*
Bills of material → Material BOM → Create

Create material BOM: Initial Screen

Field	Data
Material	**B1-0XX**
Plant	**3000**
BOM Usage	**1**

- Click on green check mark

Create material BOM: General Item Overview screen:

ICt (Item Category)	Component	Quantity
L	**C1-0XX**	**2**
L	**D1-0XX**	**1**

- Click on Enter and SAVE this single-level BOM

Create a Bill of Materials (BOM) for C1-0XX

Similarly, component C1-0XX is made up of 1 unit of D1-0XX and 2 units of
E1-0XX. This is shown as follows:

Menu Path: *Logistics → Production → Master data → Bills of material → Bills*
of material → Material BOM → Create

Create material BOM: Initial Screen

Field	Data
Material	**C1-0XX**
Plant	**3000**
BOM Usage	**1**

- Click on green check mark

Create material BOM: General Item Overview screen:

ICt (Item Category)	Component	Quantity
L	**D1-0XX**	**1**
L	**E1-0XX**	**2**

- Click on Enter and SAVE this single-level BOM

Create Independent Requirements for material

Menu Path: *Logistics* → *Production* → *Production Planning* → *Demand Management* → *Planned Independent. Requirements* → *Create*

Create Planned Independent Requirements: Initial Screen

Field	Data
Select Material and Enter	**A1-0XX**
Plant	**3000**
Version	**00**
Planning Period	**W** (week)

- Click on Enter ![icon] icon

Click on [Sched. lines] tab and Enter the following requirements data:

Reqmts date	Planned qty
49/YYYY (current Year)	**15**
50/YYYY	**10**
51/YYYY	**20**
52/YYYY	**25**

- Click on Enter ![icon] icon

- Click on SAVE ![icon]

Run Master Production Scheduling for material 110-0XX (Finished Product)

Before creating a production order, we need to run Materials Requirements Planning (MRP) to plan our purchasing and production runs. Running MRP helps to ensure the availability of the product.   It is necessary to have the goods ready for transport in a timely manner.

SM should now create MRPs for the finished product and the semi finished product.

Menu Path: *Logistics* -- → *Production* → *Production Planning* → *MPS* → *MPS* → *Single-Item,Single-Level*

On MRP-Single-Item, Single-Level screen:

Field	Data
Material	**A1-0XX**
Plant	**3000**

- Enter MRP control parameters:

Field	Data
Processing Key	**NETCH**
Create pur.req.	**2**
Schedule Lines	**3**
Create MRP list	**1**
Planning mode	**1**
Scheduling	**1**
Planning date	**today's date**

- Hit Enter twice   to complete MPS run.

Run Material Requirements Planning (MRP) for material B1-0XX.

Menu Path: *Logistics* → *Production* → *MRP* → *Planning* →
Single-Item,Multi-Level

On MRP-Single-Item, Multi-Level screen:

Field	Data
Material	**B1-0XX**
Plant	**3000**

- Enter MRP control parameters:

Field	Data
Processing Key	**NETCH**
Create pur.req.	**2**
Schedule Lines	**3**
Create MRP list	**1**
Planning mode	**1**
Scheduling	**1**
Planning date	**today's date**

- Hit Enter twice ✅ ✅   to complete MRP run.

Analyze MRP results for all the materials.

Menu Path: *Logistics* → *Production* → *MRP* → *Evaluations* →
Stock/Requirements list

On Stock/Requirements List: Initial screen

1. Enter Material A1-0XX

2. Plant 3000

3. Click on Enter ✅

4. Print the stock requirement list for A1-0XX.

5. Click on the Green back arrow to get back to Stock/Requirements List: Initial
   Screen

6. Enter Material B1-0XX

7. Plant 3000

8. Click on Enter

9. Print the stock requirement list for B1-0XX.

10. Click on the Green back arrow to get back to Stock/Requirements List: Initial Screen

11. Enter Material C1-0XX

12. Plant 3000

13. Click on Enter

14. Print the stock requirement list for C1-0XX.

15. Click on the Green back arrow to get back to Stock/Requirements List: Initial Screen

16. Enter Material D1-0XX

17. Plant 3000

18. Click on Enter

19. Print the stock requirement list for D1-0XX.

20. Enter Material E1-0XX

21. Plant 3000

22. Click on Enter

23. Print the stock requirement list for E1-0XX.

Step 6 – Creating Production Order

To start processing a production order, the transaction file that triggers the production process should be created. Here in this section we are looking at the production order of 1200cc powertrain (Material number 2300-101) that SM has been manufacturing. To create a Production Order the company officials are asked to go to the stock requirements list, which is a representation of the production plan they created earlier. Creating a production order from here is as simple as clicking on the first planned order and pressing one button to turn it into a production order. The production order can be reviewed, which will tell the company the exact date and times that the product will be put together. Once the production order is released, it must be confirmed. This tells the system that production has been completed for the order in question and that there is now inventory for the particular product. In other words, they are ready for sale.

Menu Path: ***Logistics →Production → Shop Floor Control → Order → Create →With material***

Enter

Field	Data
Material	2300-101
Production Plant	3000
Order Type	PP01

- Click on Enter

On the "Production Order Create: Header" Screen, enter

Field	Data
Total Quant.	10
Finish Date	Last working day of next month
Schedule Type	Backwards

- Click on Enter

Note: The system is now busy doing the following tasks:

♦   TRANFERS ROUTING OF THE MATERIAL INTO THE

ORDER

♦   TRANSFERS BOM OF THE MATERIAL INTO THE

ORDER

♦   RESERVE NEEDED STOCK FOR THE MATERIALS

♦   CAPACITY REQUIREMENTS ON WORK CENTERS

♦   SCHEDULING THE ORDER

♦   CALCULATE PLANNED COSTS FOR THE ORDER

Write down the following dates for the order:

Basic Dates   Schedule

Dates

Finish _____   Finish _____

Start   _____   Start _____

Release_____

Save   the Production Order and write down the number _____
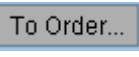
Release the Production Order to the Shop Floor

Menu Path:*Logistics → Production → Shop Floor Control → Order → Change*

1. Enter your production order number if it is not defaulted there.

2. Click on Enter   .

3. Note the status of the order _____

4. ***FUNCTIONS → RELEASE***

5. Note the status of the order _____

6. NOW SAVE

Process the Production Order

Menu Path: *Logistics → Production → Shop Floor Control → Goods Movements →Goods Issue*

1. Click on "To Order" To Order... Button on the application tool bar

2. Enter

- Production order number

- storage location   0001

3. Click on Enter [icon] to continue

4. Issue the quantity proposed in the screen by Clicking on SAVE [icon] and write down

the document number _____

Perform the completion confirmation for the order.

Menu Path: *Logistics → Production → Shop Floor Control → Confirmation → Enter → For Order*

1. Enter Production Order Number

2. Final Confirmation: SELECT

3. Yield to Conf.:   should be 10 which is the production order quantity.

4. Save [icon].

Receive quantity of completed production order.

Menu Path: *Logistics → Production → Shop Floor Control → Goods Movement → Goods receipt*

1. On the menu bar*:   Goods Receipt → Create With Reference → To Order*

Field	Data
MOVEMENT TYPE	**101**
STORAGE LOCATION	**0001**
ORDER	**YOUR PRODUCTION ORDER NO**
PLANT	**3000**

2. Click on Enter [icon].

3. SAVE [icon]

4. MATERIAL DOCUMENT NUMBER _____

Display completed order.

Menu Path: *Logistics → Production → Shop Floor Control → Order → Display*

1. Enter your production order number and click on Enter [icon]

2. STATUS _____

3. Click on Blue icon with **i** to view the description of the status.

Display the material document.

Menu Path: ***Logistics*** → ***Material management*** → ***Inventory Management*** → ***Material Document*** → ***Display***

1. ENTER

    Material document number from earlier step

    Mat. Doc. Year **YYYY** (Current Year) **and** click on Enter .

2. Click on Accounting Documents and review info by double-clicking on each of the documents

    This shows how actions in logistics (such as receipt of material) are integrated with accounting and costing modules.

Step 7 – Understanding Customer and Sales order Management

Just like that of the previous two modules, we need to first define Customer Order Management (COM) for a company in question. COM keeps all of a company's customers, products for sale, pricing structures, warehouse management, and billing administration in order. With a right structure in place, the company of concern should create a Customer Master. This step is very similar to the creation of a Vendor Master in POM. This Customer Master, however, is for the purpose of selling. The Customer Master includes basic information, reconciliation accounts, terms of payment, delivery priorities, shipping conditions, incoterms, and tax applications.

Speedwell Motors are now well established in the USA. The new car they have released for the US market has gained wide acceptance by the public because of the cost effectiveness and fuel efficiency. Due to this reason, NYC taxi agency has decided to purchase a bulk of cars from SM.

Creating Customer Master Record

We are associating 80XX (XX = last 2 digits of your assigned SAP number) as the customer ID for the Customer – NYC Taxi Inc.

Menu Path: *Logistics → Sales and Distribution → Master Data → Business Partner → Customer → Create → Complete*

1. Customer Create: Initial Screen

Field	Data
Account Group	**Sold-to party-0001**
Customer	**80XX**
Company code	**3000**
Sales organization	**3000**
Distribution channel	**10**
Division	**00**

2. Reference

Field	Data
Customer	**3000**
Company code	**3000**

Sales organization	**3000**
Distribution channel	**10**
Division	**00**

3. Select Enter Icon [✔] to continue

NOTE: There are 3 main areas to enter data in creating a customer (General Data, Company Code, and Sales area data). The buttons for these data areas are located in the application bar.

4. CREATE CUSTOMER: GENERAL DATA

Address:

Field	Data
Name	**NYC Taxi Inc 0XX**
Search term	**0XX**
Street	**200 Beekman's Street**
Postal code	**10038**
City	**NYC**
Country	**US**
Transportation Zone	**0000000002 (mountain)**
Language	**EN**
Telephone 1	**212-123-4567**

5. Select Control Data tab to continue

6. **Control Data**:

- Review this screen

- You do not need to enter information on this screen

7. Select Payment Transactions tab to continue

8. **Payment Transactions**:

- Review this screen

- You do not need to enter information on this screen

9. Select Marketing to continue

10. **Marketing**:

- Review this screen

- You do not need to enter information on this screen

11. Select Unloading Points to continue

12. **Unloading Points**:

- Unloading point: **Dock 1**

- Calendar Key: **US**

13. Select Export Data to continue

14. **Export Data**:

- Review this screen

- You do not need to enter information on this screen

15. Select Contact Persons to continue

16. **Contact Persons**:

- Review this screen

- You do not need to enter information on this screen

17. Select Company Code Data [Company Code Data] button on the header bar to

continue

18. CREATE CUSTOMER: COMPANY CODE DATA

19. **Account Management**:

Field	Data
Reconcil. Account	**140000**
Sort Key	**002**
Cash mgnt group	**E2 (Domestic Customer)**

20. Select Payment Transactions to continue

21. **Payment Transactions**:

Field	Data
Payment terms	**ZB00**
Payment History Record	**Selected**

22. Select Correspondence to continue

23. **Correspondence**:

- Review this screen

- You do not need to enter information on this screen

24. Select Insurance to continue

25. Insurance:

- Review this screen

- You do not need to enter information on this screen

26. Select Sales Area Data `Sales Area Data` button on the header bar to continue

27. CREATE CUSTOMER: SALES AREA DATA

28. **Sales Area**:

Field	Data
Sales Distric	**000001 (Northern Region)**
Order probab.	**100 (%)**
Currency	**USD**
Cust. Price proc.	**1 (You may need to scroll down to find this)**

29. Shipping:

Field	Data
Delivery priority	**01 (high priority)**
Order combination	**select**
Shp. Cond.	**02 (Standard)**
Delivery plant	**3000**
Max part deliveries	**9**

30. Select Billing Document to continue

31. **Billing Document**:

Field	Data
Incoterms	**FOB**
Comment next to incoterms	**Chicago**
Payment terms	**ZB00**
AcctAssgGr	**01**
Taxes	**Enter 0 for Tax**

	Classification in all seven fields

32. Select Partner Functions to continue

33. **Partner Functions**:

- Review this screen

- You do not need to enter information on this screen

- Click on Save Icon to save this customer master record

- Write down the message on the status bar. _____

- Click Cancel (Red X) at the create customer: initial screen

Link Customer to Material

Now that we have defined the customer and customer's details, we should link the customer with the product he/she is going to buy from SM. In our case the product under consideration is F01-0XX and the customer is 80XX.

Menu Path: *Logistics* ➔ *Sales/Distribution* ➔ *Master Data* ➔ *Agreements* ➔ *Customer Material Information* ➔ *Create*

Create Cust-Material-Info Record: Initial Screen

Field	Data
Customer	**80XX**
Sales organization	**3000**
Distribution Channel	**10**

1. Click Enter

2. Create Cust-Material-Info Record: Overview Screen

3. For Material no.   enter   **F01-0XX**

4. Click on Save Icon

5. Now you have just created an info record that links the customer to a material. Exit to the main menu.

Create Sales Order

After the Customer Master is created, the product produced in PP can now be sold to the new customer. This is done by creating a Sales Order. The structure is once again defined, and in the Sales Order it is specified as to who the product is being sold to, where it is being shipped, the date, what material is being sold, and how much it is being sold for.

Menu Path: *Logistics* →   *Sales/distribution* →   *Sales* →   *Order* →   *Create*

1. Create Sales Order: Initial Screen

Field	Data
Order type	**OR**
Sales organization	**3000**
Distribution Channel	**10**
Division	**00**

2. Click on Enter

3. Create Standard Order: Overview

Field	Data
Sold-to-party	**80XX**
Purchase order number	**PO-0XX**
PO Date	**Enter Today's Date**

4. Click on the Item Overview tab

Field	Data
Required Delivery Date	**Enter Today's Date**

5. Under All Items

Field	Data
Material	**F01-0XX**
Qty	**10**
Plant	**3000**

6. Click on the Enter   .

7. Click Enter Enter   to pass any warning messages.

8. Highlight Line Item by clicking on box next to item #.

9. Select: On the Menu bar Select: *Goto* → *Item* → *Conditions*.

10. Under CNTY (where the cursor is located) type **PR00**, which stands for price.

11. Enter **4500** under amount. This is the price you are charging.

12. Click on the Enter .

13. Click on the shipping tab, locate storage location and enter 0001.

14. Save

15. Write down the sales document number:_____

16. Exit. Click "no" on the "do you wish to save" screen.

Display the sales order and record the scheduled delivery date.

Menu Path: *Logistics* → *Sales/distribution* → *Sales* → *Order* → *Display*

1. Display Sales Order: Initial Screen

   • For Order Number, enter your sales document number recorded at the end of step three

   • Click on the Enter .

2. To display the delivery date for a line item, select the box to the left of the item, and click on Shipping Button (Tab).

3. Display Standard Order: Item - Schedule Line - Shipping Details

4. Write in the dates displayed

Delivery date	
Material available date	
Loading Date	

5. Exit

Create the delivery for the sales order

Now that the Sales Order has been filed, the company must let the shipping department know that a delivery must be made. This is done by creating a delivery order, which involves entering a Shipping Point (what part of the world the product is going to), the required delivery date that the customer wishes to receive the product, as well as the amount of time the product can feasibly be prepared for shipment, and the sales order number. The company then needs to tell the warehouse to pick the items off the shelves with the help of a transfer order. Once the goods are shipped, they can be posted as goods issued.

Menu Path: *Logistics* → *Sales/distribution* → *Shipping & Transportation* → *Outbound Delivery* → *Create* → *Single Document* → *With reference to sales order*

Create Outbound Delivery with Order Reference

Field	Data
Shipping point	**3000**
Selection date	**Delivery date that you recorded from earlier step**
Sales order	**Enter your sales document number recorded at the end of step three**

1. Select the Enter icon

2. Change Planned GI date to today's date

3. Click on Enter

4. Ignore any information messages by clicking on Enter

5. Save

6. Write down the Delivery Note number:_____

7. Exit

Transfer stock from Warehouse Management

Menu Path:

Logistics → *Sales/distribution* → *Shipping & Transportation* → *Picking* →

Create Transfer Order → Single Document
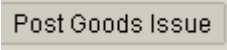
Field	Data
Warehouse Number	**300**
Plant	**3000**
Delivery	**delivery # from the previous step if not defaulted**
Activate items	**select**
Adopt pick quantity	**1**

1. Click on Enter ![green check] and SAVE ![save]

2. If an information message regarding not having authorizations to the print device will appear. Click the green check mark on the dialog box.

3. Exit

Update order.

In this step, you will change the delivery note and update the picked quantity. Then, you will post goods issue to notify that the delivery has left the plant

Menu Path: *Logistics → Sales/distribution → Shipping & Transportation → Outbound Delivery → Change → Single Document*

1. Change Delivery

   • Under Outbound Delivery, enter Delivery Note number from the end of Step: Create the delivery for the sales order (Click Here)

   • Select the **Post goods issue** ![Post Goods Issue] button to inform the system that the goods have left the dock.

   • The message on the status bar should state that your delivery has been saved.

2. At this time the system posts the goods and creates a goods issue document, which credits the inventory account.

3. Exit

Create an invoice (Bill) for the delivery

The last item of business here is to create a billing document that is to be sent to the customer. As long as all of the previous documents were created correctly and the Customer and Material Masters were properly configured, creating a billing invoice is as simple as hitting a save button. The company is then required to review all accounting documents that are tied to the COM process.

Menu Path: *Logistics* ➔ *Sales/distribution* ➔ *Billing* ➔ *Billing document* ➔ *Create*

1. Enter Delivery Note number from the end of Step: Create the delivery for the sales order (Click Here)

2. Click on the Enter   .

3. You will be on Invoice (F2) Create: Overview of Billing Items

4. Save

5. Write down the billing document number: _____

6. Exit

Examine your Progress.

Menu Path: *Logistics* ➔ *Sales/distribution* ➔ *Shipping & Transportation* ➔ *Outbound Delivery* ➔ *Display*

1. Enter Delivery Note # if not defaulted

2. *Select: Environment* ➔ *Document Flow*   (located on the top menu bar)

3. You will see a list of the documents and if they have been completed. You can drill down by double clicking on any document.   You can also click on the graphics button to display a model of the document flow.

4. Exit
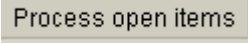
Collect Cash.

Menu Path: *Accounting* ➔ *Financial accounting* ➔ *Accounts receivable* ➔ *Document Entry*   ➔ *Incoming payments*

1. Post-Incoming Payment: Header Data

Field	Data
Document date	**today's date**

Company code	3000
Currency/rate	USD
(Bank data) Account	113100
Amount	Net Value from invoice
Value date	today's date
Account (Open items)	80XX
Automatic Search	Select

2. Click on Process open items Process open items on the application tool bar

3. Click Enter to move "not assigned" to "assigned"

Note: The amount entered should be equal to the assigned amount and there should be 0.00 under not assigned field. The system posts the document if the debits are equal to credits unless the partial payment is made.

4. Save

Document Number: _____

5. Exit

6. Exit Editing? Yes

Display Summary Graph for Customer.

Menu Path: *Accounting* ➔ *Financial Accounting* ➔ *Account Receivables* ➔ *Account* ➔ *Analysis*

1. Enter in your Customer number, Company Code (**3000**), and Fiscal year (**YYYY** (current year))

2. Click Enter

3. A zero balance should be displayed.

4. Go to *Edit* ➔ *Graphics View Graphics*

5. View the results

6. Click the cancel icon.

7. Exit

Step 8- Report Generation

At the end of the fiscal year, every organization would like to know their performance in terms of their revenue/profits and costs. ERP systems like SAP help managers to generate specific reports like balance sheet, income statement, variance reports, profitability analysis and cost reporting. Managers of SM have also requested for these reports in order to analyze the company's performance outcomes in the current fiscal year so that they can continuously improve their products and services to meet or exceed the needs of customers.

Profitability Analysis report

'Profitability analysis report' reports the company's planned and actual cost and revenue. This practice helps the manager identify problems early and take actions to resolve the problem.

Menu Path: Accounting → Controlling → Profitability Analysis → Information System → Execute Report

1. Set Operating Concern Pop-up Box

Field	Data
Operating Concern	**IDEA**
Costing-based	**Select**

2. Select *Enter*

3. Run Profitability Report: Initial Screen

Select: Report	**IDES-015**

4. Select *Execute*

5. Selection: Plan/Actual Comparison w. Process Costs

Field	Data
From period	**1**
To period	**12**
From Fiscal Year	**2000**

6. Select *Execute*

Balance Sheet

At the end of each Fiscal year, managers at SM are interested in getting the balance sheet report to know the company's position at the end of the year. A company balance sheet has three parts: assets, liabilities and ownership equity. The main categories of assets are usually listed first and are followed by the liabilities.

A **balance sheet** or **statement of financial position** is a summary of a person's or organization's balances. Assets, liabilities and ownership equity are listed as of a specific date, such as the end of its financial year. A balance sheet is often described as a snapshot of a company's financial condition

Menu Path: *Information systems -> Accounting -> Financial Accounting -> General Ledger -> Balance Sheet*

In the Financial statements screen, enter

1. Chart of Accounts : **CAUS**

2. Company Code : **3000**

3. Financial statement Version : **BUS1** (Commercial Statement for US)

4. Reporting Year: **2000** (whichever year you want)

5. Reporting Periods: 1to 16

6. Comparison year: **1999** (Usually previous year)

7. Comparison Periods: 1 to 16

8. Click Execute

Income statement

Income statement, also called **profit and loss statement** (P&L) and Statement of Operations, is a company's financial statement that indicates how the revenue (money received from the sale of products and services before expenses are taken out, also known as the "top line") is transformed into the net income (the result after all revenues and expenses have been accounted for, also known as the "bottom line"). The purpose of the income statement is to show managers and investors whether the company made or lost money during the period being reported.
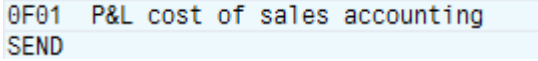
Menu Path: *Accounting → Financial Accounting → Special Purpose*

Ledger → Tools → Report Painter → Report→ Display (GRR3)

In the 'Report Painter: Display Report':

1. Expand 0F1 Income Statement

2. Select 0F-GUV1 IDES Cost of sales

3. Click Execute

4. If you get a dialog box saying `0F01  P&L cost of sales accounting`
   `SEND`

   Click on SEND

   On "CA705Bericht-/Bericht-Schnittstelle: Selection" Screen -

5. Fiscal Year: **2000** (which ever year you want)

6. Company Code: **3000**

7. Ledger: 0F

8. Plan Version: **1**

9. Click Execute

Congratulation!   You have finished your SAP assignment.   Please remember to send this word file to "Digital Dropbox" (Tools/Digital Dropbox on the left-side menu of course website).

Error 1: Confirmation Of Production Order: Actual Data

Menu Path:

Accounting → Controlling → Cost Center Accounting → Planning →
Planning Aids → Copy → Copy Plan to Plan (KP97)

This function allows you to copy a version of a given planning year into a
version of a different planning year.

You now create copy of versions 0,10, 20 and 110 of planning year 2000 to be
used in planning year 2009. This only applies, however, to activity type
planning, as this ensures smooth integration with the PP module.

1.   Enter the following data

Field	Version 0	Version 10	Version 20	Version 110
Target Cost Centers				
All cost centers	select	select	select	select
Template (Plan)				
Version	0	10	20	110
Period	1 to 12	1 to 12	1 to 12	1 to 12
Fiscal year	2000	2000	2000	2000
Plan data				
Structure with values	Select	Select	Select	Select
Target (Plan)				
Version	0	10	20	110
Period	1 to 12	1 to 12	1 to 12	1 to 12
Fiscal year	2009	2009	2009	2009
Reference CCtr=Target CCtr	Select	Select	Select	Select
Do not change	Select	Select	Select	Select
Test run	Deselect	Deselect	Deselect	Deselect
Detail list	Select	Select	Select	Select

2. On the Copy Planning: *Initial* Screen, choose **Edit → Select date**. In the dialog box, enter the following data:

Field	Data
Activity quantities	Select
Prices	Select

3. Choose

4. Choose

You have now copied version 0 (10, 20,110) of fiscal year 2000 for activity type planning into fiscal year 2009.

5. Repeat this procedure for versions 10, 20 and 110.

6. Repeat these procedures for controlling areas 1000 and 2000.

7. Choose until the overview tree appears

Appendix 2

Exploring ERP Performance Factors in the Context of ERP Continuous Improvement

Abstract

The primary aim of this study is to identify the factors that affect enterprise resource planning (ERP) outcomes. Seven main factors were investigated: managerial aspects, technical environments, sociopolitical environments, multidimensional competence, person-job fit, person-organization fit, and job performance. Graduated students from a major university in the New York City area were trained on the use of SAP's International Demonstration and Educational Systems (IDES) and were used as subjects in the study. They were given interdisciplinary cases and were asked to make decisions on the cases. Their experiences with ERP were analyzed using the Analytic Network Process (ANP) to identify the order of importance of the seven factors that were identified. The empirical results collected from these students' experiences show that 'person-organization fit' is the most significant factor, followed by the 'multidimensional competence' criterion. Based on this result, a Quality Function Deployment (QFD) model is developed to focus on the top four significant factors. The application of ANP and QFD as a joint analysis tool is a highly effective way of allocating resources and raising awareness to problems at hand.

1. Introduction

Enterprise resource planning (ERP) is a system-wide application software that is used to manage and coordinate information among different functional units of an organization. In today's information-intensive world, investment in ERP seems to be one of the major undertakings that a modern enterprise may embark on. Pace University, for example, has successfully implemented a single ERP platform for functions such as student services, human resources, and finance applications in a multi campus setting. Starwood Hotels & Resorts Worldwide, Inc., one of the world's largest hotel and leisure companies, has adopted state-of-the-art ERP systems to improve its guest and associate experience. Cisco Systems has also benefited from a stable ERP *platform*. Specific benefits from Cisco's quote-to-cash business process include (http://www.cisco.com/web/about/ciscoitatwork/business_of_it/erp_purchasing.html):

- improved financial controls and tax application,
- support for global procurement,
- simplified pricing systems for products and services,

- scalable order fulfillment, order management, and accounting, and
- scalable, integrated, service logistics and case management.

These examples show the trend in strategic and operational management and highlight the importance of information technology (IT) practices in major enterprises. They make it clear to modern enterprises that the *ERP* project is a priority. As noted by McGinnis and Huang (2004, p.612), however, "ERP implementation is a continuous improvement effort and continued work after system start-up will largely influence the ultimate success of an ERP system." This notion is also supported by Wei et al. (2008). Maximizing one's ERP system investment at the conclusion of the ERP start-up phase therefore seems to be o*ne of the biggest challenges* for policy and decision makers in today's organizations. With ERP, strategic and tactical decisions still need to be made regularly on the ERP system and its compatibility with the enterprise's infrastructure, process, and culture. Also, there exist certain realities of decision-making and social issues that policy and decision makers will perceive as roadblocks to quality decision-making and ERP system performances because oftentimes they are not properly prepared to (1) understand the critical success factors of ERP implementation projects and maintenance programs, and (2) employ contemporary decision science techniques. In order to address these issues, it is thus important to thoroughly evaluate factors that affect ERP performance outcomes after going live on a new ERP system to ensure that the overall ERP competency will meet the needs and expectations of the organization in question. Equally important to policy and decision makers when dealing with ERP continuous improvement seems to be decision-making in multi-stakeholder contexts. To this effect, two decision-making tools, namely, the Analytic Network Process (ANP) and Quality Function Deployment (QFD), are discussed in this study. ANP is a multi-criteria, multi-level decision model that allows for (1) the possible interdependencies between higher and lower level elements along a hierarchical network, (2) the possible interdependencies among elements at the same level in a hierarchical network, and (3) the development of priority weights for survey items based on decision makers' professional evaluation (Saaty and Vargas, 2006, Saaty, 2005). QFD involves listening to the voice of the stakeholder and systematically, translating stakeholder requirements into appropriate organization initiatives (Madu, 2006). They can be utilized effectively during the decision-making and knowledge acquisition process (Kahraman et al. 2006).

The ability to effectively identify critical success factors of ERP programs and use modern decision science tools in multi-stakeholder contexts can help today's policy and decision makers develop high level ERP system performances. To fully address this, a framework for ERP continuous improvement is proposed and illustrated in this study. Specifically, the presented framework addresses the following

questions:

- What are the major content variables in the context of ERP continuous improvement?
- How do these content variables rank?
- How do organizations prioritize the potential initiatives for continuous improvement?

Through literature review, we develop a list of content variables in the context of ERP continuous improvement. The ANP approach is used to develop the ranking for these content variables. Strategic program prioritization is achieved through QFD.

Our research approaches and findings will be helpful to enterprises around the globe to understand the key aspects of ERP continuous improvement and enhance the current knowledge base in ERP literature.

2. Research Background

2.1 Factors that Affect ERP Performance Outcomes

In order to identify potentially critical factors that significantly impact the ERP performance, we look to the existing ERP literature. Wei et al. (2008), for example, note that it is *essential* for *organizations* to choose a suitable ERP system and vendor in the first place. To identify critical success factors, they use an empirical study conducted in Taiwan. In the case of 'ERP systems', evaluation criteria are divided into ten distinct areas: module completion, function fitness, security, ease of operations, ease of learning, upgrade ability, ease of integration, ease of in house development, development stability, and recovery ability. The top four factors are function fitness, module completion, development stability, and ease of operation. As for the 'vendor', one needs to pay special attention to technical support, training support, and service capability and capacity. The 'service capability and capacity' criterion was found to have the highest priority, followed by the 'technical support' criterion. Wei et al. (2008) also reported three impact factors that address the impact of information on the ERP system performance. They are customer, organization, and individual. Their empirical results show that 'customer impact' is the most important factor driving overall success of ERP projects. For the continuous improvement of ERP, Wei et al. (2008) further observe that improvement programs are needed in the following two areas: organization (management enhance, cycle time reduction, workflow standardization, efficiency of system) and individual (quality of decision making, personal productivity improvement, and employee satisfaction). From another perspective, Huang et al. (2004) identifies ten common causes of disaster along the path of ERP implementation and maintenance: lack of senior manager commitment, ineffective communications with users, insufficient training of end-users, failure to

get user supports, lack of effective project management methodology, attempting to build bridges to legacy applications, conflicts between user departments, the composition of project team members, failure to redesign business processes, and unclear changing requirements. Examining those causes plays an essential role in the context of ERP continuous improvement. Firms that have adopted ERP-driven strategies need to come up with countermeasures to remain competitive in the long run.

To facilitate the deployment of ERP-driven strategies, Botta-Genolaz et al. (2005, p.510) note from literature review a growing interest on:

- the post-implementation phase of ERP projects,
- the customization and optimization of ERP systems,
- the sociological aspects of ERP implementation,
- the interoperability of ERP with other systems, and
- the return investment of the implementations.

The m*ost notable* of the *factors* on the transformation of an organization emphasized in Botta-Genolaz et al. (2005) can be divided into four groups: management and control issues, supply chain issues, multidimensional competences, and cultural/sociologic dimensions. Successful ERP-driven strategies depend on how well these critical dimensions are acknowledged and managed. Stratman and Roth (2002, p.601) also define ERP competence as a portfolio of "managerial, technical and organizational skills and expertise posited as antecedents to improved business performance occurring after an ERP system is operational and functionally stable." Sumner (2000) provides a summary of the risk factors in the domain of ERP projects. The three *most* widely discussed risk factors are organizational fit, skill mix, and software systems design. The organizational fit can be characterized by indicators such as task complexity, the extent of changes, resource management, and the magnitude of potential loss. The skill mix can be measured by indicators such as insufficient training and re-skilling, insufficient internal expertise, lack of business analysts with business and technology knowledge, and failure to mix internal and external expertise effectively. The software systems design is consisted of system integration and specifications. Through empirical studies conducted in Taiwan, Lin and Liou (2009) also note that in an ERP environment, there exist certain associations among the following factors: person-job fit, person-organization fit, and job performance.

Based on previous discussions, it appears that the dominant items within this literature base center on organizational evaluation and personal evaluation. Policy and decision makers, when deploying ERP continuous improvement strategies, thus must pay attention to both organizational and individual aspects of ERP systems. The

emphasis on managerial issues, technical environments, sociopolitical environments, and multidimensional competences can be viewed as organizational issues. Dimensions such as person-job fit, person-organization fit, and job performance are more in line with personal evaluation. They are therefore used for planning subsequent models and interviews.

2.2 The Analytic Network Process (ANP) Model and the Quality Function Deployment (QFD) Model

The Analytic Network Process (ANP), in Saaty's words (Saaty 2005, p.47), "provides a general framework to deal with decisions without making assumptions about the independence of higher-level elements from lower level elements and about the independence of the elements within a level as in a hierarchy." By using experts' judgments based on a nine-point scale system (see Appendix A), the ultimate goal of the ANP solution procedure is to obtain survey items' overall weights. By replacing decision hierarchies with network structures, the application of ANP generalizes the widely used Analytic Hierarchy Process (AHP). The ANP way thus has gained substantial *attention* as a possible solution to the multi-criteria decision making problem with a non-linear network structure. Ayag and Ozdemir (2009), for example, employ the ANP model in evaluating conceptual design options in a new product development environment. Sarkis (2003) explores the ANP for decision making in a green supply chain setting. Lee and Kim (2001) also consider the project interdependent property and develop the ANP model for information system project selection. While developing the ANP model, the major steps include (Avag and Ozdemir, 2009, Sarkis 2003):

▪ constructing the decision network structure,

▪ preparing the pairwise comparison matrices (see Appendix B),

▪ calculating the consistency ratio for each pairwise comparison matrix, and

▪ obtaining local weights (priorities) and global weights (priorities) through using the Super-matrix formulation and analysis approach.

There *has been* a good deal of recent research concerned with the issue of incorporating ANP results into the Quality Function Deployment (QFD) model (Kamvysi et al. 2010, Lin et al. 2010, Andronikidis et al. 2009, Kahraman et al. 2006, Ertay et al. 2005). As stated earlier, *QFD's* primary goal is to link what is often called the voice of the customer with design parameters. The primary deliverables that can be expected from a QFD planning exercise are the priorities of design parameters. At the conclusion of a QFD exercise, resources can be allocated subsequently according to the weights of design parameters. Using an original equipment manufacturing (OEM) firm in Taiwan as a case example, Lin et al. (2010) show that policy and

decision makers can rely on the ANP procedure to prioritize the voices of customers and the QFD approach to evaluate feasible sustainable production initiatives. To study engineering characteristics at the basic product planning stage of a car design, Ertay et al. (2005) also use both the ANP and QFD planning processes. The application of ANP and QFD as a joint analysis tool seems to be a highly effective way to deal with multi-criteria scenarios and to raise awareness to problems at hand. The present study thus adopts the ANP to evaluate our ERP model's two critical clusters, namely, organizational evaluation and personal evaluation. Once the overall weights of survey items are found, the QFD implementation procedure is followed to prioritize the ERP continuous improvement initiatives.

2.3 Current Advances on ERP Continuous Improvement

Continuous improvement is essential to strategic and operational management. Effective programs can promote continuous improvement for all ERP-based systems and facilitate an organization's cultural transformation. A number of published studies exist to provide insights on the possible directions for ERP continuous improvement. Parry and Graves (2008), for example, suggest that knowledge management (KM) is a key driver of ERP success. KM, in general, is defined as a process of acquiring, storing, distributing, and making sense of information (Parry and Graves 2008, McGinnis and Huang 2004). McGinnis and Huang (2004) introduce a four-phase ERP continuous improvement model that incorporates knowledge management (KM) into each phase of ERP development. The four phases are socialization, externalization, combination, and internalization. Once an *ERP* implementation is complete, it is still important to ensure that knowledge of ERP-based systems is assimilated, verified, and stored for the purpose of continuous improvement. Carmeli et al. (2009), on the other hand, suggest that a stronger emphasis should be placed on learning behaviors in the workplace. Learning is a process, as noted by Carmeli et al. (2009, p.81), "often relational in the sense of relying on interactions between people to determine what needs improving and how to do it." Drucker (1991) also *supports* the *notion* that creating a culture of *continuous* growth and development through a partnership between management and employees can contribute to quality improvements. In the context of ERP continuous improvement, policy and decision makers thus need to help employees broaden their perspective, hear employees about their continuous learning needs, help employees upgrade their knowledge and skills, see it in action, and make sure things are *moving along* fairly smoothly in the process of change. To facilitate the deployment of supply chain strategies for competitive advantage, as noted by Bose et al. (2008) and Tarn et al. (2002), modern organizations tend to integrate ERP and supply chain management (SCM) systems. This poses new

technical and organizational challenges. The integrated system, however, can consolidate supply chain resource management and streamline the information system. This understanding is important because the ultimate goal of this integrated system is to improve supply chain operations, foster a paperless environment, provide better financial management and corporate governance, and achieve information *visibility* in a demand-responsive supply chain (Bose et al. 2008, Madu and Kuei 2004). To *improve organizational* performance, Hoffman and Mehra (1999) theorize that management leadership and productivity improvement programs play a major role. They are the driving forces for the transformation of high quality organizations. Major factors causing the failure of such a transformation include: lukewarm commitment and involvement by top management, a piecemeal, unplanned approach to improving productivity, poorly trained supervisory personnel, ineffective coordination among functional departments, and insufficient investment in workforce training. Although there is no easy path to transformation, Prado-Proado (2009) *suggest* working on the organizational structure of the implementation and improvement processes. The participation of top management is critical to successful transformation. Leaders in the context of ERP continuous improvement thus need to think strategically, assess current organizational conditions, mobilize change within the organization or along the supply chain, and get endorsement from other supply chain partners.

Through ERP continuous improvement initiatives, organizations can remain competitive by developing long-term ERP competences. This, however, will also take a well designed and persistent effort to realize such a goal.

3. A Framework for ERP Continuous Improvement
3.1 The Architecture of the Integrated Decision-making Process

We have examined the current context surrounding ERP continuous improvements. Of particular interest in this paper is the *answer* to the *question "*What are the strategic *choices* in the context of ERP continuous improvement?" As suggested by Strauss and Gorbin (1998, p.9), strategic choices in the material world are made on the basis of "an awareness of the interrelationships among conditions (structure), action (process), and consequences." It is thus our intent to present a framework for ERP continuous improvement to provide policy and decision makers in today's modern enterprises with the knowledge and skills to make appropriate strategic choices. Figure 1 depicts such a framework. To meet the new challenges of ERP continuous improvement, as can be seen in Figure 1, t*here must be interaction* between the organization in question and a *decision making* process. To produce a final *choice*, policy and decision makers normally need to make a decision under uncertainty. However, as noted by Li and Li (2009, p.5558), "it is evident that many

directors or senior managers lack knowledge and analytical skills." To deal with this, it is most important to consider a path so that major content variables in the context of ERP continuous improvement can be conceptualized, and contemporary decision making tools can be used to form a basis for further managerial/technical/sociopolitical actions. On the left hand side of Figure 1, a hybrid approach is thus adopted to help policy and decision makers make a solid strategic choice. The general approach of the proposed hybrid approach is a five-step process that consists of the identification of critical dimensions and their definitions, the construction of an Analytic Network Process (ANP) model, a procedure for obtaining weights of dimensions, the development of a Quality Function Deployment (QFD) model, and finally a recommendation. Expected deliverables are also presented to ensure the success of applications.

3.2 An ANP-based Conceptual Model

A *review* of the *literature* in section 2.1 leads to the conclusion that ERP-based businesses should focus on critical success factors in the context of ERP continuous improvement. We further hypothesize that there may be two dominant groups, namely, organizational evaluation and personal evaluation. By considering different dimensions for ERP performance outcomes, Figure 2 depicts a holistic view of the problem, in which two-way *interactions* between organizational evaluation and personal evaluation may also influence the outcome of ERP performance. As shown in Figure 2, the challenge for policy and decision makers in this context is to explore the following seven areas:

- Managerial aspects: planning and running (strategic, core, and business support) processes, management control methods, work flow management, and management infrastructure
- Technical environments: information infrastructure development, functions and mechanism design, and technology planning and integration
- Sociopolitical environments: leadership, business climate, and the communication mechanism with others
- Multidimensional competences: ERP competence, and a portfolio of individual learning and enterprise growth
- Person-job fit: application-specific knowledge and training, and user experiences and capacities
- Person-organization fit: task complexity, the extent of changes, and the quality of decision making
- Job performance: personal productivity improvement, and employee satisfaction

In this study, we also hypothesize that our decision-making problem cannot be structured hierarchically because it involves a two-way dependence between the 'organizational evaluation' cluster and the 'personal evaluation' cluster. This decision-making problem, however, fits the ANP representation model well. We thus select the ANP conceptual modeling approach to represent the decision structures adopted in this study. Figure 3 depicts the ANP model that captures all seven survey items under consideration and dependencies between organizational evaluation and personal evaluation.

3.3 Evaluating the ANP Model

The general approach of the ANP data collection and Super-matrix analysis procedure described by Avag and Ozdemir (2009) is adopted and followed here. Specifically, a systematic approach consisting of four steps was used:

Step 1: Preparing pairwise comparison matrices based on the proposed ANP model,

Step 2: Collecting field data by employing Saaty's 9-point scale system (see Appendix A),

Step 3: Obtaining the initial weights (priorities) for each pairwise comparison matrix and constructing the initial Super-matrix, and

Step 4: Using the SuperDecisions software (http://www.superdecisions.com/) to obtain the local and global (or final) weights (priorities) for each survey item.

3.4 Conducting a Quality Function Deployment (QFD) Exercise

Quality Function Deployment (QFD) is an effective method to address how stakeholder concerns can be satisfied through design. In this study, stakeholder concerns, which are often referred to as "whats", are derived from the ANP analysis. QFD is used subsequently to translate "whats" into "hows". The output of QFD exercise, or "hows", can be used as a blueprint for ERP continuous improvement. A stepwise form described by Madu (2006) is shown below:

Step 1: identifying stakeholders' concerns (also known as "survey items") and the rate of importance for each item [Ai],

Step 2: developing a list of the design parameters (known as "hows"),

Step 3: forming the basis for the QFD chart using inputs from steps 1 and 2,

Step 4: constructing a relationship matrix, and

Step 5: totaling each design parameter column and converting each column total to a "%".

We shall conduct an empirical study by following each of the steps presented here. For the purpose of this study, the recommendation plan, however, is not

presented.

4. Empirical Assessment

4.1 Sample

Graduated students from a major university in the New York City area were trained on the use of SAP's International Demonstration and Educational Systems (IDES) and were used as subjects in the study. The objectives of the training are:

• to enhance interdisciplinary education;

• to enhance understanding of ERP-enabled process changes and improvement;

• to enhance understanding of the effective use of the ERP platform;

• to investigate the process management issues that focus on organizational structures, leadership styles and team empowerment and how they affect technology adaptation, resistance to and management of change, and information management.

At the conclusion of the training session, students were lectured on the use of ANP and the meaning of the 9-point scale system (see Appendix A). The seven major survey items are reviewed and presented using the ANP model. This is shown in Figure 3.

The ANP methodology is then applied to obtain the local and global (or final) weights for each survey item.

4.2 The ANP Methodology

In the discussion above, we noted the importance of finding what the most preferable stakeholders' requirements are. This can be done through the use of ANP. Based on the prior exposure to ERP case studies and walk-through exercises, our participants follow the systematic approach described in section 3.3:

Step 1: Preparing pairwise comparison matrices based on the proposed ANP model

The first step is to prepare pairwise comparison matrices. As shown in Figure 3, four survey items in the top cluster of the ANP model are managerial issues, technical environment, sociopolitical environment, and multidimensional competences. With respect to the "Person-Job Fit" factor, for example, the corresponding pairwise comparison table needs to be established first. This is shown in Appendix B. Similar matrices need to be prepared according to the proposed ANP model (see Figure 3). In total, seven pairwise comparison matrices are prepared for this study.

Step 2: Collecting field data by employing Saaty's 9-point scale system

In the second step, we collect field data by employing Saaty's 9-point scale system (see Appendix A). Based on the matrix shown in Appendix B, four pairwise

comparison questions were answered by the participants. The first question, for example, is: With respect to the "Person-Job Fit" factor, how much more important is the "managerial issues" criterion than the "technical environment" criterion? The end results obtained from this exercise are shown in Appendix B.

We also apply this procedure to the other six pairwise comparison matrices to collect field data.

Step 3: Obtaining the initial weights (priorities) for each pairwise comparison matrix and constructing the initial Super-matrix

In the third step, we find the initial weights for each pairwise comparison matrix. A decision support system (DSS) such as SuperDecisions may be used for the computation of initial weights. The initial weights are used to form the un-weighted Super-matrix. Avag and Ozdemir (2009) call the Super-matrix a partitioned matrix, where each sub-matrix is composed of a set of initial weights derived from the computation procedure. The un-weighted Super-matrix formed in this study is shown in Table 1. In total, there are seven groups of initial weights. In column six, for example, with respect to the "Person-Job Fit" factor, the initial weights for four survey items in the top cluster of the ANP model are 0.1546, 0.1169, 0.2523, and 0.4761. For this case, the participants gave the highest priority (0.4761) to the "multidimensional competences" criterion, followed by the "sociopolitical environment" criterion (0.2523). The Super-matrix can be used as a check list to ensure that we complete the analysis based on the proposed ANP model.

The consistency ratio (C.R) is shown on the last row of Table 1. Since they are all less than 0.1, we conclude that there are no inconsistencies in the judgment of the participants.

Step 4: Using the SuperDecisions software (http://www.superdecisions.com/) to obtain the local and global (or final) weights (priorities) for each survey item

The final step is to derive the local and global weights for each survey item. The local weights are priorities in a given cluster. As shown in Table 2, in the "organizational evaluation" cluster, the "multidimensional competences" criterion receives a local priority index of 0.44252. The "sociopolitical environment" criterion is also high on the priority scale with an index of 0.25306. The global weights are obtained by raising the initial Super-matrix to a sufficiently large power, normally the power 2^{k+1} (k is an arbitrarily large number), until the weights can remain stable. Both weights can be obtained through the use of SuperDecisions. On both local and global scales, the priorities for seven survey items are given in Table 2.

4.3 Quality Function Development (QFD)

The previous section presents a readily applicable set of steps from the ANP. Once global priorities are known, they can be *ranked* in *order of importance* and used to guide continuous improvement (CI) actions. For prioritizing design parameters, the *QFD* modeling approach is adopted here:

Step 1: identifying stakeholders' concerns (also known as "survey items") and the rate of importance for each item [Ai]

For the sake of illustration, we assume that only the top four factors given in Table 2 have been considered by participants in the QFD exercise. As a result, the "whats" section is composed of person-organization fit, multidimensional competences, job performance, and sociopolitical environment. For the sake of computation, in this step, each initial global weight derived from the ANP is multiplied by 100. The result is called the Ai value. As shown in Figure 4, the Ai value for the "person-organization fit" factor is 28.49.

Step 2: developing a list of the design parameters (known as "hows")

Four design parameters are under consideration: (1) programs to help Knowledge Management systems integrate into ERP continuous improvement (McGinnis and Huang, 2004), (2) programs to help employees upgrade their skills and broaden their perspective (Carmeli et al. 2009), (3) programs to enhance ERP and SCM systems integration (Bose at al. 2008), and (4) programs to enhance management leadership and productivity improvement (Hoffman and Mehra, 1999). We can label them as Q1, Q2, Q3, and Q4 respectively.

Step 3: forming the basis for the QFD chart using inputs from steps 1 and 2

The inputs from steps 1 and 2 form the basis for the QFD chart. Figure 4 presents such a chart. On the left side of the chart, the list of significant stakeholder concerns is presented. On the top of the matrix, we identify design parameters under consideration.

Step 4 constructing a relationship matrix with the following two sub-steps:
Step 4(a): filling in the correlation weights

Correlation weight symbols are portrayed in the bottom right corner of Figure 4. For example, a @ symbol shown at an intersection point between stakeholder concern and design parameter means the strongest link. The corresponding numerical weight is 9. In this step, subjects were normally asked to assign a correlation weight to each link presented in the QFD chart. In total, there are sixteen links in our illustrative

example. The simulated correlation weights are shown in Figure 4.

Step 4(b): calculating the cell values

The cell value is defined as follows: a numerical value of symbol*its row's Ai value. For example, the cell value shown at the intersection point between the "person-organization fit" factor and the first design parameter is 3*28.49, or 85.47.

Step 5: totaling each design parameter column and converting each column total to a "%"

In this step, we can determine the importance weighting for the design parameters. For example, consider the design parameter "Knowledge Management." We can determine its importance weighting as (3*28.49)+(9*22.13)+(9*14.29)+(3*12.65)≈ 451. Similarly, we can determine the other design parameters' importance weights as 527, 261, and 309 respectively. The final step is to convert each column total to a percentage. The result findings are presented on the bottom of Figure 4.

Based on the QFD exercise, we conclude that, to satisfy the stakeholder concerns laid out for ERP continuous improvement, the design requirements should first focus on Q2 (individual learning and growth in the ERP-based environment) and Q1 (Knowledge Management).

5. Managerial Implications and Future Works

We have described a process that will assist in the development of ERP continuous improvement programs. The process involves empirical assessment of critical success factors and ERP-enabled initiatives. There are several observations from our results:

First, there is abundant evidence that modern enterprises adopt enterprise IT strategies and take managerial, technical, and sociopolitical actions for continuous improvement. Our findings shed light on the importance of critical success factors in the context of ERP continuous improvement. We prioritize those strategic variables and identify ERP-enabled operations as the major source of the long-term business success. The implementation and deployment process *is essential* for business to strive to *improve competitiveness*. The process presented in this study showed that proven tools could be applied in the context of ERP continuous improvement.

Second, because *our proposed framework* is highly integrated, it has the potential to make much better decision-making *information* available to policy and decision makers. *By following* the architecture of ERP continuous improvement, policy and decision makers can use decision tools such as the ANP to decide on the strategic direction in the eyes of stakeholders. The most important strategic direction, according to our participants, is to work on person-organization fit in an ERP-enabled environment. Practicing managers thus need to pay attention to issues such as task complexity, the extent of changes, and the quality of decision making. Our finding is consistent with that of Sumner (2000). Once the strategic direction is laid out, policy and decision makers can introduce plans with the help of tools such as QFD. The most important design requirement, as shown in our illustrated example, is to focus on individual learning and growth. Scarce *resources* can then be *allocated* appropriately in a competitive environment.

Third, when joining colleagues in engaging *discussion*s about ERP competence and continuous improvement, participants' worldviews can be expanded. Our joint analysis procedure can give participants a *better understanding of the* long-term ERP *problem* at hand. It should be pointed out that this benefit is not expected initially by our subjects when participating in the ERP training project. The primary emphasis of our participants, initially, is to understand the ERP platform and applications. Our participants, when taking the ERP training class, thus tend to focus on ERP's ability to (1) automate and integrate a firm's business processes, (2) share common data and practices across the entire enterprise, (3) and provide and access information in a real-time environment. The present study, conducted at the end of an ERP training session, draws our participants' *attention* to vital *managerial* skills and management knowledge for the efforts of ERP continuous improvement. In other words, our

participants learn that ERP implementation is vital to long term competitiveness. *Equally important* are the ERP competence development after the conclusion of ERP start-up phase. Further, they also learn that stakeholders are active participants in the deployment process. *The discussion*s presented on these issues thus are of value to our participants. They conclude that there is a great need to be able to identify and classify core variables from the very beginning of the ERP improvement process to improve an enterprise's overall capabilities. This conclusion is in line with the suggestions by Stratman and Roth (2002).

Fourth, in conducting self assessment in terms of ERP continuous improvement, Stratman and Roth (2002) provide a robust set of criteria. They classify ERP competences into eight groups: strategic IT planning, executive commitment, project management, IT skills, business process skills, ERP training, learning, and change readiness. The same ANP and QFD joint analysis procedure presented in this study can be used in conjunction with the ERP competence framework proposed by Stratman and Roth (2002). By including stakeholders and considering different worldviews, policy and decision makers can help develop a more enterprise-specific assessment model. This will enable the effective use of continuous improvement initiatives that may create and improve long-term ERP competences.

Fifth, our ANP model needs to be further validated and tested in a different setting. In determining the survey items and dependencies, the views of experts must be considered when developing such a model. This is an important step to improve the quality of the ANP network structure in the context of ERP continuous improvement. Figure 5 depicts an attempt to realize the ANP model in a more advanced form. The DSS such as SuperDecisions can be used for forming the graphical model and obtaining both the local and global weights. Further, since it would be hard to capture the imprecision in human judgment and obtain crisp data from the experts, we should consider using fuzzy scales in future works. The overall acceptability of a Fuzzy ANP approach, however, needs to be tested to ensure its practical values.

Sixth, we focus on strategic choice and policy deployment using the ANP and QFD. There is also the problem of other technology management issues and resource allocation problems. Through the use of optimization techniques such as linear programming, goal programming, and data envelope analysis (DEA), these problems can be addressed. Kamvysi et al. (2010), for example, discuss the combination of QFD with the ANP and DEA methodologies in a service context. This hybrid process, if adopted in the context of ERP continuous improvement, will lead to the design of programs and processes that are Kaizen conscious and meet the aspirations of the stakeholders.

Although our empirical study cannot be generalized beyond its scope, the general framework and deployment procedures shown in this paper can offer good guidance in effectively managing ERP competences.

6. Conclusions

Our paper presents a strategic framework to consider critical success factors and the policy deployment process in the context of ERP continuous improvement. This framework can help policy and decision makers in modern enterprises find immediate innovative solutions to the following two common challenges: (1) identifying and prioritizing major content variables in the context of ERP continuous improvement, and (2) making the right strategic choice by using the right decision science tool. As illustrated with our empirical studies, the application of ANP and QFD as a joint analysis tool can be a highly effective way to deal with such a challenge. In this preliminary investigation, we have found some interesting results. It is however, important to conduct more studies in the future to assess experts' worldviews on ERP continuous improvement in a variety of organizational settings. Such studies can help ERP-based enterprises become more competitive.

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Table 1 Unweighted Super-matrix

Dimensions	Managerial Aspects	Technical Environment	Sociopolitical Environment	Multidimensional Competences	Person-Job Fit	Person-Org Fit	Job Perf.
Managerial Aspects					.1546	.2322	.1219
Technical Environment					.1169	.0800	.1835
Sociopolitical Environment					.2523	.2785	.2026

Multidimensional Competences					.4761	.4092	.4919
Person-Job Fit	.1958	.1260	.0809	.1634			
Person-Org Fit	.4934	.4578	.7306	.5396			
Job Perf.	.3108	.4161	.1884	.2969			
C.R.	.0516	.0064	.0624	.0089	.0363	.0618	.0830

Table 2 Results

		Local Weights	Global Weights
Organizational Evaluation	Managerial Aspects	.18951	.0948
	Technical Environment	.11492	.0575
	Sociopolitical Environment	.25306	.1265
	Multidimensional Competences	.44252	.2213
Personal Evaluation	Person-Job Fit	.14439	.0722
	Person-Org Fit	.56981	.2849
	Job Perf.	.28580	.1429

Figure 1 A Framework for ERP Continuous Improvement (CI)

The Architecture of our hybrid Approach

Deliverables

Enterprise in Question

What are the strategic choices in the context of ERP continuous improvement?

Critical Dimensions and their Definition (Figure 2)

Business case (ERP Performance)

Organizations

Literature review

Constructing the ANP Model (Figure 3)

Survey items based on the ANP framework

Supply Chain Systems

Determining local and global priorities (Table 2)

Filled-out survey forms

Practicing Managers

Identifying ERP CI initiatives based on the QFD model (Figure 4)

Survey items (based on QFD)

Actual Practices

Recommendations

Filled-out QFD forms

Implementation plans

- - - - - - - ➤ Not considered in this study

Figure 2 Factors that Affect ERP Performance Outcomes

Organizational Evaluation

Personal Evaluation

Multidimensional Competences

Learning and Growth, ERP Competence

Managerial Aspects

Strategic Process, Core Process, Business Support Process

Person-Job Fit

Person-Organization Fit

Job Performance

Sociopolitical Environment

Leadership, Business Climate, Communication with Customers and Suppliers

Technical Environment

Product Complexity, Process Complexity, ERP Complexity
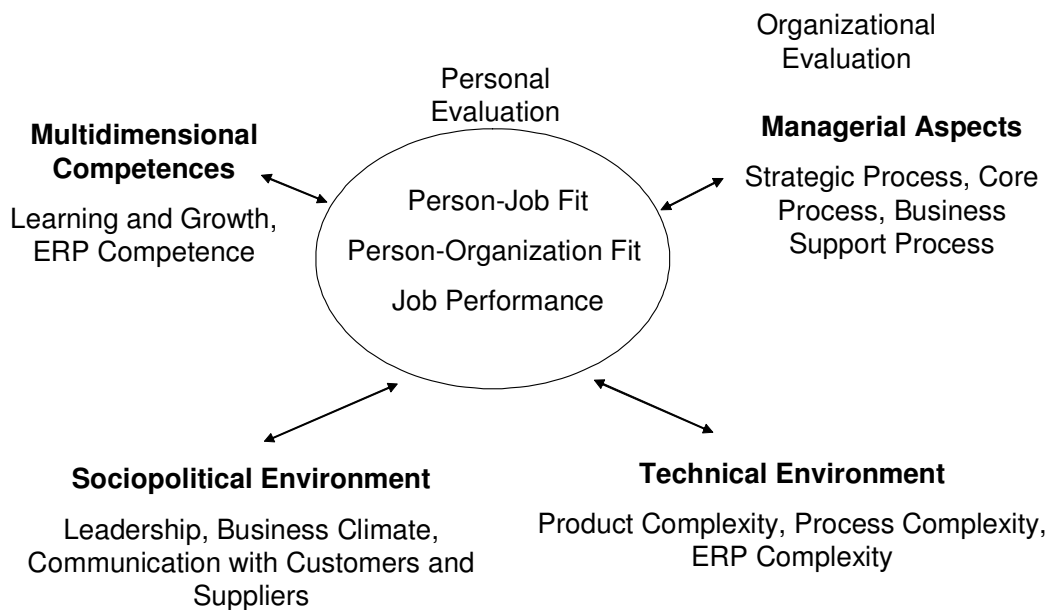
Figure 3 Evaluating the ERP System in question through using the ANP

Dimensions - Organizational Evaluation

Managerial Aspects	Technical Aspects	Sociopolitical Aspects	Multidimensional Competence

Dimensions - Personal Evaluation

Person-Job Fit	Person-Organization Fit	Job Performance
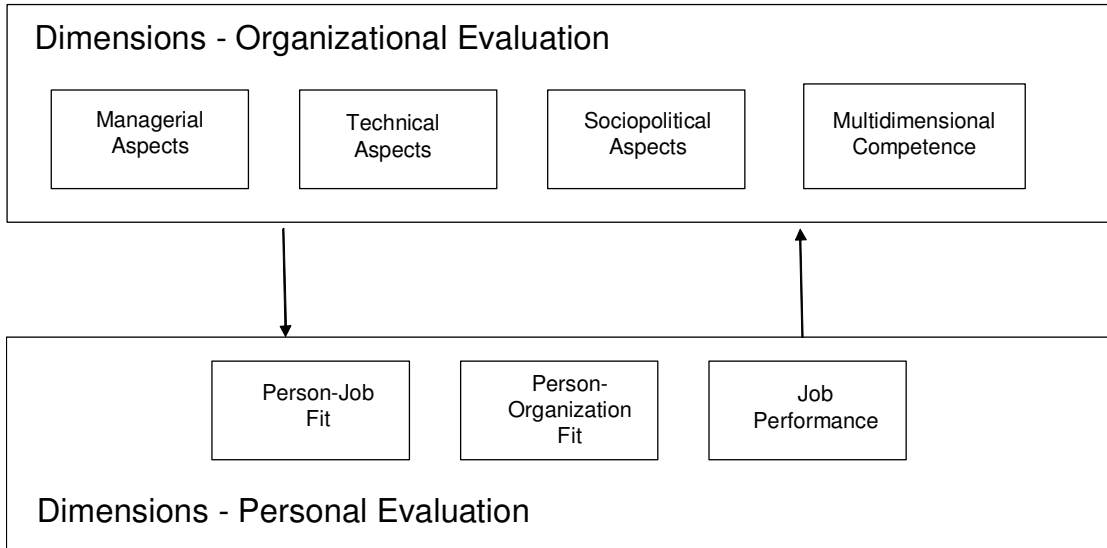
Figure 4 Quality Function Deployment (QFD)

CI Initiatives (how)

Critical Dimensions (what)	Q1	Q2	Q3	Q4	Rate of importance
Person-Organization Fit	#	#	^	#	28.49*
Multidimensional Competences	@	@	#	#	22.13
Job Performance	@	@	@	#	14.29
Sociopolitical Environment	#	@	#	@	12.65
Total	451	527	261	309	1548
%	26	34	17	20	
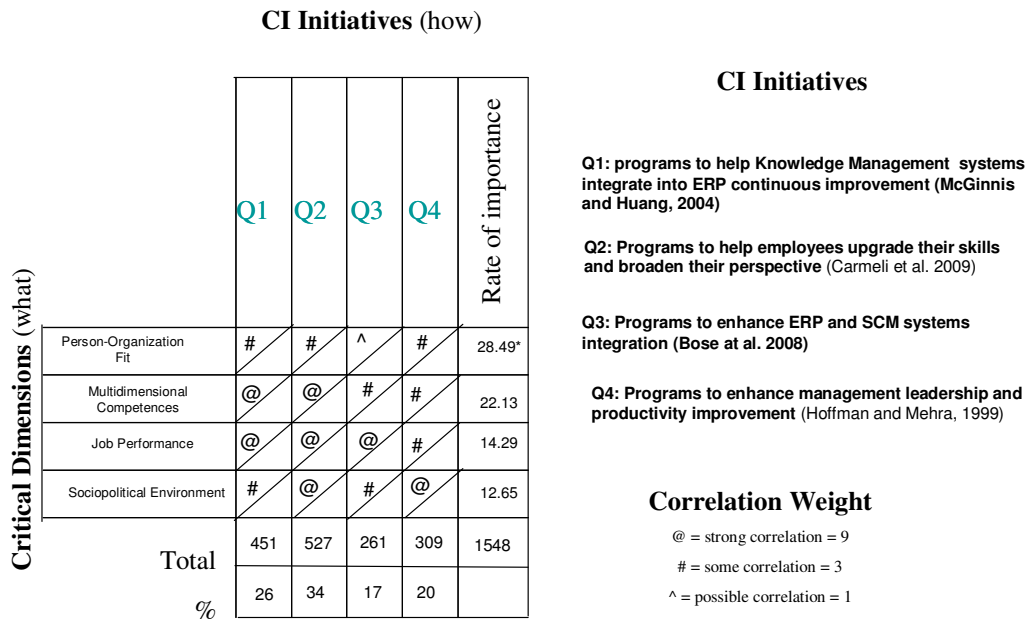
*:28.49=initial ANP global weight * 100=.2849*100

CI Initiatives

Q1: programs to help Knowledge Management systems integrate into ERP continuous improvement (McGinnis and Huang, 2004)

Q2: Programs to help employees upgrade their skills and broaden their perspective (Carmeli et al. 2009)

Q3: Programs to enhance ERP and SCM systems integration (Bose at al. 2008)
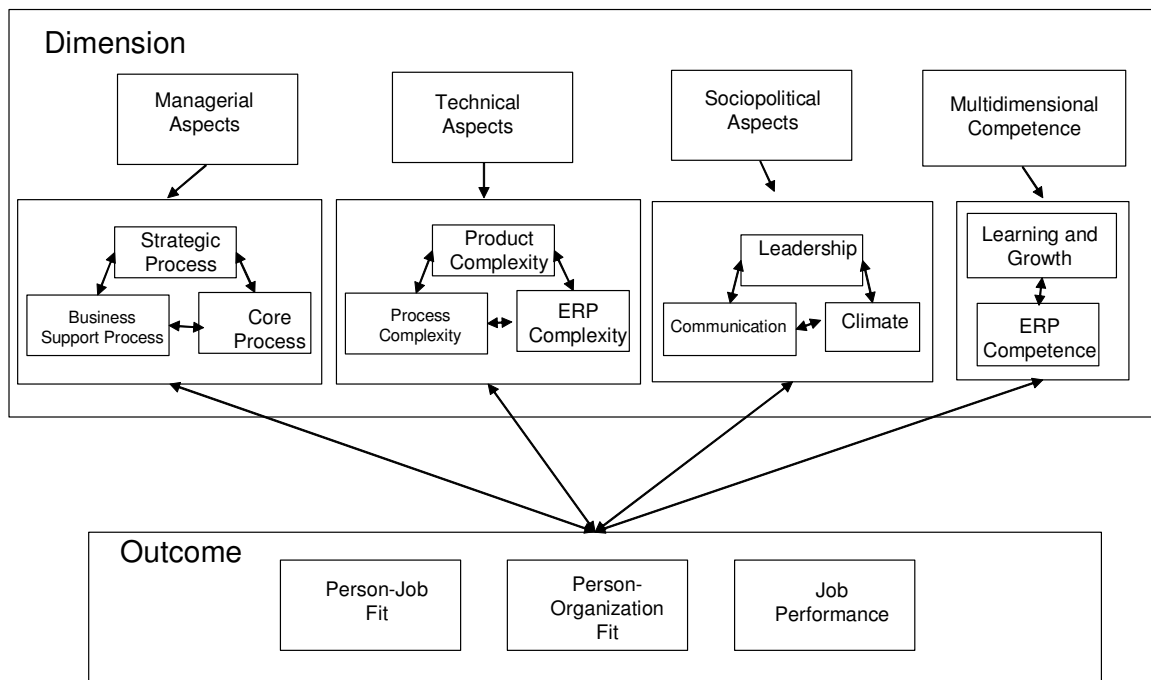
Q4: Programs to enhance management leadership and productivity improvement (Hoffman and Mehra, 1999)

Correlation Weight

@ = strong correlation = 9

= some correlation = 3

^ = possible correlation = 1

Figure 5 Implications for Research Strategy and Further Study

Appendix A

9-point scale system used in the conventional ANP model to assign their judgments:

When comparing item i and item j, select a numerical value A_{ij} from the following set:

1: item i and item j are of equal importance,

3: item i is weakly more important than item j,

5: item i is strongly more important than item j,

7: item i is very strongly more important than item j,

9: item i is absolutely more important than item j, and

2, 4, 6, 8: intermediate values between the two adjacent judgments.

Further, $A_{ii}=1$. If $A_{ij}=y$, then $A_{ji}=1/y$.

Appendix B

With respect to the "Person-Job Fit" factor,

please make 6 judgments about the relative importance of the item i and item j

	j			
i	Managerial Aspects	Technical Aspects	Sociopolitical Aspects	Multidimensional Competence
Managerial Aspects	1	2	1/2	1/4
Technical Aspects	X	1	1/2	1/3
Sociopolitical Aspects	X	X	1	1/2
Multidimensional Competence	X	X	X	1