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# **GLOBAL MANUFACTURING**

## **STUDY OF COMPANY INTEGRATION WITHIN A COUNTRY**

By

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**Abstract**

GLOBAL MANUFACTURING: A  
STUDY OF COMPANY  
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COUNTRY

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A number of studies on Global Manufacturing Practices and the establishment of global company integration based on the similarity of practices among countries or regions have been conducted in the past. However, very few studies have been conducted on the integration of companies within a country. This study, using a survey approach, investigates an integration method based on Global Manufacturing Practices data collected from small and medium manufacturing companies in Indonesia.

The development of successful joint ventures, integration, and other forms of collaboration depend on the ability to successfully integrate the production activities (Gyula Vastag, 1993). Global Manufacturing Practices developed by D. Clay Whybark, describe methods to examine the aspect of manufacturing activities based on the compatibility index (i.e. manufacturing practices) among participating companies around the world. The measurement of compatibility developed in his study is based on the data compiled by the Global Manufacturing Research Group (GMRG). Several comparisons, primarily based on statistical analysis, are helpful in understanding differences in manufacturing practices.

Using the Global Manufacturing Practices survey, the study examines the participant perceptions of the manufacturing practices within their companies. The survey subjects are small and medium manufacturing firms (SMEs) from different regions of Indonesia. In addition to making general conclusion about manufacturing practices, the research proposes suggestions for development of integration based on measurements of the compatibility index of manufacturing practices relative to the Polman<sup>1</sup> base region.

The study evidence indicates the following major finding:

- The participating companies indicated that a manufacturing activities database of Global Manufacturing Practices is an important knowledge resource and should be established on the basis of being clearly defined and accessible to all, including people outside the contributing companies.
- To gain the most potential benefit, this data should be used for strategic planning prior to collaboration.

The findings of the study suggest that a successful production activities integration process is dependent, to some degree, on the compatibility of manufacturing practices between collaborative parties. Further work, to confirm the suitability of the Compatibility Index for predicting actual compatibility, will be needed, but was judged to be beyond the scope of this thesis.

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<sup>1</sup> Politeknik Manufaktur Bandung (Bandung Polytechnic for Manufacture), an Educational institution (see chapter 4).

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## 1 CHAPTER 1: INTRODUCTION

### 1.1 Project Area of Interest

*"The concept of "Martini Merger" was developed to describe alliances that had great promise from a boardroom standpoint but failed because of operational details. Often, top executives enter into agreements for collaborating. These agreements must then be made to work at the operational level, and that is where the compatibility of the manufacturing practices comes into play..." (D. Clay Whybark, 1993)*

"Manufacturing competition in the global markets has posed strategic challenges for every nation. In this global era, the national boundaries become less important than the ability of the manufacturing organization to find and secure its competitive place in the world" (Kenichi Ohmae, 1990). The companies that do not plan for continuous improvement in the conceptualization and implementation of innovative state-of-the-art manufacturing systems will be marginal competitors (Bidanda, Cleland, and Dhawadkar, 1993). To face this challenge, Indonesia has established cooperation efforts in the field of science and technology. During the 1995 meeting of APEC's Science and Technology ministers in Beijing, it was agreed that member economies should accelerate their common efforts in science, technology, and research (Samadikun, 1991). Samadikun concluded that Indonesia has to prepare by developing its small and medium-sized enterprises through technology-oriented knowledge and by strengthening the degree they collaborate as a group.

A form of collaboration among companies within a country is an important factor in the 25 years to come. In this era, Indonesia together with other APEC countries, has agreed to joint trade liberalism (Samadikun, 1991). This event will

have big influences for Indonesian manufacturing industries considering that they have to compete with multi national industries. To face the challenge and to achieve the benefits of the situation, companies should have strong and well-developed strategic cooperation systems. Such systems should consist of strategy for both planning and management including the use of all information on manufacturing practices. The purpose of such information is to help provide insights on the practices that lead to better performance and develop an understanding of where differences in practice between two parties might lead to problems (Whybark, 1993). By achieving a database of such information, Indonesian companies could have all the needed information prior to the collaboration process taking place between them.

Hence, the establishment of a manufacturing practices database within a country is important to the success of the integration process. Such data can be obtained based on the Global Manufacturing Practices survey methodology.

## 1.2 Research Problem

In relation to the database above, most companies in Indonesia have recently begun developing an information system for the creation of a manufacturing database organized by the Biro Pusat Statistik<sup>2</sup> (BPS). This data is intended to support manufacturing development. Any company looking for integration can search and gain information about their prospective business partners, as can people outside the company such as suppliers, markets, and vendors.

Nevertheless, it appears that this strategic planning manufacturing database covers only “regulation or policy”. It is not intended for integration matters that are based on the production activities. Therefore, this study will seek to gather

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<sup>2</sup> Biro Pusat Statistik (Statistics Central Bureau).

such general data of manufacturing activities based on global manufacturing theory.

Given the problem context above, the objective of this study is to have information on production activities available for the Indonesian manufacturing communities, as well as people from outside the communities. Also based on these survey database results, the study will investigate the integration process.

Companies have been surveyed in order to seek answers to the following research questions derived from the objective above:

- How could a Global Manufacturing Practices database be beneficial to Indonesia manufacturing communities?
- How should the collected data be considered as a strategic planning tool toward companies' cooperation within the country?
- What are the major factors related to the integration process under Global Manufacturing Practices?

### **1.3 Conceptual framework and study method**

Referring to the research questions above, the conceptual framework applied in this study is based on Whybark and Vastag (1993) concepts of how the data should be collected and processed under Global Manufacturing Practices. The purpose is to help provide insights on the manufacturing practices that lead to better performance and develop an understanding of where differences in practice might lead to problems. Thus, the units of analysis carried out in this study focus on:

- Participants perceived usefulness of the database, which is based on participants' assessment of the quality of the performance of their manufacturing practices and overall organizational management of their companies.
- Strategic planning with respect to Global Manufacturing Practices within Indonesian manufacturing enterprises, which includes identifying:
  - The companies' objectives and priorities with regard to an integration process.
  - Information that the companies hold and where it is held
  - Resources that the companies have and how they make the information accessible.
  - The value of data and how the company uses such data in relation to its resources and its objectives
  - The technologies used and how they are managed to support development of their activities

Because of these units of analysis, the study relies on a survey approach. The approach is carried out to analyze the suitability of the Global Manufacturing Survey Data to aid the integration process. This includes defining the methods for choosing variables and measuring similarities in the practices.

The survey is also used to analyze company staff's perceptions of Global Manufacturing Practices as well as to investigate the usefulness of having participation in the study. Using the questionnaire, the survey is conducted in relation to the first unit of analysis. The questionnaire was piloted with a prototype questionnaire in order to examine respondents understanding and to obtain respondents' opinions of the content of the questionnaire.

Database collected informs the current situation of the companies with respect to the Global Manufacturing Practices happening in Indonesia.

#### **1.4 Report structure**

This first chapter begins with a description of the project area of interest and the need for exploring companies' perception of manufacturing practices in order to investigate its effect on the successful integration in Indonesia. The description includes a general perspective of the problem context, as well as the project method and units of analysis carried out in this study. The remaining chapters of the report are outlined as follow:

**Chapter 2** reviews some basic theories and ideas related to the issues of Global Manufacturing Practices. This also looks at some past studies that have investigated problems associated with the issues of global manufacturing and company integration process.

**Chapter 3** discusses the methodology used in the research project. This includes the choice of research strategic and the proposed project design. The discussion comprises an assessment of theoretical-based research procedures and the application of recommended procedures.

**Chapter 4** presents the results of analysis and interpretation of the data from the survey that is documented in spreadsheet format. The chapter consists of two sections, general survey result (survey database) and integration analysis results. It includes discussions of how the hypothesis is confirmed by linking the findings with the theoretical proportions of the project study. The limitation and the overall result of the project study are also reviewed in this chapter.

**Chapter 5** concludes the entire project study with a general perspective by summarizing the project objective, design and methodology, findings and results

as well as limitations. This chapter also discusses some directions for further study.

## **2 CHAPTER 2: SUBJECT REVIEW**

This literature review aims to investigate the role of Global Manufacturing Practices leading to an integration process based on similarity of collected survey data. Therefore the review looks at some basic theories and ideas related to the issues such as:

- The ideas behind Global Manufacturing Practices
- The importance of Global Manufacturing Practices based on regional classification.
- Case study of an integration process using Global Manufacturing Practices survey results. This will focus on within-country integration.

The global manufacturing theories are discussed in relation to the possibility of their significance to the integration process for Indonesian manufacturing communities. The aim of the study is to see why Global Manufacturing Practices data should be treated as a strategic tool for an integration process, and how it should be adjusted according to the current situation so that the various manufacturing companies can gain benefits from the system. The study provides insights into how the factors or variables influencing practices would help in building a better understanding of global manufacturing activities in Indonesia. Accordingly, the literature reviews is outlined as follow:

- Global Manufacturing Practices around the world
- Current research into Global Manufacturing Practices
- Integration under Global Manufacturing Practices

## 2.1 Global Manufacturing Practices around the world

Many companies around the world have begun to develop their production activities by applying the Global Manufacturing Practices technique (Ferdows, 1993). It is a tool intended to evaluate how well companies are doing business, especially with regard to: company profiles, sales forecasting, production planning and scheduling, shop floor control, and material management. This collection of data is processed and used for information sharing. Traditionally, information sharing among the companies has relied on a range of printed materials, such as books, guides, and publications. Using computers, combined with other communication and information technologies, the data sharing is now more effective and efficient.

The project was started as the result of some questionnaire based field research on executives in Korea by Prof. Boo-Ho Rho of Sogang University. In 1985, He discussed with Prof. D. Clay Whybark of the University of North Carolina about starting a joint research project. The project purpose would be to learn more about how manufacturing was managed in various parts of the world, principally in the production planning and control areas. They developed a survey questionnaire that would be common for all data gathering activities in as many countries as possible.

The global dimension of the project (and the potential diversity) meant that the industries that were to be surveyed would have to be found everywhere. An early decision, therefore, was to restrict the sample to two industries: non-fashion textiles and small machine tools. These industries are found in both advanced and developing countries. After translation of the questionnaire, the data gathering was started. The effort was called the **Global Manufacturing Practices** project.

### 2.1.1 *The Global Manufacturing Practices Project*

The first surveys were done in Korea, China, and in Western Europe. After the data were gathered in these three areas, the survey was administered to firms in the USA with the help of Indiana University. In 1990, the coordination of the project was moved to the Kenan Institute at the University of North Carolina, where the Center for Manufacturing Excellence supported the installation of the database.

To gain the support of the companies involved in providing the data, feedback on the project was provided to them. In most instances a copy of the result was sent to each of the responding companies, usually in the form of a questionnaire indicating the mean score and ranges for each response. This enabled the company to see how it was doing relative to the other companies. A different approach was taken in China. In order to gain the cooperation of the participating firms, their representatives were brought together in one place to fill out the questionnaire, discuss the implications of some of the questions and share some of their management concerns. This proved to be a valuable technique for the researchers and experience for the company representatives. Other techniques have subsequently been used in other areas of the world.

**The objective of the project was** to gain insights into the differences in manufacturing practice that exist around the world. Therefore, very little financial or other performance data was asked in the questionnaire. This had the advantage of increasing the sample size, minimizing restrictions on data distribution and reducing the difficulties in making comparisons between countries. The main concern was to develop an understanding of manufacturing practice differences that would be important to improve cooperation between researchers, companies, and nations.

**The second objective** of the project was to make the data available to other researchers or companies around the world. Initially, the agreement was that the data were to be made available to academic researchers in all countries where data was gathered and contributed to the project. Understanding that gathering such information is a very costly task and difficult, people were invited to participate. Furthermore, involving more people would greatly improve the quality and quantity of the data. The data can now be made generally available, opening the opportunity for substantially increased involvement in the project

Recognizing the increasing globalization of commerce, **the third objective of the project** was to make the geographical scope of the activities as large as possible. This meant gathering the data in a broad sample of different cultures and economics systems, and expanding the number of people directly involved. In 1990 the Global Manufacturing Research Group (GMRG) was formed to provide a more formal means for including new people, sharing ideas and exchanging insights.

#### *2.1.1.1 The Global Manufacturing Research Group*

The GMRG was formed in June 1990 in Shanghai, China. The meeting sponsored by the Shanghai Institute of Mechanical Engineering, the Korean Sanhak Foundation, the Indiana Department of Commerce, and the Global Business Center at Indiana University. The workshop provided the researchers an opportunity to discuss the questionnaire, share research approaches and exchange insights gained. After the workshop in Shanghai, most of the group participated in the Pan-Pacific Conference in Seoul, Korea. There was a manufacturing practices track in that conference, and the researchers made use of that for presenting formal papers and acquainting other people with the project. It was during the June 1990; Pan-Pacific meetings that the group decided to create a more formal organization. All agreed that a means for continuing and expanding the collaboration was worthwhile and the Global

Manufacturing Research Group was founded. The GMRG has developed a pattern of meeting internationally.

During the 1992-Workshops, the group had worked on revision of the questionnaire, developed means of disseminating the results of the work to date, and agreed to make the data more widely available. Another result of these meetings was agreement to coordinate the data gathering and information dissemination from the GMRG Research Center at the Kenan Institute of the University of North Carolina.

The database now contains data from Bulgaria, Chile, Finland, Hungary, Japan, Mexico, South Korea, North America, Canada, China, Western Europe (northern European countries), the USSR (before the break up), and Australia. The group still has an objective, however, of increasing the geographical scope of the project. New researchers are being asked to use the revised questionnaire for gathering the data in their regions.

## 2.2 Research into Global Manufacturing Practices

Research into Global Manufacturing Practices attempts to provide a realistic database that mainly can be classified into three streams: within country studies, comparison between regions, and hypothesis model studies.

**Within country studies** attempt to present study of the data collected from a single country. It contains analyses of the firms within a country and often comparing practices between industries or between firms of different sizes. It includes definitions, conceptual issues, conceptual models, normative suggestions, and other modifications of Global Manufacturing Practices. These studies look at differences between the industries, the effects of size on manufacturing practice, or relationship between economic policies and management. Examples of the projects are “The Textile Industry Practices in

Australia” (Amrik S. Sohal and Danny Samson, 1990), “Manufacturing Practices in Chile” (Antonio E. Kovacevic, J. Claudio Lopez, and D. Clay Whybark, 1990), “Manufacturing Practices in Mexico: An example of the Non-Fashion Textile and Machine Tool Industries” (Benito E. Flores, Felipe Burgos, and Arturo Macias, 1992), “Material Management Practice of Finish Manufacturing Companies” (Allan Lehtimaki, 1991), and “Manufacturing Practice in Korea” (Boo-Ho Rho and D. Clay Whybark, 1993).

**Comparison between regions** can compare practices between two regions (bilateral comparisons) or among three or more (multilateral comparisons) regions of the world. The bilateral comparisons primarily document manufacturing practices that differ significantly from one region to the others. Others relate the differences to specific aspects of the manufacturing mission or differences in the cultural or economic systems in the regions. Examples of the projects are: “Comparing Manufacturing Practices in The People’s Republic of China and South Korea” (Boo-Ho Rho and D. Clay Whybark, 1993), “Reducing The Gap in Manufacturing Practices Between North America and The People’s Republic of China” (Gyula Vastag and D. Clay Whybark, 1992), “A Comparison of Logistics Management In Hungary, China, Korea, and Japan” (Robert B. Handfield and Barbara Withers, 1992), “Global Manufacturing Practices and Strategies: A Study of Two Industries” (Scott T. Young, K. Kern Kwong, Cheng Li and Wing Fok, 1991), and “Cross-National Comparison of Production-Inventory Management of Production-inventory Management Practices” (Attila Chikan and D. Clay Whybark, 1990).

**Hypothesis model studies** present quite different approaches to the analysis of the GMRG data. Most studies look at different relationships between *elements of the data*, generally on a multi-region basis. Some of the studies look at questions concerning inventory, lead-time, delivery performance, and factors affecting their practices and behaviors. Other studies raise issues of productivity

concerned with the influence customers have on manufacturing practices. All studies show the diversity of insight. Examples of the studies are “Global Relations Between Inventory, Manufacturing Lead Time and Delivery Date Promises” (Vastag and Whybark, 1993), “Are customers linked to Manufacturing?” (Whybark, 1990), and “Manufacturing Practices in Transition Economy” (Attila Chikan and Krisztina Demeter, 1992). Table 2-1 depicts the selected references that illustrate the on-going research into the Global Manufacturing Practices.

Table 2-1: Research projects on Global Manufacturing Practices

Researchers	Classification	Focus or finding
D. Clay Whybark and Boo-Ho Rho	Theory	A World wide Survey of Manufacturing Practices
Pavel Dimitrov and D. Clay Whybark	2, 3	Studies of other relationship; determinants of manufacturing Delivery reliability
John G. Wacker	1, 2	A comparison of productivity in tool industry in the U.S. and Japan
Gyula Vastag	Theory	Technical consideration in analyzing the manufacturing practices data
John G. Wacker and Ling Feng Li	Theory	An empirical evaluation of the worldwide survey of manufacturing practice: implication and limitation
Gyula Vastag and D. Clay Whybark	2	Manufacturing practices: differences that matter
D. Clay Whybark	Theory	Future activities for the global manufacturing research group
GMSG	Theory	Manufacturing practices survey

1. Within country studies, 2. Comparison between regions, and 3. Hypothesis model studies

### 2.3 Compatibility under Global Manufacturing Practice

This section will look at research in the area of Compatibility under Global Manufacturing Practices. Gyula Vastag and D. Clay Whybark have done research into compatibility Index in 1990. They described a method for determining the compatibility of manufacturing practices among firms from different region of the world. Based on GMRG data, they studied the relationship of manufacturing practices for international alliances.

To provide a comprehensive picture of the differences between two or more regions' manufacturing practices, multivariate statistics was used. The complexity of the multivariate techniques and the difficulty of interpretation, however, provided sufficient reason to use simpler measures of compatibility. One approach for developing such a measure was based on *scoring* each firm on selected practice. The individual scores were then used for developing overall measures for country. These in turn were used for constructing an index of compatibility of practices between countries.

There were three steps for constructing the index:

- Selection of variables. The variables that were considered important for compatibility, with respect to international alliances, were chosen.
- Scoring the variables. The variables were scored relative to a base of comparison (USA and Canada). The determination of the mode was straight forward; it was simply the most frequently chosen response. For categorical data, histograms were used, and the interval that contained the largest number of responses was the modal range.
- Developing the Index. To develop the total score for a region, the individual variable scores were summed for each company and then all company scores were summed for the region. The average score

for the region was then computed by dividing the region's total by the total number of individual variable scores. Finally, to calculate the index the average scores were divided by the USA and Canadian score. This standardized the scores of the other regions with the USA and Canadian scores.

Since a base of comparison is selected, all index values are relative to that base, but the index are not necessarily symmetrical. That is, the index for Mexico compared to the USA and Canada may not be the same as for USA and Canada with Mexico as the base.

#### **2.4 Absolute Differences**

This section will try to apply the concept of Compatibility Index to the situation relevant to SMEs in Indonesia based on Polman perspective. The first two of three basic steps are similar with the work done by Gyula Vastag and D. Clay Whybark. The third step, however, absolute differences are applied with the reason as described below:

- Instead of summed all the identical variables, this research will try to see the different values by subtracting and using the absolute value concept to define the distance between any two qualitative scale points.
- The concept of absolute value has uses other than that of findings distances between points. Generally, it is employed whenever one is interested in the magnitude or numerical value without regard to its sign. This approach is important since the research focus only on the magnitude of the different or similarity practices.

- Since the variable value expressed in scale with the range of zero (minimum) and five (maximum) this range is relevant to zero and one in the index scale. Thus absolute system prevents from having a less than zero indexes.

This compatibility index does show that it has some promise as a research tool. It looks promising as a measure that could be used for studies of cooperation, alliances or other performance oriented research.

In this literature review, the concept of Global Manufacturing Practices has been reviewed. This is followed by a discussion of the theory related to some focus on the integration or cooperation process. Some research of Global Manufacturing Practices can be classified into three streams: within country studies, comparison between regions, and hypothesis models. However, there seems to be no literature that investigates the importance of integration process among manufacturing companies within a country and how this process should be treated as a strategic way in achieving the successful of integration process.

Conforming to the concept of the integration process, this research will gather manufacturing practices data and use this database to investigate the potential for successful cooperation. This will include the choosing and analyzing of the variables with respect to the integration process. The methodology for this research is provided in the next section.

### **3 CHAPTER 3: RESEARCH METHODOLOGY**

This chapter outlines the research methodology used in this project. Its selection is in line with the objectives of the project and the research questions derived from the objectives.

As mentioned earlier, the objective of this project is to investigate the usage of the Global Manufacturing Practices data in relation to the integration process. The investigation seeks to answer the following research questions:

- How and why is the Global Manufacturing Practices beneficial to the integration process?
- How should the data collected be treated and used strategically prior to integration?
- What are the major factors in manufacturing practices which are important to successful integration?

Other related questions that need to be investigated are:

- What are company staff expectations of the Global Manufacturing Practices database?

Based on the research questions, the survey approach was decided to be the best methods for the research strategy in this project. The reasons for this are explained in the section that follows.

### 3.1 The methodology

#### 3.1.1 Survey method

A survey is a preferred strategy because it deals with a phenomenon and context, although its ability to investigate the context is limited (Yin, 1994). According to Burns (1994), the survey method strongly figures in the triangulation process. He argues that the survey method can be used when the research needs simple frequency counts or correlation analysis, as when the method aims:

- To estimate as precisely as possible the nature of existing conditions or the attributes of a population
- To establish cause and effect relationships but without experimental manipulation

(Burn, 1994, p. 344)

Nonetheless, use of the survey method for this research is well supported (Oh, 1995; Valey and Poole, 1994; Luby, 1996).

#### 3.1.2 A strategy

Using a survey method is acceptable (Yin, 1994; Gable, 1994). Gable in 1994 proposed the method to collect quantitative and qualitative data. He argued that this strategy could be used in a complementary manner. Moreover, Tellis (1997) used the strategy by applying the survey approach within his study.

Acknowledging the problem context and the literature review, the use of survey method is preferable for this project. As the criteria meet the investigation requirements, this project used a survey approach. Based on the type of data to be collected, the strategy of this project relies on the use of document and content analysis as well as a survey questionnaire study approach. The project design using this strategy is described in the following section.

### 3.2 Project design

Based on Whybark's (1993) suggestion, the strategy used in conducting this project consists of the following:

- Preparing the questionnaire
- Conducting the survey
- Analyzing the survey results
- Bringing forward conclusions, recommendations and implications based on the evidence

The first two activities are discussed in the following parts, while the third and fourth parts are described in chapter 4 and chapter 5 later. The discussions of the first two parts are presented in the basis of recommended procedures, followed by the application of the recommended procedures.

#### 3.2.1 Recommended procedure

##### 3.2.1.1 Questionnaire format and variable types

The questionnaire format is standard and designed by GMRG. It consists of 80 questions covering five broad areas of manufacturing practices. The variables used in the questions fall into three categories: "Ratio Scaled", "Ordinal", and "Nominal". Each of these three measurement scales will be described below.

Ratio Scaled variables are those which the operations management community are most familiar. Production output, the values of linear programming models, and many of the outputs of simulation studies are measured on a ratio scale.

The second type of variable scales is "Ordinal". Examples are questions specifying a position in the company, level of education or whether the use of the computer is "extensive", "a little" or lies somewhere in-between.

The final type is the “Nominal” scale. Questions that specify several alternatives and ask for a choice(s) like; “What is the functional area of the person who makes the forecast?”; “How are priorities communicated to the shop?”; or “What are the reason for changing priorities?”. All give rise to nominal variables.

The distribution of the measurement scales used for each of the five sections of the questionnaire is shown in table 3-1:

Table 3-1: Distribution of measurement scales

Section	Ratio	Ordinal	Nominal	Total
❖ Company description and background information	3	-	16	19
❖ Sales forecasting	4	5	4	13
❖ Production planning and scheduling	6	7	3	16
❖ Shop floor control	7	2	13	22
❖ Materials management	2	-	8	10
	22	14	44	80

Whybark suggested guidelines for the general approach in conducting the research:

### 3.2.1.2 Translation of the questionnaire

In order to gain better interpretation, the original questionnaire survey that is written and developed in English (see appendix C) had to be translated into Indonesian. The translation process was done by forward and backward translation in order to gain the most accuracy of intent. This process works in the following way:

- Translate all questionnaires into Indonesian by a person familiar with the field.
- Have a different person make a translation, from the Indonesian version, back to English.

- The two results are then compared. The process is repeated until it reaches the most accurate translation.

#### 3.2.1.3 *Prototype test*

The survey began with a preliminary survey using a model or prototype questionnaire that aimed to examine the subject's understanding and to obtain the subject's opinion of the content of the questionnaire.

The prototype test of the translated questionnaire survey was conducted in five firms and proved to be very useful. The prototype test revealed some obstacles such as: Difficulties with the response scales and questions that are still unclear.

The pilot test revealed that it was necessary to reword some questions, to provide better introductions to some of the sections, and to add explanations for how some of the questions are to be answered. These changes have been made in the final version of the questionnaire survey as presented in appendix B.

#### 3.2.1.4 *Choosing the firms to survey*

Since the objective of this study is to conduct integration based on Polman's manufacturing practices, the surveyed companies are limited only to small and medium machine tools categories.

Since the integration process will be based on Polman, the data gathering is mainly dedicated to the type of SMEs that have similar business with Polman. These industries vary from small machine toolmakers to foundries.

"Surfing" the Indonesian government websites to find the address of industries targeted did the first choice of industry to survey. These government sites usually have list of industries that are classified by some criteria of industry product type and the number of employees. Since the research intended to

investigate the cooperation among the SMEs, the industries were then sorted based on the type of business and the number of employees. The BPS defines the small manufacturing companies as having fewer than 100 total employees in the enterprises.

#### *3.2.1.5 Data gathering methods*

Several different methods were used to collect the data. They are the Internet, mail survey, and personal interview.

##### *3.2.1.5.1 The Internet:*

Internet surveys have been used by many researchers for all kind of studies (Bauman, 1996). They are fairly easy to administrate, simple, and efficient in term of cost, time, and waste. There are two ways of choosing the companies to participate in the survey: first, looking directly in the well-known Internet sites (Yahoo, Hotmail, etc.) and activating their “search engine” with specific words such as “small + manufacture + Indonesia”. The system responded by listing Internet address of the matched companies. Searching for potential respondents (based on the size of the firm and the product type) was done by looking at their homepages. The company addresses (include their e-mail contact) are then noted in the list for softcopy or hardcopy distribution. The second method of searching was to use the Polman alumni groups. The questionnaire in Word file format was distributed through all members of the mail-list. This method had been proved effective since all members have a fairly “bonded” feeling toward Polman.

##### *3.2.1.5.2 Mail survey:*

Mail surveys have been used for all kind of collecting research data (Studman, 1998). They are easy to administrate and simple. The mailing survey was actually not the first priority in this survey. It was decided to use it if the respond rate to the Internet method was poor. The mailing was preceded by personal or

telephone contact to ask the companies to participate in the survey. A follow up visit or call was made to answer questions (and encourage responses). The researcher also used follow-up letters asking about the progress of the questionnaire-filling process.

#### 3.2.1.5.3 *Personal interview:*

Personal interview is one of the most effective ways to collect data, but requires more time because the process is done on a one-on-one basis. This type of data gathering was to be used if the two methods describe above still produced low responses. Personal interviews permit questions of interpretation or other difficulties to be answered immediately. They can be set up ahead of time and dates can be confirmed, which improves the response rate. The contact also helps to maintain the relationships with the companies involved.

### 3.2.2 *Application of the recommended Procedure*

#### 3.2.2.1 *Project overview*

As mentioned earlier, the objective of this research was to investigate the Global Manufacturing Practices leading to the integration process based on the compatibility index. The method proposed for the project was a survey method.

Data collected from the questionnaire are used to outline the current situation of manufacturing practices in small and medium manufacturing enterprises in Indonesia. This will try to answer the research questions with respect to the integration process. This would then be very worthwhile to the companies in achieving their objectives or targets of cooperation.

#### 3.2.2.2 *Research questions*

The research questions derived from the research objective are:

- How and why is the Global Manufacturing Practices beneficial to the integration process?
- How should the data collected be treated and used strategically prior integration?
- What are the major factors in manufacturing practices which are important to successful integration?
- What are company staff expectations of the Global Manufacturing Practices database?

The investigation of the research questions above is accomplished through the examination of some hypotheses using Microsoft Excel statistical tools under Functions menu such as: STDEV, Max, Median, Quartile, Rank, etc.

#### *3.2.2.3 Sources of Evidence*

Since it relies on the survey method, the principle of collecting data is based on the guidelines proposed by Vastag (1993). The proposed sources of evidence are:

- Survey questionnaire (original and translated)
- Documentation of feedback (survey responses, data tables, and calculation tables)

##### *3.2.2.3.1 Data Table*

Unlike other data collected previously by The GMRG, the data collected for this research was stored and coded in Microsoft Excel format in both numeric and character type of data. The reason for doing this is that Excel has better features than the dBase III format and, if necessary, it can be converted back to the dBase format. Excel customizing features make it possible to validate the data by filtering or controlling the type of data in the entry process in order to

minimize errors. These collections of data and spreadsheet process calculation can be seen in appendix E and F respectively.

### 3.2.2.4 Guidelines on Analysis

#### 3.2.2.4.1 Data Analysis

Figure 3-1 describes the company-variable facet of the basis data relation matrix,

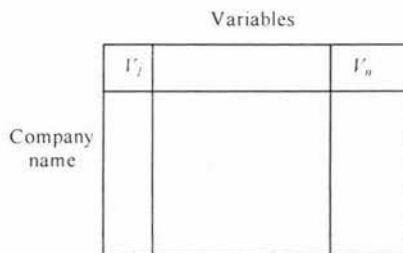


Figure 3-1: Company-variable facet

BDRM. The observations are represented by the rows (coded company names) and columns (variables). Polman, as a basis for comparison, will be assigned code 26. The focus of the analysis will be the correlation coefficient between variables  $v_1$  through  $V_n$  over the company being

investigated to collaborate with Polman.

#### 3.2.2.4.2 Variables

All companies have to have observations for the same set of variables ( $v = v_1, v_2, \dots, v_n$ ). Since one survey question could have more than one answer, multi level variables are needed in formulating every cell in the Excel. The number of variables for one question depends on the number of options available for every answer. For example, a question of ratio qualitative scale type (1 to 5) needs five variables. These multi level variables can be seen in the figure 3-2:

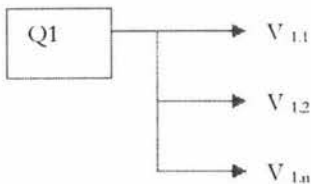


Figure 3-2: Multilevel variables

#### 3.2.2.4.3 Variable Conversion

This research uses two question types: qualitative scale and quantitative number. Since the calculation of index will be based on qualitative scale, the quantitative number has to be converted to qualitative scale by the formula:

Equation 1: Conversion formula

$$Qs = \frac{Vi}{V} \times 5$$

Where  $Qs$  is qualitative scale,  $Vi$  is a variable of company  $i$ , and  $V$  is a possible maximum number or ideal number of variable  $w$ .

#### 3.2.2.4.4 The Correlation factors

The correlation factors of the investigated company,  $Cf_i$ , are defined from the point of view of the “base company”. To do this, each cell of all practices that influences collaboration will be compared relative to the Polman “base” cells. The calculation will be done automatically by appropriate formulae within each cell of the Excel spreadsheet. These correlation factors also have values between 0 and 1.

First, we defined the *correlation factor* variables of investigated company to the based by:

$$Cf = \frac{|V_b - V_i|}{V_b}$$

Equation 2 Correlation factor

Where  $V_b$  is a variable base of comparison and  $V_i$  is a variable of company  $i$  being compared to the base.

#### 3.2.2.4.5 The compatibility index

Summing all correlation factors of company  $i$  and dividing by the total number of variables being compared, we define the compatibility index of each company relative to base as:

$$\bar{C}_{vi} = \frac{\sum_1^n Cf_i}{n_{vi}}$$

Equation 3: compatibility index

It is straightforward that:  $0 \leq C_n \leq 1$

The compatibility index,  $C_{ni}$ , is 1 if a company  $i$  ( $i=1,2,\dots,nr$ ) has the different modal value or modal range for variable  $v$  ( $v=1,2,\dots,V$ ), and 0 otherwise.

The index used was an overall index based on the sum of the correlation factors for all companies. This result of the calculation can be seen in table 4-8 in chapter four which shows the 25 compatibility indexes of the 25 investigated companies.

The presentation of guidelines for analysis thus concludes both the application of the recommended procedure and project design and methodology. The analyzing and interpreting of the evidence is discussed in the following chapter, followed by a discussion of the findings in chapter 5.

## 4 CHAPTER 4: RESULT AND ANALYSES

This chapter presents the analysis with some interpretations of the results of the survey data. This chapter is divided accordingly into two sections: **survey results** and **integration analysis results**. The samples are SMEs (machine tools) in Indonesia that have collaboration or plan to collaborate with Polman. The initial numbers of company contacted were 59, and 41 responses were received. The selection process criteria are as below:

- Machine tools medium company is defined by BPS as having 20-99 employees while a small company as having 5-19 employees.
- Type of products range from general mechanics, moulds & dies, and foundries.

After a selection process based on two criteria above, the valid actual total response are 26 (11 Internets, 8 mails, and 7 interviews).

### 4.1 Survey result

#### 4.1.1 Company profile

The company profiles section consists of general questions on the company. Summarized responses to question 1 through question 19 (except for Q.5<sup>3</sup>, Q.8<sup>4</sup> because of incomplete/ missing data, and Q.10 as the survey covered 100% domestic companies) are summarized in Table 4-1.

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<sup>3</sup> Not enough data to process Most of the responses were blank because most companies interpret "Labor" as impermanent employees.

<sup>4</sup> Not enough data to process because the question is not relevant to their companies

Table 4-1: Company Profiles

Q	Variables	Min	Average	Max
	Number of respondents (valid after selection)	-	26	-
1	Number of employees	25	71	240 <sup>5</sup>
2	Number of production workers	22	55	99
3	Shift per day	1	2	3
4	Average working hours per year	1600	1772	1992
6	Average domestic sales (millions Rp.)	200	687.706	4000
	Average export sales (millions Rp.)	0	435.294	2500
7	Average product lines/families	5	13.73	25
9	% Make-to-stock basis	0	38.50	100
	% Make-to-order basis	0	61.50	100
11	% Machine type grouped	10	40.77	80
	% Of machines grouped by combination of products	20	59.23	90
12	% Capacity of utilization rate	5	55.23	92
13	% of annual sales invested for new product equipment	10	30.27	60
14	Total investment in production. Equipment	40 000	180 000	400 000
15	Average age of prod. Equip. (y)	2	7.1	20

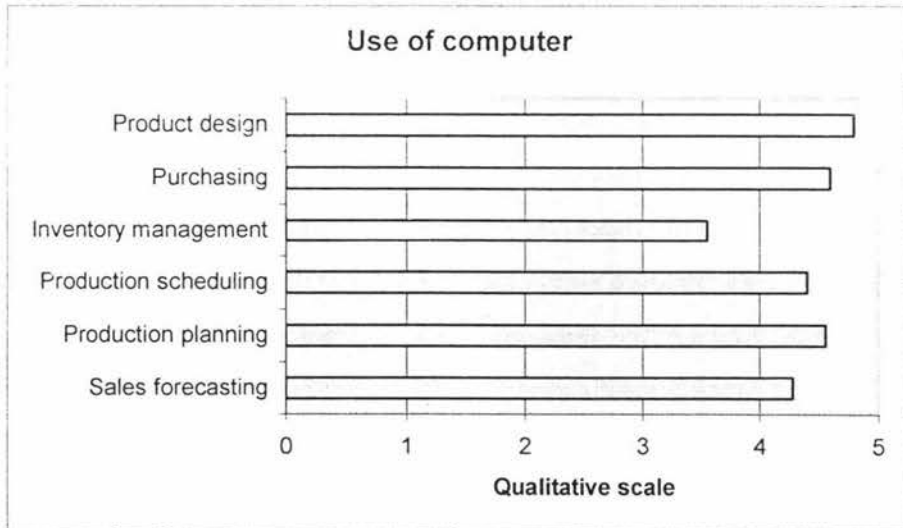
The averages sales, number of employees, and number of factory workers for SMEs in the research samples are less than Polman. The average number of production workers varied significantly (from minimum of 22 to 99 employees). Export sales are less than domestic sales, which indicates that the majority of the companies are oriented toward national markets. However, it is interesting to note that some of the SMEs have the ability to compete in export sales even though the value is still below the average of the domestic sales. Most of the companies relate to their customers on a make-to-order basis. It is important to note that most of the SMEs in Indonesia are privately owned and always

<sup>5</sup> Including educational staff and employees

manage their resources by themselves, and are not dependent on the Government.

Most companies use computers to a great extent (Q 17). Averaged scale results of 4.8 and 3.6 were identified for the use of computers for product design and inventory management, respectively. Usage of computers for other activities fell between these two results. It is not surprising that design of products was given the highest priority for computer usage as most of the companies are machine tools type industry with CAD for this industry being well developed technology (see fig. 4-1).

Figure 4-1: Use of computer



probable explanation may be the age of some of the productivity equipment, which tended to be old (see table 4-1, Q15). The fourteen measure variables of resources investment can be seen in figure 4-3.

Figure 4-3: Resources of investment



#### 4.1.2 Sales Forecasting

This section of the survey is about the method that the companies use to anticipate demand for their products. For the person and job function who has primary authority for producing the companies sales forecasting, the responses revealed that most of the president/CEO/ Director of the companies has the

highest authority for producing the sales forecast. These responses can be seen in table 4-2.

Table 4-2: Positions and functions with primary priority to make sales forecast

Question	n	%
Q.1. Which of the following best describes the <u>position</u> (level) of the person who has primary authority for producing the company's sales forecast?		
• President/CEO/ Director	10	39
• Vice president/ director	2	7
• Department/Division head	6	23
• Group/Section manager	1	4
• Owner	7	27
Q.2. Which of the following best describes the <u>function</u> of the company who has primary authority for producing the company's sales forecast?		
• Administration	8	31
• Planning	9	35
• Production	0	0
• Engineering	2	8
• Sales	4	15
• Marketing	3	11
• Accounting	0	0

Q.3. According to the respondent perceptions, forecasts are based mostly on past experience and time series model. It is interesting to see this figure because most companies indicating the use of formal forecasting technique. This can be seen in figure 4-4. Forecasting is done for individual products both in physical units and monetary terms (Q.5 and Q.7). The average forecasts are made for 9 months with monthly smallest increment (Q.8). The forecasts are updated an average of 6 times per year (Q.10). About half of the respondents claim to use computers in forecasting. The low number of companies that reported their forecast errors and how they were measured suggests that verification of the forecasts is not a regular practice. Forecasts are utilized in order of importance variables. General subjective factors in sales forecasting seem to be the current economic situation and general condition of the companies (Q.4). Supplier information is not extensively practiced. This can be seen in figure 4-5.

Figure 4-4: Sales Forecasting Method

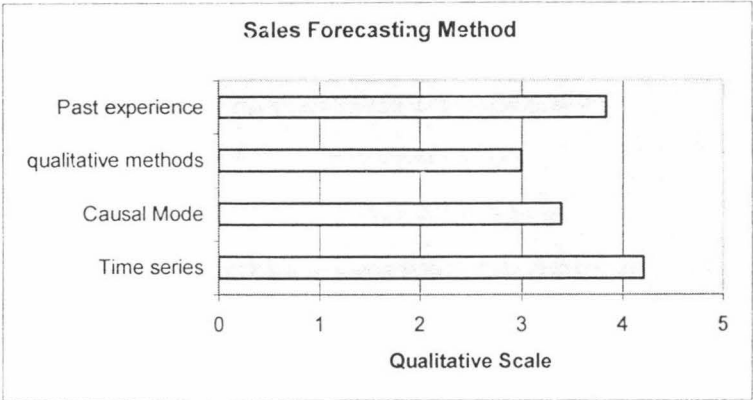


Figure 4-5: Factors considered in forecasting

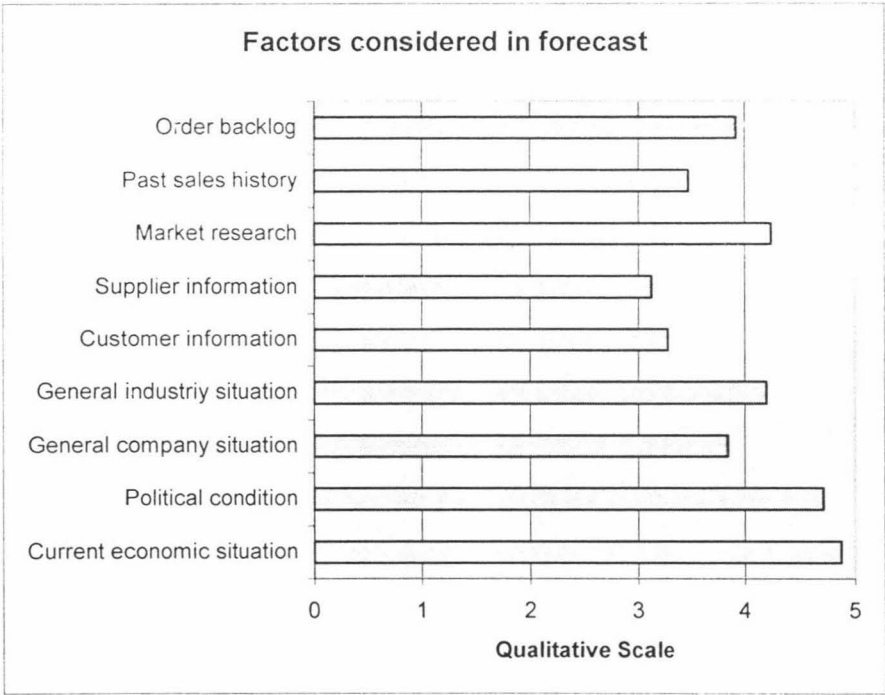
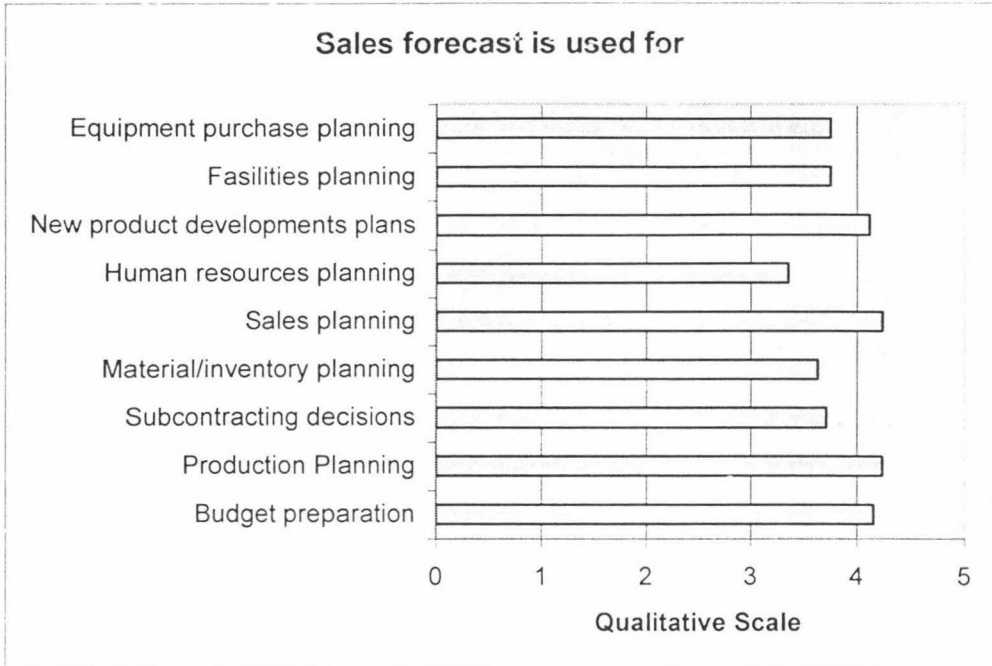


Figure 4-6: Sales forecast use

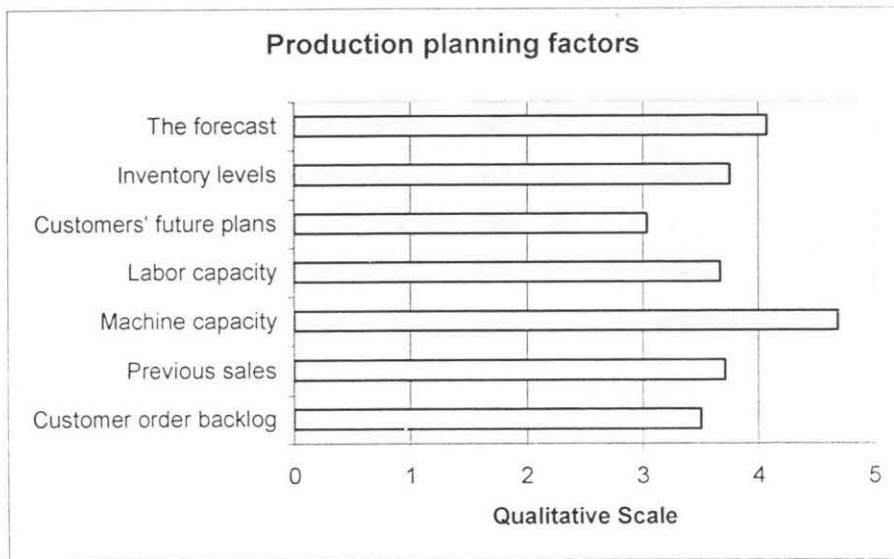


Sales forecast is produced mainly by the top executives and does not seem to be delegated. The use of forecast is directed towards the short and intermediate term. Activities such as Production Planning, New Product Developments Plans, and Budget Preparation are stressed more and reach four of the qualitative Scale (fig. 4-6).

### 4.1.3 Production Planning and Scheduling

Production plans are developed on the basis of machine capacity (4.6) and all other factors vary slightly between three and four of the qualitative scale. The customer's future plans have little importance for production planning. Figure 4-7 indicates that most companies consider the surveyed factors to a great extent.

Figure 4-7: Production planning factors



In all cases, production plans are developed for a 3-month (Q.4) basis with weekly increments (Q.5), for individual products which both expressed in physical units and monetary terms (Q.3). This reveals that most companies prepare their production planning in more detail (weekly smallest increments). In most companies, their production plans are updated on average of 7 times per year and nearly 75% of the respondents claim to use computers. All of the respondents find the use of computers in production planning is useful. Production plans are compared with the actual results.

Production plans of most companies are quite flexible and considered easy to change in responding to market demand. Most companies use overtime when

the demand exceed the capacity, and eliminate shift when the demand less than capacity. These two decisions can be seen in figure 4-8 and 4-9.

Figure 4-8: Demand exceeds capacity

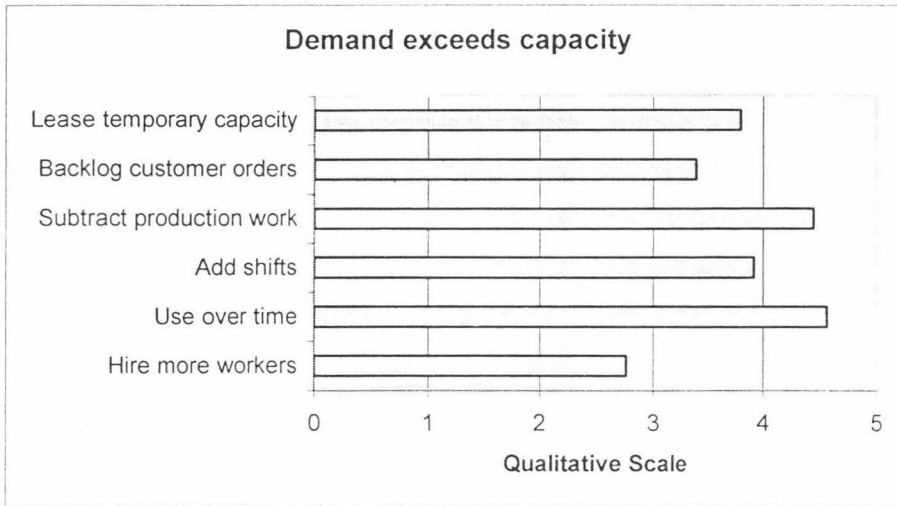
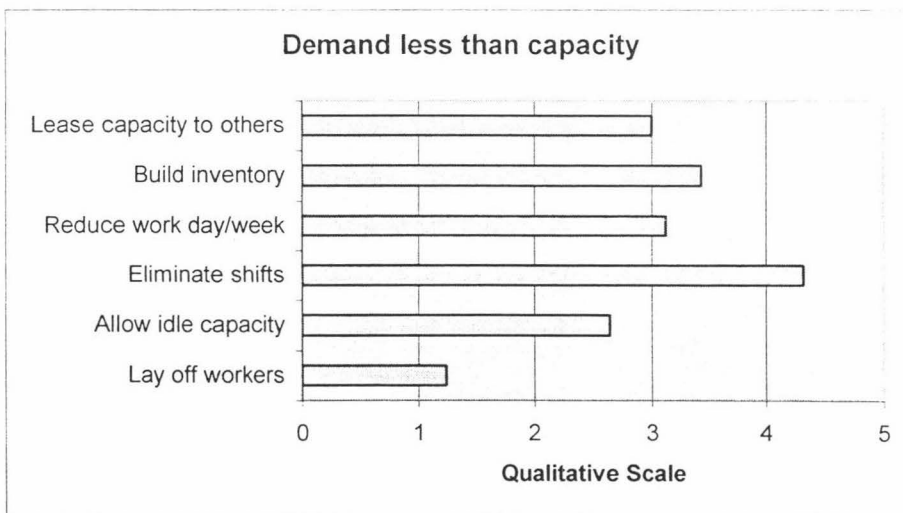


Figure 4-9: Demand less than capacity



Production plans are used (Q.10) mostly for production scheduling, materials/ inventory planning, and subcontracting decisions. Other uses of production

plans are less important such as human resources planning. Other purposes of production plan can be seen in fig. 4-10.

Figure 4-10: Production plan uses

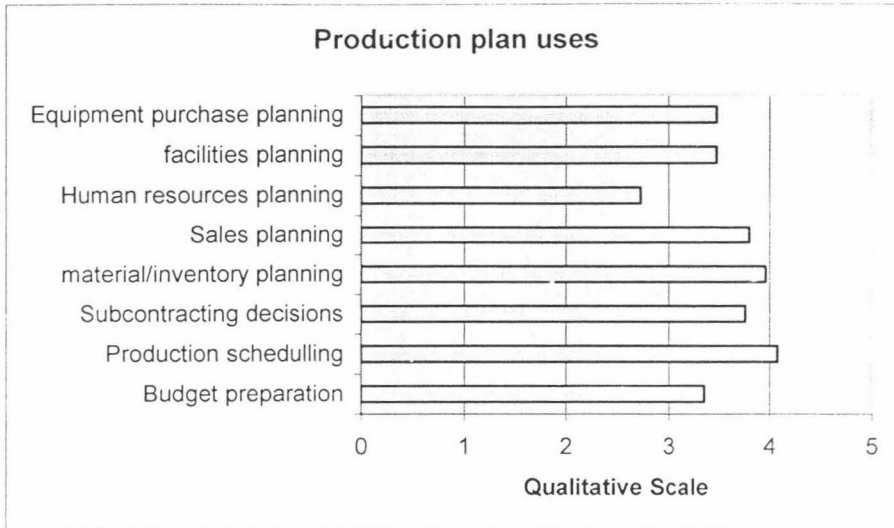
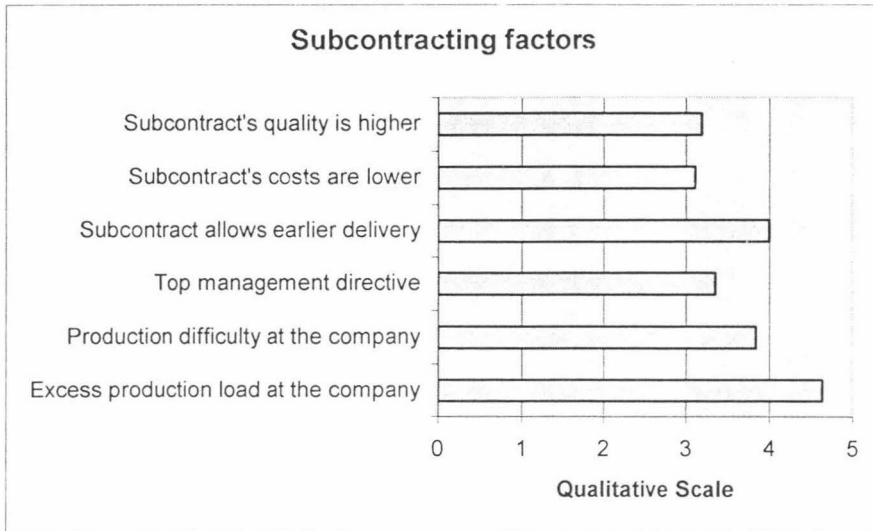


Fig. 4-11 describes subcontracting activities (Q.11). The responses reveals that most companies consider subcontracting when their orders are exceeding their production load capacity and when subcontracting can help them reach an earlier delivery date. It is interesting to see that the top management role in directing activities is less important in making subcontracting decisions. Other factors that influence the decision of subcontracting activities can be found in fig. 4-11.

In most cases, production schedules are developed for a month (Q.13) with weekly smallest increment basis (Q.14), and mostly for unit product lines (Q.12). Almost all companies have formal measurement for variables asked in Q.16.

Figure 4-11: Subcontracting factors



4.1.4 Shop Floor Control

For the person and job function who have authorization (Q.1 and Q.2), the responses reveal that most of the Department/Division Head and Planning function personnel have the highest priority for the plant to start work on an order, respectively (see table 4-3).

Table 4-3: Positions and functions who authorized to start production orders

Question	n	%
Q.1. Which of the following best describes the <u>position</u> of the person in the company who authorizes the plant to start work on an order?		
• President/CEO/ Director	5	19
• Vice president/ director	0	0
• Department/Division head	16	62
• Group/Section manager	0	0
• Owner	5	19
Q.2. Which of the following best describes the <u>function</u> group in the company that authorizes the plant to start work on an order?		
• Administration	7	27
• Planning	11	43
• Production	3	11
• Engineering	5	19
• Sales	0	0
• Marketing	0	0

• Finance	0	0
• Accounting	0	0

The basis for starting production (Q3.) can be seen in fig. 4-12. Detailed production schedule and production plans play a substantial role, followed by importance of the customer and actual customer orders. The part shortage list plays a less significant role in initiating production. Scheduling in most cases is based on time standards.

Figure 4-12: Influenced factors to start order

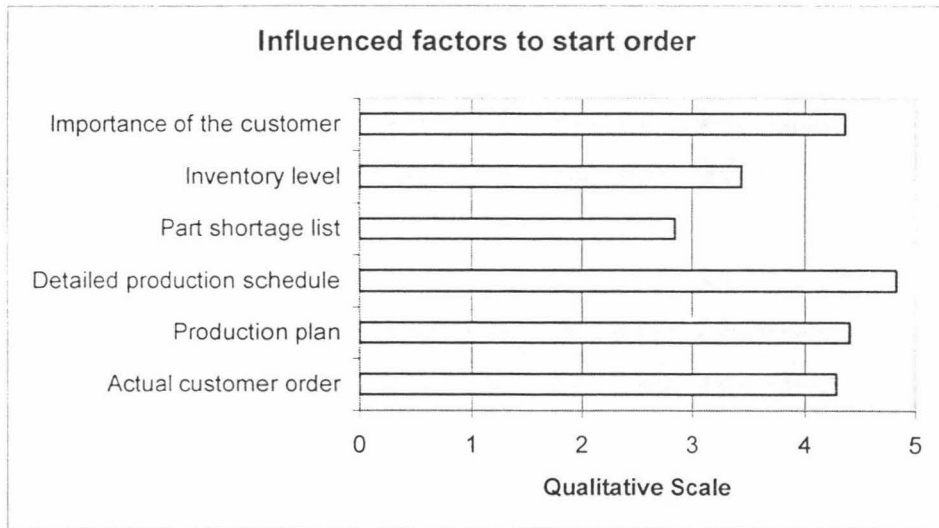
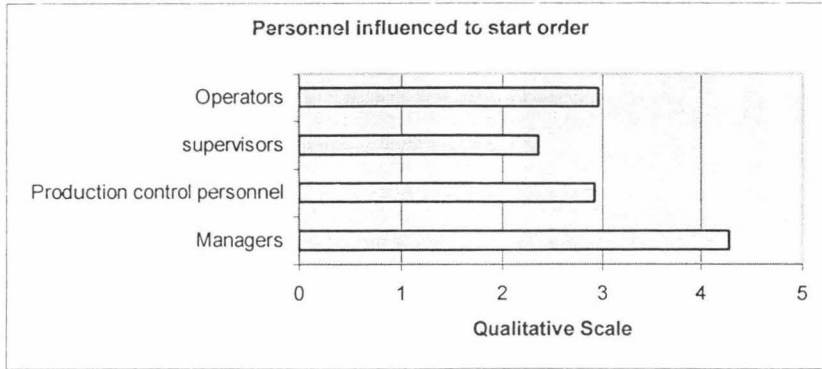


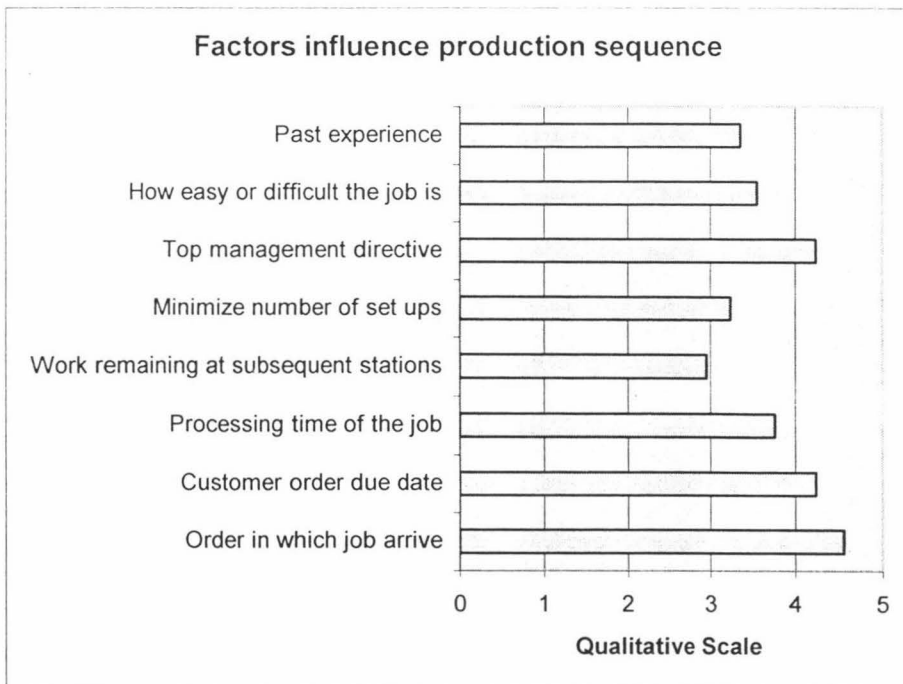
Figure 4-13 reveals the individual of the company decide on the sequence in which jobs will be processed at machines or work centers. The most individual who always give authorization to start production work is manager, followed by production control personnel.

Figure 4-13: Personnel influenced to start order



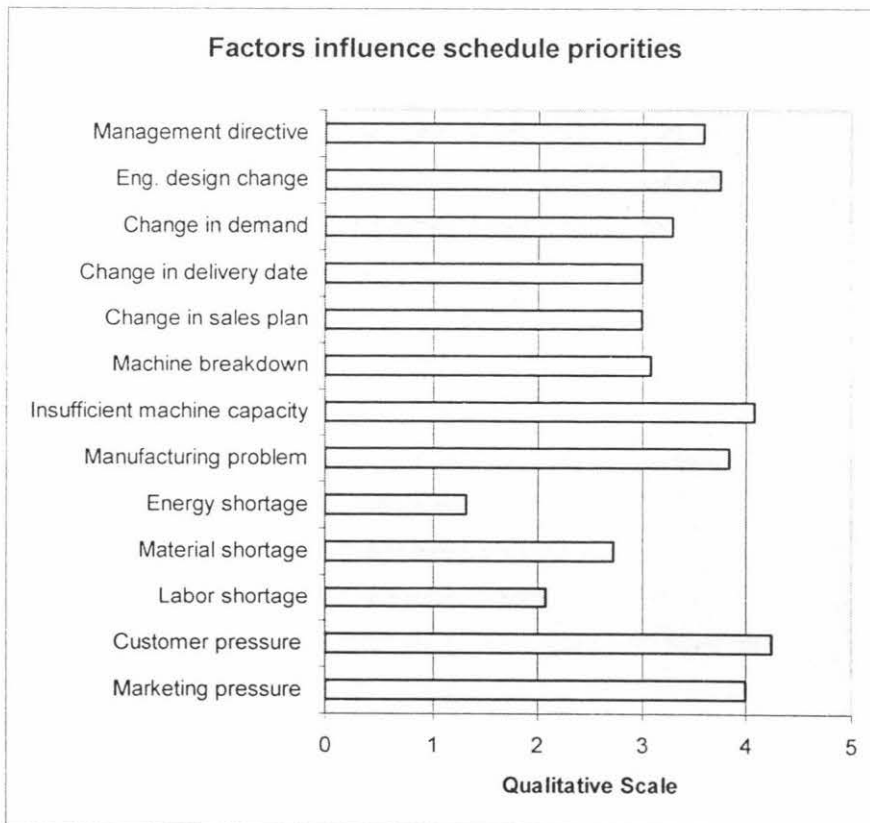
Based on the companies' responses to rate factors that often influence production sequences at machines or work centers are rated in the following (Q.5): Order in which the jobs arrive (4.5), customer order due date (4.2), and top management directive (4.1). Other factors fall between three and four of the scale as in fig. 4-14.

Figure 4-14: Factors influence production sequence



It is interesting to see that pressure from customers is still a major factor in changing the production schedule priorities when the plant has started to process orders (Q.6). This reveals that customer's satisfaction is the highest priority among the SMEs, which reflected by low percentage (about 8.5%) of customer schedule changes after the start of production (Q.12). Another factor that determines schedule changing is insufficient machining capacity of the companies (see fig. 4-15).

Figure 4-15: Factors influence schedule priorities



The delivery dates to customers are determined mostly by “negotiation with customer” (Q.7) and followed by customer (customers decide the due-date). This figure indicates that delivery dates are made based on the interest of all

involved parties, and is likely to produce a workable solution for both the customers and the companies. State plans play almost no role in determining the due-date. This data can be seen in figure 4-16.

Figure 4-16: Delivery practices



The average percentage of delivery orders late delivered to the customers for most of companies were about 10% (Q.9). These customer orders that are not delivered on time average 6 days past their due dates (Q.10). The low percentage of the late orders can be explained by the fact that delivery dates are determined by negotiation with customers. Other variables cause lateness can be seen in figure 4-17 (Q.11). The responses reveal that delivery lateness is often caused by production bottleneck in their production workshop, insufficient machine capacity, and material shortage. Finished goods transportation problem and energy shortage is not a major contributor to the lateness.

Figure 4-17: Cause of lateness

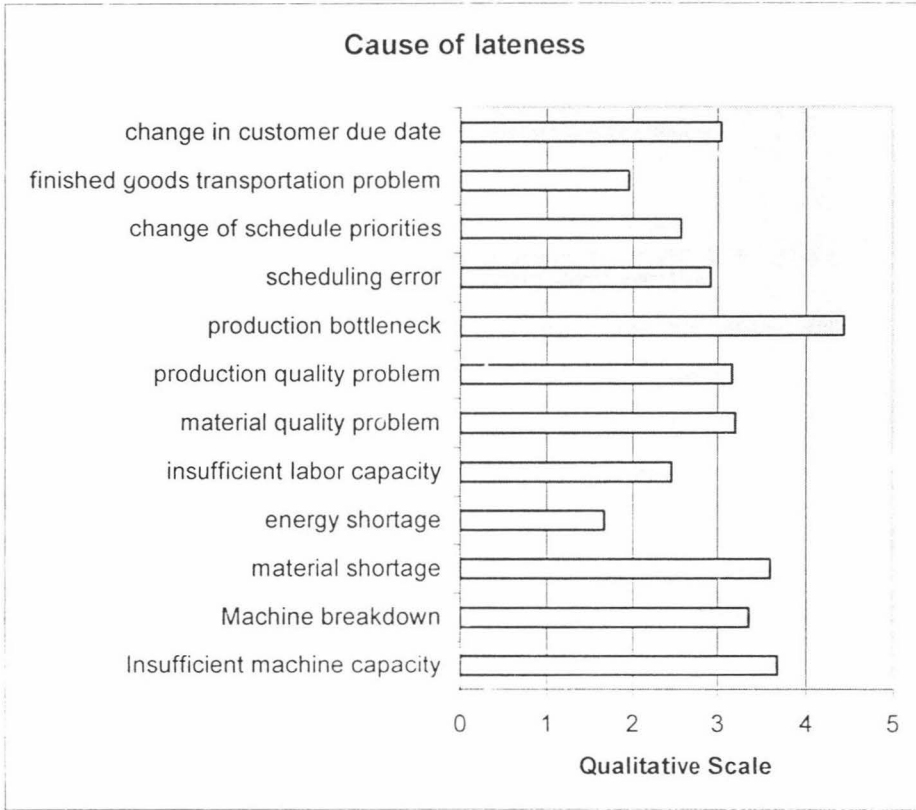
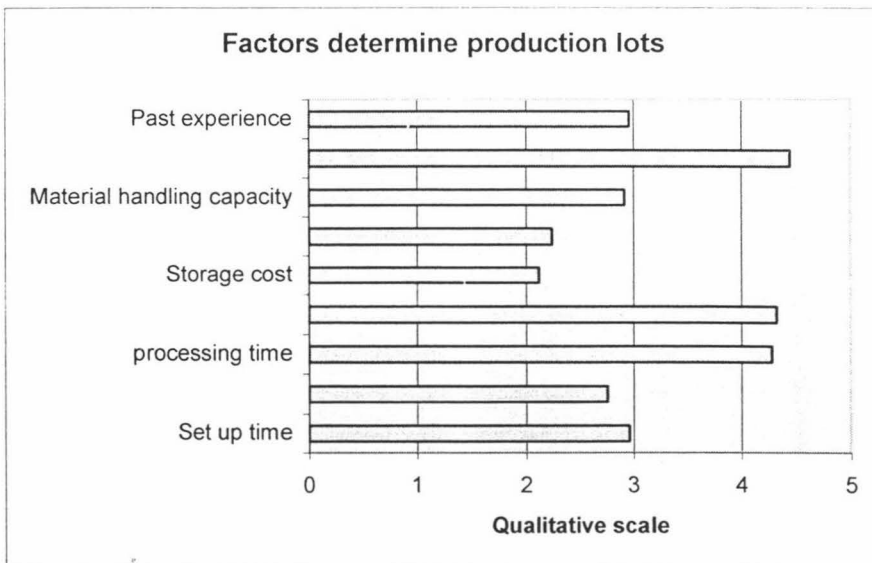


Figure 4-18: Factors determine the size of company's production lots.



In general, all factors contribute in determining the size of company production lots (Q.14). This fact can be seen that almost all variables lie between two to three of the qualitative scale. Except for cost per unit, size of the order, and processing time (see fig. 4-18).

Other findings on the shop floor control activities, which are rated on nominal scale, can be found in table 4-4.

Table 4-4: Other findings on Shop floor control

Question	% or days
Q.12. On approximately what percent of its orders do customer schedule changes occur after the start of production?	8.5 %
Q.13. On approximately what portion of the company's orders do engineering or design changes occur after the start of production?	8.1 %
Q.15. What are the companies approximate reject or return percentages at each of the following stages?	
• % Rejects of incoming material	4.1 %
• % Rejects during processing in factory (scrap rate)	5.7 %
• % Rejects at final inspection	4.5 %
• % Returns from the customer	4.8 %
Q.16. About how many times typically elapses from the start of the first operation until a batch of the company's products is finished?	
• Days minimum time from start to completion	28.5
• Days maximum time from start to completion	42.3
• Days usual time from start to completion	32.6
Q.17. Of the elapsed factory time described in the previous question, approximately what percentage is spent in actual processing operations (i.e., non waiting time)?	88 %
Q.18. About how much time typically elapses from the receipt of a customer order until it is shipped?	
• Days minimum time from order to shipment	35.9
• Days maximum time from order to shipment	50.1
• Days usual time from order to shipment	44.7
Q.19. What proportion of the company's orders is completed on or before the time specified by the production schedule?	77.2 %
Q.20. For approximately what portion of its manufacturing operations does the company have time standards?	92.6 %
Q.21. About what percentage of the company's time standard are accurate?	94 %

#### 4.1.5 Material Management

Materials management includes a wide range of activities associated with purchasing, managing, distributing, and controlling inventories within the plant. Inventory includes raw materials, component parts, work in process, and finished goods.

Figure 4-19: Purchase quantity determination

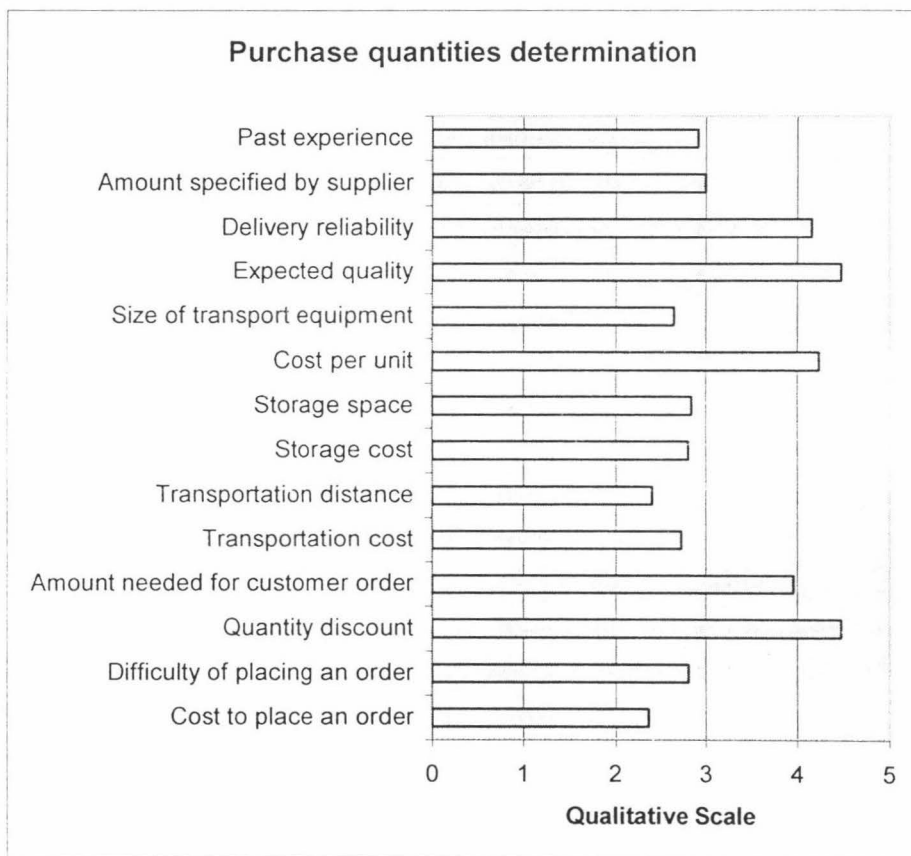
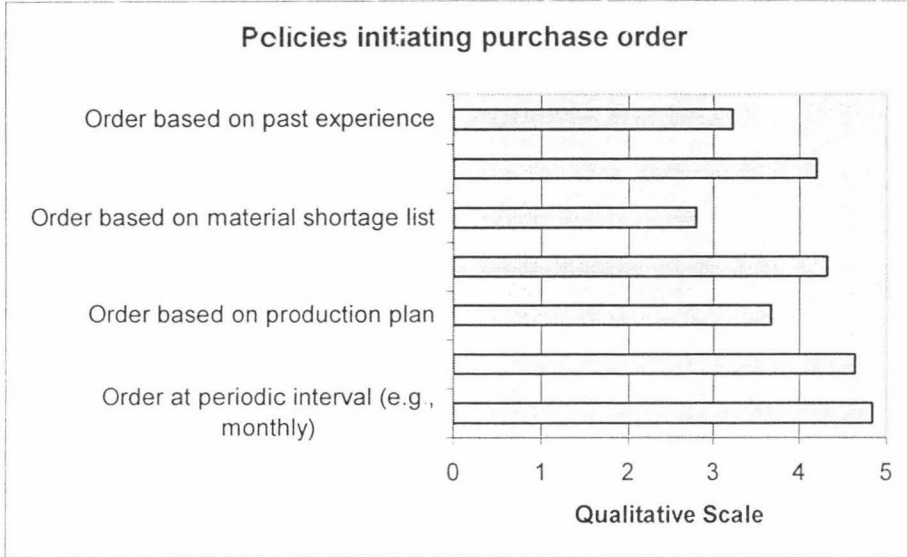


Figure 4-20: Policies initiating purchase order



Materials ordering at periodic intervals and in response to inventory levels are the most significant drivers of purchasing actions material management (Q.4). Other variables of policies to initiate purchase orders can be seen in table 4-20.

Table 4-5: Other findings on material management

Question	Min	Average	Max
Q.2. Approximately what percent of the parts and components that comprise the company's products are fabricated within the plant?	25 %	77.1 %	95 %
Q.3. What percent of the company's total manufacturing cost is for purchased material?	10 %	22.5 %	50 %
Q.5. What proportion of the company's purchase orders are delivered by suppliers as follow?	26.73 % early	59.5 % on time	13.8 % late
Q.6. Of the purchase orders that are delivered late by suppliers, what is the approximate average lateness?	1 day	5.4 days	10 days
Q.7. About how many suppliers does the company have, on average, per part?	5	28.7	95
Q.8. What is the approximate total number of part	572 raw	741	1394

numbers in each segment of the company's inventory system?	material	component	finished goods
Q. 9. What is the value of the company's total inventory? (Million Rp)	50	274	800
Q.10. What is the percentage distribution of the company's inventory values?	21.6 % in parts	48.3 % in work in process	30 % in finished goods

The distribution percentage of the companies' inventory held was: 48.31% value in work-in-process, 30.08% in finished goods, and 21.62% in value of purchased materials and parts (Q.10). Most of the companies have an average of 29 suppliers of parts (Q.7). This is because most of the SMEs participating in the research are machining companies in general tools, precision component, molding, and dies. Other findings on materials management rated in nominal scale can be seen in table 4-5.

Indonesia's machine tools industries had not generally been internationally competitive, as evidenced by the flood of imports into Indonesia and the lack of exports in these areas of activities. On the other hands, Polman machine tools had been described as of superior quality and technologically advanced. The products were carefully engineered and were more competitive than those produced in other companies. Consequently, most of the companies considered this cooperation process with Polman. These assumptions were reflected in their responses that tend to answer each element of cooperative variables to the right of the qualitative scale. The responses for this study were very influenced by Polman reputations.

Subjective responses played very significant role in answering the questionnaire, and, this indicated unconstructive in term of the ability of companies to collaborate effectively. However, based on company's executives explanation and researcher visited to company sites, most companies started reducing

manufacturing cost, achieving more flexibility, and shortening processing time by introducing Numerical Control Machines (CNC). It was not surprise that the brand and type of these machines were exactly the same with the CNC machines in Polman's workshop. They already planned this automation system before the economic crises. Even though the program seemed to be postponed, the spirit of companies to collaborate was perhaps the most important to be concerned. And that was one contribution factor to the success of collaboration process.

The material management analysis thus completes the analysis and interpretation of the survey questionnaire responses. The next section outlines the analysis of the integration or cooperation process based on the compatibility index.

## 4.2 Integration Analysis

This section presents the analysis of integration process. As mentioned before, the integration process will be based on the data collected and analyzed in the previous section with respect to Polman practices data as the “base region”. A comparison of the similarity of practices will be done using the compatibility index. The analysis is used to develop answers to the research questions (see chapter 2). The development of the compatibility index is not to rank companies according to their manufacturing performance but to describe their existing practices from the point of view of a potential cooperation with others (Whybark, 1993).

Whybark (1993) suggests three steps as the strategy used in conducting the study:

- Selection of the research questions and variables
- Scoring the variables
- Developing the index

### 4.2.1 *Selection of the research questions and variables*

Selection of the research questions and variables mostly depends on the companies aim for the integration; this includes individual interest from companies considering a joint venture. For this study, the selection process was done by involving participation of key management personnel of Polman and other companies interested in the project. The entire set of questions was reviewed in search for those questions and variables, which it was felt indicated areas where differences in manufacturing practices can cause trouble in the cooperation process. Each member provided an individual written note, together with supporting arguments and assumptions of why he chose such questions and variables. These notes of selected questions were submitted to the

researcher, who edited, clarified, and summarized the data for a second meeting. This procedure continued for four rounds, when a consensus among members had been reached.

The approach taken in selection process was to begin with the question: “Is the subject of this question likely to have an important influence in the partnership to integrate manufacturing activities?” If the question seems to have influence, then the process is followed by a second question: “Which variables have the greatest impact?” This selection process provided more than 27 potential candidate questions that consist of 60 variables. Finally, the rest of 53 questions were dropped because they were not seen to be important in the integration of the manufacturing practices.

Other valuable results of this management participation meeting are:

- Be able to set up value of ideal variables for Polman that were represented in qualitative scales. These modal numbers were set-up by managerial level of different disciplines and backgrounds
- Effective transfer knowledge: Share with all concerned step-by-step processes of achieving the index and the constraints that might have.

#### 4.2.2 Scoring the variables (Modal Value)

As mentioned in chapter 3, the variables associated with the research questions fall into three measurement categories: Ratio scaled, ordinal, and nominal. Since the index measures the degree of compatibility with respect to Polman practices, the modal values of variables are taken from Polman database (code 26 in Appendix E). For each ordinal question type that requires an answer by number (e.g. percentage), the results have to be converted to qualitative scale by equation 1 in chapter 3. Finally, for a type of question that requires answer other than

ratio scaled or ordinal (weekly, monthly, etc.) the number will be 1 (no compatibility) or 0 (complete compatibility). If a practice matches that of Polman, the score assigned is zero and if not, the score is one. The resulting modal values (M.V.) are summarized in table 4-6 for each of the variables chosen in selection process.

Table 4-6: Variable and modal value practices and qualitative scale conversion

No.	Variables	M.V.	
		n	Q.S.
<b>COMPANY PROFILE</b>			
1	Q.9. About what percentage of the company's products are: <ul style="list-style-type: none"> <li>• Make-to-stock</li> <li>• Make-to order</li> </ul>	80%	4
		20%	1
2	Q.17. To what extend does the company use the computer for: <ul style="list-style-type: none"> <li>• Product design</li> <li>• Production Planning</li> <li>• Sales forecasting</li> </ul>		4
			5
			5
3	Q.19. To what extend has the company invested resources for <ul style="list-style-type: none"> <li>• Computer hardware/software</li> <li>• Factory automation</li> <li>• Employee training</li> <li>• Just-in-time system</li> </ul>		5
			4
			4
			4
<b>SALES FORECASTING</b>			
1	Q.3. To what extend does the company use forecasting methods below: <ul style="list-style-type: none"> <li>• Past experience</li> <li>• Time series model</li> </ul>		4
			5
2	Q.4. To what extend does the company consider forecasting factors below: <ul style="list-style-type: none"> <li>• Current political situation</li> <li>• Result of market research</li> <li>• Current economic situation</li> </ul>		5
			4
			5
3	Q.8. How far into the future does the forecast extend?	9 m.	0
4	Q.9. Smallest increment time of the forecast	Monthly	0
5	Q.10. How many times per year is the sales forecast modified?	6 times	0
6	Q.12. To what extend is the company's sales forecast used for the following purposes? <ul style="list-style-type: none"> <li>• Budget preparation</li> <li>• Production planning</li> <li>• Sales planning</li> </ul>		5
			5
			4

<b>PRODUCTION PLANNING AND SCHEDULING</b>			
1	Q.4. How far into the future does the production plan extend?	3 m	0
2	Q.5. Smallest increment time of production plan	Monthly	0
3	Q.6. How many times/year the production plan revised?	12 times	0
4	Q.7. To what extend factors below are considered in Production plan <ul style="list-style-type: none"> <li>• Machine capacity</li> <li>• Work-man / labor capacity</li> <li>• The Forecast</li> </ul>		5 3 3
5	Q.8. When demand exceed capacity, how often the company respond by: <ul style="list-style-type: none"> <li>• Adding shifts</li> <li>• Subcontract production works</li> <li>• Use overtime</li> </ul>		5 3 5
6	Q.9. When demand less than capacity, how often the company respond by: <ul style="list-style-type: none"> <li>• Eliminate shifts</li> <li>• Lease capacity to others</li> <li>• Reduce workday or week</li> </ul>		4 3 3
7	Q.11. How often does the company consider factors below in subcontracting works? <ul style="list-style-type: none"> <li>• Excess production load at your company</li> <li>• Production difficulty at your company</li> <li>• Subcontractor's costs are lower</li> </ul>		5 4 2
<b>SHOP FLOOR CONTROL</b>			
1	Q.3. To what extend is each the following decisions considered to start work on an order? <ul style="list-style-type: none"> <li>• Production plan</li> <li>• Detailed production schedule</li> <li>• Actual customer order</li> </ul>		4 5 5
2	Q.5. How often is the processing sequence at machine centers established by the following criteria <ul style="list-style-type: none"> <li>• Customer order due date</li> <li>• Processing time of the job</li> <li>• Top management directive</li> </ul>		4 3 4
3	Q.6. How often does each of the following factors change the company's production schedule priorities after the plant has started an order? <ul style="list-style-type: none"> <li>• Change in delivery due date</li> <li>• Pressure from Marketing</li> <li>• Change in sales plan</li> </ul>		3 3 2

4	<p>Q.7. How often are the due dates that are promised to customers determined by each of the following?</p> <ul style="list-style-type: none"> <li>• Negotiation with customers</li> <li>• The Customer</li> <li>• The company</li> </ul>		5 4 3
5	<p>Q.11. When the company's finished goods are delivered late to the customers, how often does each of the following occur as the cause of lateness?</p> <ul style="list-style-type: none"> <li>• Insufficient machine capacity</li> <li>• Machine breakdown</li> <li>• Production bottlenecks</li> </ul>		3 2 3
6	<p>Q.14. To what extent does each of the following determine the size of the company's production lots?</p> <ul style="list-style-type: none"> <li>• Size of the order</li> <li>• Processing time</li> <li>• Cost per unit</li> </ul>		3 4 5
<b>MATERIAL MANAGEMENT</b>			
1	<p>Q.1. To what extent does the company consider each of the following in determining purchase quantities?</p> <ul style="list-style-type: none"> <li>• Quantity discount</li> <li>• Expected quality</li> <li>• Delivery reliability</li> </ul>		4 4 4
2	<p>Q.2. Approximately what percent of the parts and components that comprise the company's products are fabricated within the plant?</p>	25 %	1.25
3	<p>Q. 4. How often does the company use each of the following policies when initiating purchase orders?</p> <ul style="list-style-type: none"> <li>• Order at periodic interval</li> <li>• Order based on past experience</li> <li>• Order for actual customer order</li> </ul>		4 3 4
4	<p>Q.5. What proportions of the company's purchase orders are delivered by suppliers as follow?</p> <ul style="list-style-type: none"> <li>• % Delivered early</li> <li>• % Delivered on time</li> <li>• % Delivered late</li> </ul>	30 % 40 % 30 %	1.5 2 1.5
5	<p>Q.10. What is the percentage distribution of the company's inventory values?</p> <ul style="list-style-type: none"> <li>• % Of value in purchased materials and parts</li> <li>• % Of value in work-in-process</li> <li>• % Of value in finished goods</li> </ul>	30 % 50 % 20 %	1.5 2.5 1

### 4.2.3 Calculating the index

This section discusses the calculation process using Excel spreadsheets. A total of 27 questions that consists of 60 modal variables were selected for generating the index. The identical variables of two companies were compared side by side such as in appendix E (spreadsheet calculation).

Figure 4-7 illustrates the sample calculation process for company code 1 to 26 (Polman). Unfortunately, it is not possible to show all the cells because of page limit availability.

Table 4-7: sample calculation company 1 with 26 (Polman)

<b>From Cal-1 (Company description and background information-V total=9)</b>										
CODE	STK	ORDER	17-A	17-b	17-f	19-b	19-c	19-d	19-e	
	26	80,00	20,00	4	5	5	5	4	3	4
	1	13,00	87,00	4	4	5	5	3	2	2
Diff		67,00	67,00	0,00	1,00	1,00	0,00	1,00	1,00	2,00
Cf		0,84	3,35	0,00	0,20	0,20	0,00	0,25	0,33	0,50
Index 1		0,61								
<b>From Cal-2 (Sales forecasting-V total=11)</b>										
CODE	3-a	3-d	4-a	4-b	4-g	proj	unit	MOD	12-a	12-b
	26	5	4	5	5	4	9	2	6	5
	1	3	5	4	5	5	3	3	6	4
Diff		2	1	1	0	1	6	1	0	1
Cf		0,40	0,25	0,20	0,00	0,25	0,67	0,50	0,00	0,20
Index 2		0,27								
<b>From Cal-3 (Production planning and scheduling-V total=15)</b>										
CODE	Proj	Unit	67-c	7-d	7-g	8-b	8-c	8-d	9-c	
	26	3	2	9	5	3	3	5	5	3
	1	3	3	12	5	5	4	5	5	5
Diff		0	1	3	0	2	1	0	0	2
Cf		0,00	0,50	0,33	0,00	0,67	0,33	0,00	0,00	0,67
Index 3		0,34								
<b>From Cal-4 (Shop floor control-V total=18)</b>										
CODE	3-a	3-b	3-c	5-b	5-c	5-f	6-a	6-l	6-j	7-a
	26	5	4	5	4	3	4	3	2	3
	1	3	5	5	4	4	4	3	4	4
Diff		2	1	0	0	1	0	0	2	1
Cf		0,40	0,25	0,00	0,00	0,33	0,00	0,00	1,00	0,33
Index 4		0,32								

From Cal-5 (Material management-V total=13)										
CODE	1-c	1-k	1-l	own	4-a	4-f	4-g	supply	8-a	8-b
26	4	4	4	25,00	4	4	3	350	1080	1296
1	4	3	2	55,00	5	3	5	5	1000	300
Diff	0	1	2	30	1	1	2	345	80	996
Cf	0,00	0,25	0,50	1,20	0,25	0,25	0,67	0,99	0,07	0,77
Index 5	0,49									

The calculation processes were done in five worksheets Cal-1 to Cal-5, which correspond to five parts of the research questionnaire (see appendix E). The cell labeled “diff” of each worksheet was defined by absolute comparison of identical variables of the two companies. The correlation factor,  $C_f$ , which had value varies between 1 and 0, was defined by dividing the value of “diff” by the modal value. To compute the index<sub>i</sub>, the correlation factor,  $C_{f_i}$ , divided by the number of investigated variables. Finally, the value of the compatibility index for company 1 to Polman is the average value of index<sub>1</sub> to index<sub>5</sub>. The result of the compatibility index calculation for company code 1 is 0.3940. Repeating the same process for the rest of the companies, the company ranks and their compatibility indexes are shown in table 4-8 (see calculation in appendix E).

Table 4-8: Average score and compatibility index

RANK	CODE	C. INDEX	RANK	CODE	C. INDEX
1	9	0,2520	14	24	0,3380
2	10	0,2780	15	6	0,3400
3	22	0,2800	16	3	0,3420
4	18	0,2840	17	12	0,3440
5	4	0,3000	18	15	0,3560
6	20	0,3040	19	14	0,3620
7	5	0,3140	20	13	0,3780
8	11	0,3140	21	17	0,3820
9	19	0,3160	22	7	0,3840
10	21	0,3200	23	1	0,3940
11	8	0,3220	24	16	0,4720
12	25	0,3320	25	2	0,4840
13	23	0,3380			

Table 4-8 ranks the participated companies based on their compatibility index values. The company nine has the lowest compatibility index of 0.2520, which means that it could be predicted that its manufacturing practices are quite similar to Polman, and most likely has a greater chance for successful collaboration.

In reality, it is not possible to integrate Polman to all 25 companies for integration purposes. It was agreed at the management meeting that one purpose of the ranking was to choose the first five companies with the lowest index values. To see how large the difference in practices was and to know whether the difference was in the expected direction, the five companies having the lowest index were investigated; they were 9, 10, 22, 18, and 4. The analyses focused on the index of each survey section by comparing six selected companies (i.e. the five mentioned earlier, plus Polman) side by side.

Table 4-9: Distribution of descriptive statistic of index

Company Code	4	9	10	18	22	26	4	9	10	18	22	26
	Company description						Shop floor control					
Mean	0,172	0,127	0,050	0,127	0,222	0,185	0,297	0,386	0,266	0,076	0,166	0,386
Median	0,250	0,063	0,000	0,063	0,250	0,250	0,250	0,292	0,250	0,000	0,200	0,292
Standard Deviation	0,157	0,140	0,100	0,140	0,317	0,220	0,315	0,283	0,241	0,129	0,166	0,283
Minimum	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Maximum	0,400	0,333	0,250	0,333	1,000	0,667	1,000	1,000	0,667	0,333	0,500	1,000
Count	9	9	9	9	9	9	18	18	18	18	18	18
	Sales forecasting						Material management					
Mean	0,283	0,297	0,235	0,194	0,162	0,283	0,305	0,330	0,286	0,259	0,275	0,349
Median	0,250	0,250	0,000	0,200	0,000	0,250	0,250	0,250	0,250	0,100	0,214	0,250
Standard Deviation	0,332	0,324	0,367	0,209	0,206	0,332	0,282	0,341	0,330	0,346	0,277	0,327
Minimum	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Maximum	1,000	1,000	1,000	0,500	0,500	1,000	0,833	1,000	0,875	1,233	0,833	1,000
Count	11	11	11	11	11	11	13	13	13	13	13	13
	Production planning											
Mean	0,210	0,343	0,369	0,270	0,156	0,357						
Median	0,200	0,250	0,250	0,250	0,000	0,250						
Standard Deviation	0,245	0,448	0,360	0,192	0,186	0,440						
Minimum	0,000	0,000	0,000	0,000	0,000	0,000						
Maximum	0,667	1,000	1,000	0,667	0,500	1,000						

Count	15	15	15	15	15	15
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Table 4-9 shows the mean, median, minimum, and maximum value of index variables taken from appendix F. A primary objective of these statistical data was to analyze how large the differences and interpret a correlation hypothesis.

It was stated within a previous section, that companies nine and four had the lowest and the highest index, respectively. Referring to this table, the stock plot method was used to see which section influenced the compatibility index. In this graphical method, the box represents the range distribution of mean values of counted variables, and the vertical line above and below the box represent the highest and lowest data points.

Figure 4-21: Company description index

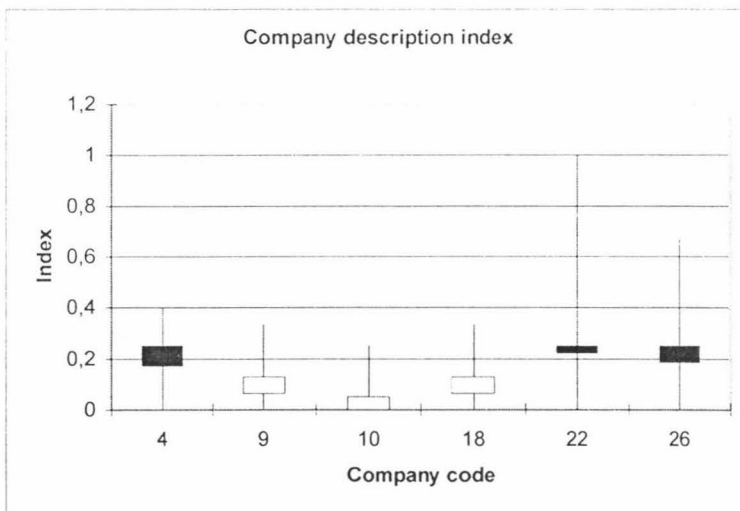


Figure 4-21 showed the index distribution of the first survey section; Company Description and Background Information. It depicted that the company four had the same index with Polman at about 0.2. Companies 9, 10, and 18 had superior performance of practices since their boxes were at lower values than

Polman. The area of shaded squares represented the distribution of the mean values. Therefore company four had the most similar area with Polman, which indicated that in terms of company description they were alike.

Figure 4-22: Sales forecasting index

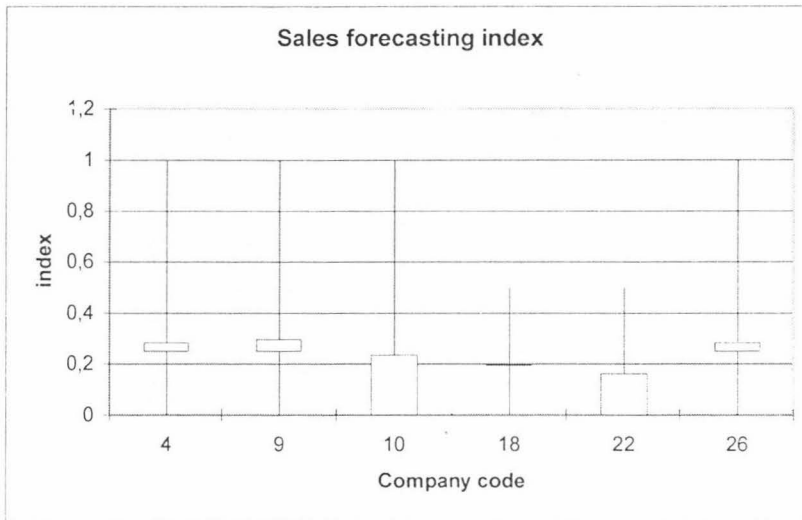


Figure 4-22 showed the index distribution of the sales forecasting section. It showed that companies four and nine had the same index, at about 0.3 of the scale. Companies 10, 18, and 22 had superior performance of practices since their boxes were lower than Polman. However, their index distributions were not well presented. The area of shaded squares represented the mean distribution of the index. Companies four and nine had the most similar area to Polman, which indicated that they had the same sales forecasting practices.

Figure 4-23: Production planning and scheduling index

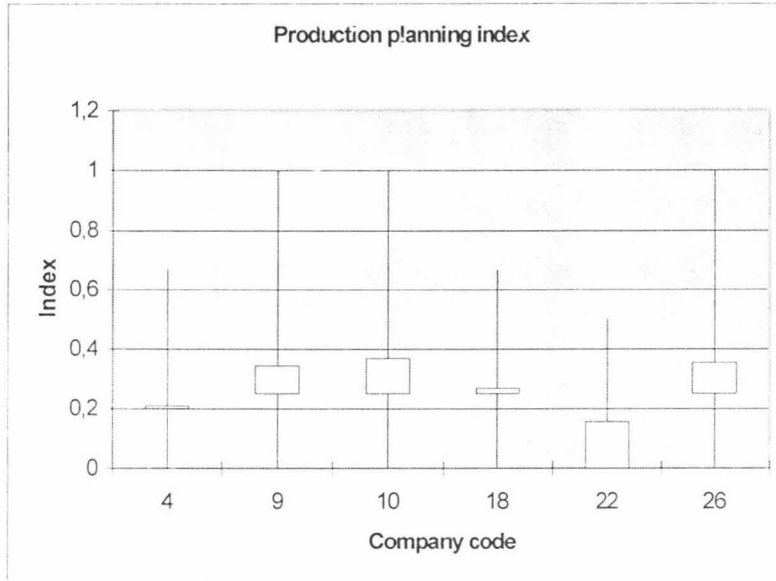


Figure 4-23 showed the index distribution of the production planning and scheduling. Most indexes of the companies fell in between 0.2 and 0.4 of the scale except company 22. Compared with Polman, it showed that company nine had the same index, at about 0.3 of the scale. Since the box of company 22 was at a lower value, its performance of production planning and scheduling practices were superior to Polman. However, the larger area of the box and longer distance of the mean value informed that its index range was not well distributed and the different practices were larger than most of the companies, respectively. The area of shaded square represented the mean distribution of the index. Company ten and nine had the most similar area to Polman, which indicated that in terms of sales forecasting they were alike.

Figure 4 24: Shop floor control index

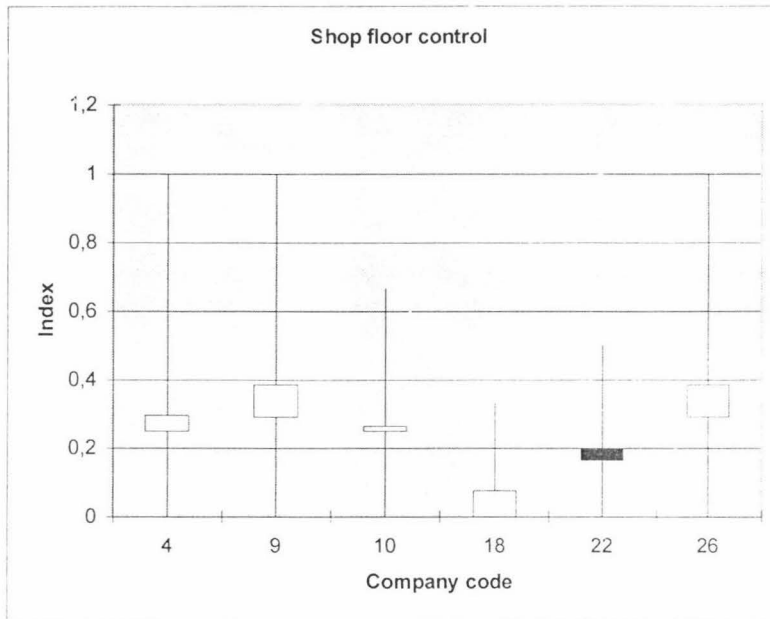


Figure 4-24 showed the index distribution of the shop floor control questions. Most indexes of the companies fell in between 0.2 and 0.4 of the scale except companies 18 and 22. Compared with Polman, it showed that company nine, again, had the same index at about 0.35 of the scale. Since the boxes of companies 18 and 22 were at a lower value, their performances of shop floor control activities were superior to Polman. However, larger area of the company 18's box and longer distance of the mean value meant that its index range was larger than most of the companies. Smaller area of the squares of the companies 4, 10, and 22 represented that the index of their manufacturing practices distribution closer each others but far from Polman. Company nine had the most similar area to Polman, which indicated that in terms of shop floor control manufacturing practices they were almost the same.

Figure 4-25: Materials management index

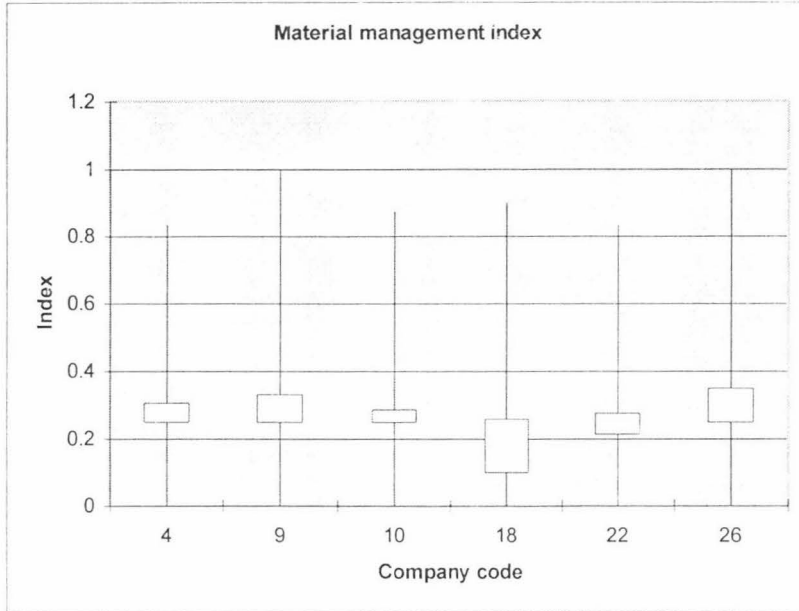


Figure 4-25 showed the index distribution of the materials management results. Most indexes of the companies fell in between 0.2 and 0.4 of the scale except company 18. Compared with Polman, it showed that company nine, again, had the same index at about 0.3 of the scale. Since the boxes of companies 18 were at lower values, its performances of materials management activities were slightly superior to Polman. However, the larger area of the company 18's box informed that its index distribution range far from Polman. This meant that even having superior practices, its manufacturing activities were far compared with other companies relative to Polman. The area of shaded square represented the mean distribution of the index. Therefore, company nine had the most similar area to Polman, which indicated that in terms of materials management manufacturing practices, they were almost the same.

The integration analysis thus concludes both sections of the data analysis and integration process investigation. The findings will be further used to give conclusion and recommendation, which are discussed in the following chapter.



## 5 CHAPTER 5: CONCLUSION

This chapter concludes the entire project study and summarizes the project objective, design methodology, findings and results as well as limitations of the project. Some directions for further research are then presented.

### 5.1 Summary

#### 5.1.1 Project overview

In general, this was a study of Global Manufacturing Practices as well as of an analysis process for company suitability for integration based on similarity of their manufacturing practices. The data come from Indonesian's SMEs and was gathered using a standard GMRG questionnaire. The conceptual framework applied in the study emphasizes in detail an analytical approach for the absolute comparison of one based company to others. The framework presented here groups the data into basic units for statistical comparisons, accounts for the measurement scales of the variables, and uses different statistical approaches depending on the assumptions and type of data. The framework was used to seek answers to the following research questions:

- How and why is the Global Manufacturing Practices survey beneficial to the integration process?
- How should the data collected be treated and used strategically prior to integration?
- What are the major factors of manufacturing practices which are important to successful integration?

The analysis of the study was divided into two sections, general analysis survey result and the analysis of integration. The first part, simply, provided a

document of useful data not only for participants but also for other companies in general. The analysis of integration process was based on the compatibility index developed by Whybark (1993), and the theory of statistical analysis developed by Bernstein (1988), which are respectively as follows:

- The success of the integration depends on the similarities or differences in manufacturing practices.
- To measure these similarities or differences, the statistical mean distribution analysis calculates the compatibility index that reveals the rank of the companies.

Referred to the concept above as the theoretical proportions, accordingly the analysis focus on how an aim of this study can be used as a strategic planning prior to the integration.

#### *5.1.2 Finding and results of the project*

The findings of the study were drawn from statistical analyses. The two findings were general survey result and integration analyses result. The first part draws a general real-life picture of SMEs manufacturing practices, and the last part compared variables using statistical analysis. The calculation was mostly carried out in the computer spreadsheet. Linking the findings to the theoretical propositions, the three main findings of the project were:

1. Participants considered the Global Manufacturing Practices survey was important to the integration process. These can be seen in:

- Before knowing the compatibility index, most companies doing collaboration used informal approach and mainly decided by top executives. The lack of success seemed to occur because the decision was

made from the management's view. Using GMP, however, all manufacturing activities were compared at the operational level. This can be expected to have better outcomes.

2. The index revealed rank of the companies based on the different practices, so:

- For management purposes the index could be broken down back into scales to search variables. Based on these variables, actions to close the different gap could be performed.
- It could be used for selection process; the companies with greater index value could be dropped from the list.

3. Mean comparison and distribution of the index revealed findings to answer the research questions because it described prediction on:

- How large and long the different values of the selected companies compared to the based company.
- The superiority practices of one company to others.

Hence, the use of Global Manufacturing Practices appears to affect the successful prediction prior to the integration process.

### *5.1.3 Project limitations*

The findings of the project might have been affected to some extent by limitations in the following aspects:

The survey, was limited because of:

- Very small number of survey subjects.

- Inconsistent responses data in relation to current activities in companies.
- Target subjects did not represent the full community of SMEs.
- Lack of subjects' knowledge on the material of Global Manufacturing Practices.
- Poor participation in relation to the on-going economic crisis in Indonesia.

The integration process, which was very limited in relation to the following

- Small number of investigated companies.
- Lack of supporting documents (sales record, annual record, etc.)
- Lack of professional staff in filling the survey.

Statistical analysis, which was the main limitation of this project study in relation to the following:

- Limited literature on a way of testing the variables.
- Missing variables.

Based on the limitations above, possibilities for further research were identified and discussed next.

#### *5.1.4 Direction for further work*

The limitations of the study bring about determination of other potential aspects that are not clarified by this study. The aspects could be the basis for further

research, and would be focused on specific issues that are in most need of attention, including the following:

The first aspect concerns with the usage of the absolute comparison, which neglected superior performance of one company to others. Clearly, the stockplot provides information about superior performances of a company(s) compared to the base company. This could correspond to the following questions “What are the factors that determine this superiority, and what are proper statistical analyses to determine these superiorities?”

The second aspect is in converting the process of ratio and nominal to ordinal scale. For this study, the process was based on the ideal number and was heavily depended on personnel subjective assessment. This could be investigated by seeking the answer to the following questions “Can the GMP survey reveal the ideal number for each variable, and how to do it? By nations, regions, or best practices of one recognized sample company?”

The last aspect is that the respondents rated most variables of the questionnaire as important (above 50% of the scale). One assuming reason for this fact is that most companies concentrate to survive in on-going economic crisis at the time the questionnaire distributed. Therefore, they neglect the importance of this study, or sought to ensure that their company looked competitive. This former assumption was reflected in a shop floor control question 22, which clearly shows that most responses have negative numbers of their annual change compared with last year references. Question 4 of sales forecasting is also support for this assumption that the economic situation is a major consideration. Referring to these findings, redistribution of questionnaire by involving more participants after economic recovery may well produces different results.

The development of this study forms a sound basis for ongoing action research that will involve a larger variety of techniques for data collection. Therefore, a further investigation of the problem context above could be based on the data collected in this study as a preliminary step, and the findings could be seen as a pilot for further action research.

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## I. Latar Belakang Perusahaan

1. Berapa jumlah total pekerja pada perusahaan anda? \_\_\_\_\_ orang.

												26
75	73	65	70	74	94	60	70	25	85	71	84	84
71	70	40	97	95	100	75	87	98	100	94	90	240

2. Dari jumlah tersebut, diatas, berapa yang bekerja pada bagian produksi? \_\_\_\_\_ orang.

												26
59	65	47	51	45	77	48	55	22	65	60	64	53
59	60	35	68	80	90	60	80	80	75	78	83	99

3. Berapa jumlah shift produksi per hari? \_\_\_\_\_ shift produksi per hari.

												26
3	2	2	3	2	1	1	1	2	3	2	3	1
1	1	2	3	2	2	2	1	2	2	2	2	2

4. Dalam satu tahun, berapa jumlah total jam kerja seseorang yang bekerja dibagian produksi?  
\_\_\_\_\_ jam kerja per tahun

												26
1680	1800	1800	1800	1800	1760	1600	1800	1800	1800	1800	1680	1800
1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1992

5. Berapa persen dari total biaya manufaktur (manufacturing cost) dialokasikan untuk membiayai pekerja tidak tetap, bila itu ada? \_\_\_\_\_ %

												23
60	15	10	30	20	15	10	30	N/A	40	N/A	N/A	70
90	30	25	75	10	25	14	18	20	11	17	14	2

6. Berapa total penjualan tahun lalu? (dalam unit Juta Rupiah)

\_\_\_\_\_ penjualan domestik (domestic sales)

\_\_\_\_\_ penjualan ekspor (export sales)

Dom												26
511	630	320	350	700	300	380	450	500	850	200	1000	1000
2500	700	500	800	2400	3000	2500	1500	4000	2000	2400	2600	3500

Xport												19
0	0	0	200	0	0	0	300	0	400	200	500	500
1000	1500	2500	300	500	2500	2450	300	2500	2500	1000	1300	1700

7. Berapa jumlah alur produksi (product lines) atau produk sejenis (product families) didalam perusahaan anda?

\_\_\_\_\_ alur produksi atau produk sejenis.

												26
--	--	--	--	--	--	--	--	--	--	--	--	----

8	14	11	10	8	17	20	12	20	15	12	17	10
5	7	10	12	20	10	15	12	16	20	25	16	15

8. Berapa persentase penjualan (company sales) yang dihasilkan dari penjualan produk anda'an?  
 \_\_\_\_\_ % dari penjualan

26

20	35	72	85	80	95	75	80	95	80	65	60	70
90	95	60	70	80	85	75	90	78	89	95	80	80

9. Berapa persentase pembuatan produk dibuat berdasarkan pesanan (make-to-order) dan berapa persentase pembuatan produk dibuat berdasarkan persediaan (make-to-stock)? (jumlah keduanya harus 100%)  
 \_\_\_\_\_ % berdasarkan pesanan  
 \_\_\_\_\_ % berdasarkan persediaan

26

13	0	10	85	95	100	50	75	85	80	80	95	0
0	30	0	0	25	20	25	10	0	5	16	22	80

26

87	100	90	15	5	0	50	25	15	20	20	5	100
100	70	100	100	75	80	75	90	100	95	84	78	20

10. Berapa persentase kepemilikan perusahaan dikuasai oleh kedua jenis pemilik dibawah ini ? (jumlah keduanya 100%)  
 \_\_\_\_\_ % domestik (pemilik berdomisili didalam negeri)  
 \_\_\_\_\_ % asing (pemilik berdomisili diluar negeri)

26

100	100	100	100	100	100	100	100	100	100	100	100	100
100	100	100	100	100	100	100	100	100	100	100	100	100

26

0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

11. Berapa persentase mesin produksi dikelompokkan kedalam kedua kelompok dibawah ini?  
 \_\_\_\_\_ % mesin dikelompokkan berdasarkan jenis (contoh, kelompok mesin bubut)  
 \_\_\_\_\_ % mesin dikelompokkan berdasarkan gabungan antara alur produksi dan produk families

26

30	50	68	50	45	75	50	45	20	30	30	15	38
25	45	47	53	20	10	35	56	32	67	32	12	80

26

70	50	32	50	55	25	50	55	80	70	70	85	62
75	55	53	47	80	90	65	44	68	33	68	88	20

12. Berapa rata-rata persentase perubahan kapasitas utilisasi dari plant permesinan atau peralatan (machinery or equipment)?  
 \_\_\_\_\_ % kapasitas perubahan utilisasi (capacity of utilization rate)

26

87	80	90	40	30	10	10	15	10	15	5	25	92
90	85	76	80	75	86	65	76	60	56	45	58	75

13. Dalam dua tahun terakhir, kira-kira berapa persentase penjualan tahunan (annual sales) dialokasikan untuk membeli peralatan produksi baru?  
 \_\_\_\_\_ % dari penjualan tahunan

												26
45	60	35	20	35	20	10	10	10	40	10	20	50
30	55	30	45	40	56	35	40	20	25	10	24	12

14. Berapa total investasi dialokasikan untuk peralatan produksi? (dalam juta Rupiah)  
 Rp. \_\_\_\_\_

												26
200	150	330	100	150	50	50	100	150	250	50	200	400
300	60	300	40	100	200	230	120	200	250	350	200	150

15. Berapa rata-rata umur mesin/peralatan produksi pada perusahaan anda?  
 \_\_\_\_\_ tahun

												26
6	3	7	5	4	3	6	5	4	7.5	9	5	4
6	8	5	7	2	6	8	12	20	10	7	4	20

16. Berapa persen total biaya manufaktur dari total hasil penjualan?  
 \_\_\_\_\_ % dari hasil penjualan

												24
73	45	40	N/A	70	65	50	60	N/A	60	45	50	40
30	60	60	30	56	75	78	65	75	45	37	70	50

17. Seberapa jauh, perusahaan menggunakan komputer untuk hal dibawah ini? (lingkari angka yang cocok)

	1	2	3	4	5	
◆ Sales forecasting	0	3	2	10	11	26
◆ Perencanaan Produksi	0	2	2	6	16	26
◆ Penjadualan produksi	0	1	5	7	13	26
◆ Manajemen inventory	0	4	11	7	4	26
◆ Pembelian	0	0	2	11	13	26
◆ Desain produksi	0	1	2	3	20	26

<- tidak

Sangat tergantung ->

18. Untuk setiap karakteristik dibawah ini, bagaimana anda membandingkan perusahaan anda terhadap perusahaan kompetitor (lingkari angka yang cocok untuk setiap karakteristik)

	Lebih buruk dari kompetitor		Sama dengan kompetitor		Lebih bagus dari kompetitor	
	1	2	3	4	5	
◆ Unit biaya manufaktur	0	0	4	15	7	26
◆ Kualitas produk	0	0	3	16	7	26
◆ Kecepatan waktu proses produksi	0	0	4	14	8	26
◆ Kecepatan pengiriman produk	0	0	5	9	12	26
◆ Pengiriman produk sesuai perjanjian	0	0	4	15	7	26
◆ Fleksibilitas terhadap perubahan produk	0	4	10	5	7	26
◆ Fleksibilitas terhadap perubahan output (volume)	0	3	6	8	9	26
◆ Waktu desain produk	0	0	10	7	9	26

19. Dalam dua tahun terakhir, sejauhmana perusahaan menginvestasikan sumber (resources) (uang, waktu, dan/atau, orang) untuk mengikuti pelatihan pada bidang dibawah ini? (lingkari angka yang cocok untuk setiap karakteristik.)

	Tidak sama sekali			Sangat diperhatikan		
	1	2	3	4	5	
◆ Selular manufactur	0	3	10	8	5	26
◆ Perangkat lunak/keras Komputer	0	1	3	4	18	26
◆ Pelatihan umum untuk karyawan	0	1	12	11	2	26
◆ Factory automation (FA)	0	5	11	5	5	26
◆ Just-in-time (JIT)	0	3	6	6	11	26
◆ Manufacturing time reduction	0	5	5	9	7	26
◆ Material Requirements Planning (MRP)	1	1	6	12	6	26
◆ Productivity improvement	0	3	4	1	18	26
◆ Setup time reduction	0	6	9	6	5	26
◆ Process analysis	0	2	8	11	5	26
◆ Statistical Process Control (SPC)	2	7	8	6	3	26
◆ Supplier partnership	0	7	9	9	1	26

◆ Total Quality Management (TQM)	1	2	3	4	5	
	0	0	4	12	10	26
◆ Daur ulang material	1	2	3	4	5	
	0	2	6	6	12	26

## II. Sales Forecasting

1. Dari daftar dibawah ini, jabatan mana yang memiliki kewenangan dalam merumuskan sales fore cast ?

Posisi (pilih satu)		
<input type="checkbox"/>	Presiden/CEO/ direktur	10
<input type="checkbox"/>	Wakil presiden/ wakil direktur	2
<input type="checkbox"/>	Departemen/Kepala divisi	6
<input type="checkbox"/>	Group/manager bagian	1
<input type="checkbox"/>	Pemilik perusahaan	7
		26

2. Dari daftar dibawah ini, bagian mana yang memiliki kewenangan utama dalam menentukan sales forecast?

Bagian (pilih satu)		
<input type="checkbox"/>	Administrasi	8
<input type="checkbox"/>	Perencana (Planning)	9
<input type="checkbox"/>	Produksi	0
<input type="checkbox"/>	Enjinering	2
<input type="checkbox"/>	Penjualan (Sales)	4
<input type="checkbox"/>	Pemasaran (Marketing)	3
<input type="checkbox"/>	Akuntansi (Accounting)	0
		26

3. Sejuahmana perusahaan memanfaatkan metode dibawah ini dalam menentukan sales forecast? (Lingkari angka untuk setiap metode)

	Tidak samasekali				Sangat	
	1	2	3	4	5	
◆ Time series model	0	1	7	8	10	26
◆ Causal models (contoh, regression)	1	2	3	4	5	
	1	6	8	7	4	26
◆ Metode Kualitatif (contoh, delphi)	1	2	3	4	5	
	1	11	6	6	2	26
◆ Pengalaman lalu	1	2	3	4	5	
	0	7	4	5	10	26

4. Sejuahmana faktor dibawah ini diperhitungkan dalam menentukan forecast? (**lingkari angka untuk setiap faktor**).

	Tidak sama sekali			Sangat diperhatikan		
	1	2	3	4	5	
◆ Situasi ekonomi saat ini	0	0	1	6	19	26
◆ Situasi politik saat ini	0	1	2	5	18	26
◆ Situasi umum perusahaan	0	1	11	9	5	26
◆ Situasi industri keseluruhan	0	0	8	9	9	26
◆ Informasi dari pelanggan	1	6	10	6	3	26
◆ Informasi dari supplier	1	9	8	5	3	26
◆ Hasil riset pasar	1	1	4	9	11	26
◆ Data penjualan lalu (demand)	0	5	11	6	4	26
◆ Catatan order saat ini	0	3	6	11	6	26

5. Apakah sales forecast dibuat berdasarkan individual produk atau alur produk? (**Pilih satu atau gabungan keduanya**).

- Individual produk 2
- Alur produk (Produk lines) 25

6. Untuk berapa individual produk atau alur produk, perusahaan mengembangkan forecast?

\_\_\_\_\_ produk dimasukkan dalam mengembangkan forecast 26

\_\_\_\_\_ alur produk dimasukkan dalam mengembangkan forecast 26

0	30	25	5	10	20	5	10	50	0	0	0	30
60	50	30	30	10	21	17	30	12	16	18	20	11

10	10	10	15	25	30	10	30	0	20	25	5	40
20	30	20	15	30	20	18	24	10	23	14	18	20

7. Bagaimana sales forecast dinyatakan? (**Pilih satu atau keduanya**).

- Dalam nilai mata uang dari produk 7
- Dalam unit fisik dari produk 23

8. Berapa jauh jangkauan forecast diproyeksikan kedepan? \_\_\_\_\_ bulan

												26
3	5	8	3	6	8	3	12	3	3	6	6	12
9	12	24	15	12	18	6	12	6	6	6	10	9

9. Forecast biasanya dirancang berdasarkan unit waktu, apakah satuan terkecil unit waktu tersebut? (Pilih satu).

- Hari
- Minggu
- Bulan
- Tahun

0
8
17
1
26

10. Berapa kali dalam setahun, forecast dirubah atau dimodifikasi?  
\_\_\_\_\_ kali perubahan pertahun

													26
6	3	4	12	6	12	3	4	12	2	12	2	2	2
4	5	3	6	6	6	6	6	6	3	6	3	6	6

11. Dari data aktual dalam dua tahun terakhir, berapa rata-rata persentase kesalahan dalam menentukan forecast?  
\_\_\_\_\_ rata-rata persentase kesalahan forecast.

													26
5	15	3	10	10	5	10	10	5	5	15	15	10	10
25	15	5	3	10	8	3	9	9	6	10	14	8	8

12. Sejah mana sales forecast digunakan dalam menentukan atau merumuskan aktivitas dibawah ini? (Lingkari angka yang cocok untuk setiap aktivitas).

	Tidak sama sekali					Sangat diperhatikan					
	1	2	3	4	5	1	2	3	4	5	
◆ Persiapan budget	0	0	9	8	9	0	0	0	0	0	26
◆ Perencanaan produksi	0	0	6	12	8	0	0	0	0	0	26
◆ Keputusan sub-kontrak	0	2	12	7	5	0	0	0	0	0	26
◆ Perencanaan material/inventory	0	1	14	8	3	0	0	0	0	0	26
◆ Perencanaan penjualan (sales)	0	0	8	8	10	0	0	0	0	0	26
◆ Perencanaan sumber daya manusia	0	7	10	5	4	0	0	0	0	0	26
◆ Perencanaan pengembangan produk baru	0	2	6	9	9	0	0	0	0	0	26
◆ Perencanaan fasilitas	0	2	9	12	3	0	0	0	0	0	26
◆ Perencanaan pembelian peralatan	0	3	8	11	4	0	0	0	0	0	26

13. Seberapa sering sales forecast dirubah atau disesuaikan dengan keadaan aktual perencanaan produksi (production planning) oleh bagian produksi? (Lingkari angka yang cocok).

jarang

Sering

◆ forecast dirubah oleh bag. produksi

1      2      3      4      5

3	2	7	7	7	26
---	---	---	---	---	----

### III. Perencanaan Produksi Dan Penjadualan

1. Apakah Perencanaan Produksi dibuat untuk individual produk atau alur produk? (Pilih satu atau keduanya).

Individual produk

7

Alur produk

24

2. Untuk berapa individual produk atau alur produk Perencanaan Produksi dibuat?

\_\_\_\_\_ produk dibuat berdasarkan perencanaan produksi

\_\_\_\_\_ alur produk dibuat berdasarkan perencanaan produksi

30	30	0	5	5	20	20	10	50	0	0	0	14
45	50	30	38	0	0	0	0	0	0	0	0	60
												37

20	5	20	10	10	30	30	10	0	20	20	5	20
0	0	0	0	20	15	12	20	11	10	20	16	0
												12

3. Bagaimana Perencanaan Produksi secara keseluruhan dirumuskan? (Pilih semua yang cocok).

Nilai jual produk

7

Unit fisik dari produk

11

Waktu pekerjaan (contoh: jam, hari)

6

Waktu permesinan (contoh: jam, hari )

6

4. Berapa jauh jangkauan Perencanaan Produksi diproyeksikan kedepan?

\_\_\_\_\_ bulan

3	1	3	5	3	3	3	6	6	6	3	3	26
2	2	3	3	1	3	3	3	2	1	1	2	3

5. Perencanaan Produksi biasanya dirancang berdasarkan unit waktu, apakah satuan terkecil unit waktu tersebut? (Pilih hanya satu).

Hari

3

Minggu

14

Bulan

9

Tahun

0

26

6. Dalam setahun, berapa kali Perencanaan Produksi ditinjau ulang?

\_\_\_\_\_ kali setahun

													26
12	3	12	12	12	12	3	4	6	6	3	3	6	
3	6	12	6	12	12	12	5	9	6	9	6	9	

7. Se jauh mana faktor dibawah ini dipertimbangkan dalam mengembangkan Perencanaan Produksi? (Lingkari angka yang cocok untuk setiap faktor).

	Tidak sama sekali			Sangat dipertimbangkan		
	1	2	3	4	5	
♦ Catatan order pelanggan	0	2	14	8	2	26
♦ Data penjualan lalu	0	1	12	10	3	26
♦ Kapasitas mesin	0	0	1	11	14	26
♦ Kapasitas pekerja	0	4	10	6	6	26
♦ Perencanaan mendatang dari pelanggan	1	10	9	2	4	26
♦ Tingkat inventory	0	1	11	11	3	26
♦ Forecast	0	0	9	10	7	26

8. Bila permintaan melewati kapasitas, bagaimana tindakan perusahaan menyikapi hal dibawah ini. (Lingkari angka yang cocok untuk setiap alternatif).

	jarang			Sering		
	1	2	3	4	5	
♦ Menambah tenaga kerja	2	12	8	1	3	26
♦ Menambah jam lembur	0	0	4	8	14	26
♦ menambah shift	3	2	4	6	11	26
♦ Pekerja disub-kontrakan	0	0	7	5	14	26
♦ order pelanggan dihentikan	2	7	5	6	6	26
♦ Menyewa kapasitas lain untuk sementara	1	1	9	10	5	26

9. Bila permintaan kurang dari kapasitas, bagaimana tindakan perusahaan menyikapi hal dibawah ini. (Lingkari angka yang cocok untuk setiap alternatif).

	jarang			Sering		
	1	2	3	4	5	
♦ Memberhentikan pekerja	24	1	0	0	1	26
♦ Membiarkan kapasitas terhenti	5	7	10	3	1	26

◆ Mengurangi jumlah shifts	1	2	3	4	5	
	1	0	6	6	13	26
◆ Mengurangi jumlah hari kerja	1	2	3	4	5	
	4	5	8	5	4	26
◆ Menimbun bahan (inventory)	1	2	3	4	5	
	1	6	6	10	3	26
◆ Menyewakan kapasitas ke yang lain	1	2	3	4	5	
	4	6	10	1	5	26

10. Seberapa jauh pengaruh Perencanaan Produksi terhadap hal dibawah ini? (**Lingkari angka yang cocok untuk setiap faktor pengaruh**).

	Tidak sama sekali			Sangat berpengaruh		
	1	2	3	4	5	
◆ Persiapan budget	0	4	14	6	2	26
◆ Jadwal produksi	0	1	6	13	6	26
◆ Keputusan sub-kontrak	0	1	12	9	3	26
◆ Perencanaan material/inventory	0	1	9	10	6	26
◆ Perencanaan penjualan	0	2	9	11	4	26
◆ Perencanaan sumber daya manusia	2	10	10	4	0	26
◆ Perencanaan fasilitas	0	4	11	9	2	26
◆ Perencanaan pembelian peralatan	0	3	12	10	1	26

11. Dalam melakukan sub-kontrak, seringkah pertimbangan pengaruh faktor dibawah ini diperhatikan? (**Lingkari angka yang cocok untuk setiap faktor**).

	jarang			sering		
	1	2	3	4	5	
◆ Kekurangan kapasitas produksi	0	0	1	12	13	26
◆ Kesulitan proses produksi	0	3	5	15	3	26
◆ pengaruh dari top manajemen	0	7	12	3	4	26
◆ sub-kontrak bisa menjamin delivery date lebih awal	0	2	6	12	6	26
◆ biaya sub-kontrak lebih murah	1	6	12	6	1	26
◆ kualitas sub-kontrak lebih tinggi	1	8	8	6	3	26

12. Bagaimana Penjadualan Produksi secara keseluruhan dinyatakan? (**pilih salah satu**).

<input type="checkbox"/> Nilai jual produk	0
<input type="checkbox"/> Unit fisik dari produk	9
<input type="checkbox"/> Unit dari alur produksi	12
<input type="checkbox"/> Output produk berdasarkan jam kerja (labor hours)	1
<input type="checkbox"/> Output produk berdasarkan waktu mesin (machine hours)	4
	26

13. Se jauh mana Penjadualan Produksi diproyeksikan kedepan?  
\_\_\_\_\_ minggu

													26
3	1	4	4	4	8	4	8	4	8	4	4	4	2
2	4	2	2	4	4	6	4	4	3	2	4	4	4

14. Unit terkecil dari satuan waktu untuk Penjadualan Produksi adalah? (Pilih satu).

<input type="checkbox"/> Hari	16
<input type="checkbox"/> Minggu	10
<input type="checkbox"/> Bulan	0
<input type="checkbox"/> Tahun	0
	26

15. Bisakah penjadualan Produksi dirubah ? (Pilih ya atau tidak).

<input type="checkbox"/> Ya	26
<input type="checkbox"/> Tidak	0

16. Apakah perusahaan memiliki alat ukur formal untuk mengukur tingkat keberhasilan hal dibawah ini?  
(Pilih ya atau tidak untuk setiap pertanyaan).

	Ya	Tidak	
◆ Keakuratan data inventory	<input type="checkbox"/>	<input type="checkbox"/>	
	24	2	26
◆ Keakuratan Bill of Material (BOM)	<input type="checkbox"/>	<input type="checkbox"/>	
	16	10	26
◆ Keakuratan alur produksi di bengkel	<input type="checkbox"/>	<input type="checkbox"/>	
	26	0	26
◆ Keakuratan standar waktu produksi	<input type="checkbox"/>	<input type="checkbox"/>	
	23	3	26
◆ Keakuratan Forecast	<input type="checkbox"/>	<input type="checkbox"/>	
	14	12	26
◆ Keterlambatan delivery	<input type="checkbox"/>	<input type="checkbox"/>	
	20	6	26
◆ Kecepatan delivery	<input type="checkbox"/>	<input type="checkbox"/>	
	20	6	26

◆ Waktu proses manufaktur	<input type="checkbox"/>	<input type="checkbox"/>	
	25	1	26
◆ Waktu desain produk	<input type="checkbox"/>	<input type="checkbox"/>	
	25	1	26
◆ Kualitas bahan baku	<input type="checkbox"/>	<input type="checkbox"/>	
	24	2	26
◆ Kualitas pekerjaan yang sedang berlangsung	<input type="checkbox"/>	<input type="checkbox"/>	
	26	0	26
◆ Kualitas produk jadi	<input type="checkbox"/>	<input type="checkbox"/>	
	26	0	26
◆ Kepuasan pelanggan atau pemesan	<input type="checkbox"/>	<input type="checkbox"/>	
	15	11	26
◆ Produktivitas	<input type="checkbox"/>	<input type="checkbox"/>	
	23	3	26
◆ Tingkat inventory	<input type="checkbox"/>	<input type="checkbox"/>	
	26	0	26
◆ Setup time	<input type="checkbox"/>	<input type="checkbox"/>	
	21	5	26
◆ Pergantian pekerja (employee turnover).	<input type="checkbox"/>	<input type="checkbox"/>	
	23	3	26
◆ Ketidak hadiran pekerja	<input type="checkbox"/>	<input type="checkbox"/>	
	26	0	26
◆ Format usulan perbaikan dari pekerja	<input type="checkbox"/>	<input type="checkbox"/>	
	25	1	26

#### IV. SHOP FLOOR CONTROL

1. Posisi jabatan mana yang memiliki kewenangan mengeluarkan perintah agar shop-floor (bengkel) memulai menjalankan order? (**Pilih satu saja**).

<input type="checkbox"/> Presiden/CEO/Manajer/ direktur	5
<input type="checkbox"/> Wakil presiden/direktur	0
<input type="checkbox"/> Departemen/kepala divisi	16
<input type="checkbox"/> Group/Kepala seksi	0
<input type="checkbox"/> Pemilik perusahaan	5
	<b>26</b>

2. Dari daftar dibawah ini, bagian mana yang memiliki kewenangan mengeluarkan perintah agar shop-floor (bengkel) memulai menjalankan order? (**pilih satu saja**).

<input type="checkbox"/> Administrasi	7
<input type="checkbox"/> Perencanaan	11
<input type="checkbox"/> Produksi	3

- Enjinering
- Penjualan
- Pemasaran
- Keuangan
- Akuntansi (accounting)

5
0
0
0
0
26

3. Bagaimana pengaruh faktor dibawah ini terhadap keputusan agar shop-floor (bengkel) memulai untuk melaksanakan order? (Lingkari angka yang cocok untuk setiap factor).

	Tidak sama sekali			Sangat berpengaruh		
	1	2	3	4	5	
◆ Aktual order pelanggan	0	1	5	10	10	26
◆ Perencanaan Produksi	0	1	3	11	11	26
◆ Detail jadual produksi	0	0	2	5	19	26
◆ Kelangkaan part atau komponen	0	12	10	3	1	26
◆ Tingkat inventory	0	5	10	9	2	26
◆ Kepentingan pelanggan	0	0	7	7	12	26

4. Seringkah kelompok orang dibawah ini menentukan pengaturan alur produk yang akan dibuat pada mesin atau work-centers? (Lingkari angka yang cocok untuk setiap kelompok).

	jarang			Sering		
	1	2	3	4	5	
◆ Top manajemen perusahaan	0	0	6	11	9	26
◆ staf dari kontrol produksi	3	7	9	6	1	26
◆ supervisor mesin center	6	8	11	1	0	26
◆ operator	4	5	10	5	2	26

5. Seringkah urutan pengerjaan proses permesinan atau work center ditentukan oleh kriteria dibawah ini? (Lingkari angka yang cocok untuk setiap kriteria).

	jarang			Sering		
	1	2	3	4	5	
◆ Urutan order pekerjaan yang datang	0	0	3	10	13	26
◆ Dateline order pelanggan	0	0	5	14	7	26
◆ Waktu proses pekerjaan	0	0	13	10	3	26
◆ Sisa pekerjaan pada urutan stasion	1	9	10	5	1	26

◆ Meminimalkan jumlah set-up	1	2	3	4	5	
	0	6	12	7	1	26
◆ pengarahan dari top manajemen	1	2	3	4	5	
	0	1	5	11	9	26
◆ tergantung mudah atau tidaknya pekerjaan	1	2	3	4	5	
	1	6	5	9	5	26
◆ Pengalaman lalu	1	2	3	4	5	
	0	7	11	3	5	26

6. Seringkah setiap faktor dibawah ini **merubah** prioritas pekerjaan pada Penjadualan Produksi padahal mesin **telah** berjalan mengerjakan order? (**Lingkari angka yang cocok untuk setiap factor**).

	jarang				Sering	
	1	2	3	4	5	
◆ Tekanan dari bag. pemasaran	0	2	7	10	7	26
◆ Tekanan dari pelanggan	1	2	3	4	5	
	0	0	7	10	9	26
◆ Kesulitan tenaga kerja (labor shortage)	1	2	3	4	5	
	9	8	9	0	0	26
◆ Kesulitan material	1	2	3	4	5	
	5	6	10	4	1	26
◆ Kesulitan energi (kapasitas listrik)	1	2	3	4	5	
	20	5	1	0	0	26
◆ Problem proses manufaktur	1	2	3	4	5	
	0	1	9	13	3	26
◆ Kapasitas mesin tidak memadai	1	2	3	4	5	
	0	1	6	13	6	26
◆ Mesin rusak (breakdown)	1	2	3	4	5	
	2	9	5	8	2	26
◆ Rencana penjualan berubah	1	2	3	4	5	
	3	7	8	6	2	26
◆ Waktu pengiriman berubah	1	2	3	4	5	
	2	9	6	8	1	26
◆ Perubahan demand	1	2	3	4	5	
	1	6	9	8	2	26
◆ Desain enjinerig berubah	1	2	3	4	5	
	0	0	11	14	1	26
◆ Pengarahan dari top manajemen	1	2	3	4	5	
	2	5	4	9	6	26

7. Seringkah waktu penyelesaian pembuatan produk (dateline) yang dijanjikan terhadap pemesan ditentukan oleh setiap kelompok dibawah ini? (**Lingkari angka yang cocok untuk setiap kelompok**).

	jarang				Sering	
	1	2	3	4	5	
◆ Pemesan	0	0	8	13	5	26
◆ Perusahaan	1	2	3	4	5	
	0	6	9	3	8	26
◆ Negosiasi dengan pemesan	1	2	3	4	5	
	0	0	1	7	18	26
◆ Kebijakan pemerintah	1	2	3	4	5	
	19	6	1	0	0	26

8. Ketika pemesan memberikan order, kira-kira berapa hari kedepan ditambahkan sebelum waktu pengiriman yang dijanjikan datang?  
 \_\_\_\_\_ hari **minimum** ke hari yang dijanjikan.

												26
5	3	3	7	10	5	3	3	3	3	3	10	5
5	10	4	3	7	5	3	6	6	7	7	5	5

\_\_\_\_\_ hari **maximum** ke hari yang dijanjikan.

												26
10	5	7	14	14	10	10	14	10	7	7	20	10
7	15	7	5	10	12	7	12	14	14	14	12	10

biasanya \_\_\_\_\_ hari kehari yang dijanjikan.

												26
7	4	5	10	10	5	7	8	5	4	5	7	7
7	10	5	5	7	8	5	10	10	9	7	8	7

9. Berapa rata-rata persentase keterlambatan penyelesaian produk yang dijanjikan terhadap pemesan pada perusahaan anda?  
 \_\_\_\_\_ % dari produk diselesaikan **setelah** hari yang dijanjikan

												26
5	5	3	40	5	5	10	10	10	15	10	10	12
4	3	7	4	10	20	5	9	12	4	8	15	7

10. Untuk pekerjaan yang **tidak bisa diselesaikan tepat waktu**, berapa hari rata-rata keterlambatan tersebut?  
 Rata-rata keterlambatan adalah \_\_\_\_\_ hari

												26
3	2	4	7	7	7	2	5	3	3	7	7	7
7	7	5	4	7	10	7	7	7	5	7	5	4

11. Ketika produk terlambat diselesaikan, berapa besar pengaruh dari hal dibawah ini yang menyebabkan keterlambatan tersebut? (**Lingkari angka yang cocok untuk setiap penyebab**).

	jarang						Sering				
	1	2	3	4	5		1	2	3	4	5
◆ Kapasitas mesin tidak cukup	1	1	12	7	5		26				
◆ mesin rusak (breakdown)	1	2	3	4	5		26				
◆ kekurangan material	1	2	3	4	5		26				
◆ kekurangan energi (kapasitas listrik)	12	12	2	0	0		26				
◆ kapasitas pekerja kurang	1	2	3	4	5		26				
◆ problem kualitas material	7	8	7	3	1		26				
◆ problem kualitas produksi	1	2	3	4	5		26				
	0	6	12	8	0		26				
	1	2	3	4	5		26				
	0	6	13	7	0		26				

◆ bottleneck pada proses produksi	1	2	3	4	5	
	0	0	4	11	11	26
◆ kesalahan penjadualan	1	2	3	4	5	
	1	11	8	4	2	26
◆ terjadi perubahan prioritas penjadualan	1	2	3	4	5	
	5	9	7	5	0	26
◆ problem transportasi	1	2	3	4	5	
	9	12	4	1	0	26
◆ terjadi perubahan due date pesanan	1	2	3	4	5	
	3	4	12	6	1	26

12. Berikan perkiraan persentase perubahan dari pesanan dikarenakan oleh terjadinya perubahan penjadualan oleh pelanggan yang terjadi setelah produksi berjalan?

\_\_\_\_\_ % dari pesanan berubah

													26
3	20	10	5	5	10	5	15	10	10	5	10	12	
20	5	5	14	3	6	6	4	8	10	5	7	8	

13. Dari sejumlah pesanan, kira kira berapa persentase terjadi perubahan desain atau perubahan engineering padahal produksi telah berjalan?

\_\_\_\_\_ % dari pesanan

													26
10	10	10	5	10	10	3	10	5	10	10	20	10	
5	5	4	3	5	12	7	4	9	15	5	8	6	

14. Seberapa jauh faktor dibawah ini mempengaruhi ukuran kapasitas produksi? (**Lingkari angka yang cocok untuk setiap faktor**).

	Tidak sama sekali			Sangat berpengaruh		
	1	2	3	4	5	
◆ waktu set-up permesinan	2	3	18	3	0	26
◆ biaya set-up	1	2	3	4	5	
	2	9	11	4	0	26
◆ waktu proses	1	2	3	4	5	
	0	0	7	9	10	26
◆ kuantitas order	1	2	3	4	5	
	0	3	4	5	14	26
◆ biaya gudang	1	2	3	4	5	
	4	17	5	0	0	26
◆ kapasitas ruang gudang	1	2	3	4	5	
	3	16	7	0	0	26
◆ kapasitas material handling	1	2	3	4	5	
	1	12	6	5	2	26
◆ biaya per unit	1	2	3	4	5	
	0	0	4	11	11	26
◆ pengalaman lalu	1	2	3	4	5	
	4	7	7	5	3	26

15. Berikan perkiraan persentase reject (penolakan dan barang dikembalikan oleh pemesan) yang disebabkan oleh kondisi dibawah ini? (beri jawaban untuk setiap kondisi).

\_\_\_\_\_ % reject disebabkan kesalahan material

26

10	5	10	5	5	3	5	5	5	10	3	1	5
10	3	2	5	2	2	1	1	1	1	3	2	2

\_\_\_\_\_ % reject disebabkan kegagalan proses di bengkel (scrap rate)

26

2	5	10	5	5	10	5	15	15	5	2	2	3
5	4	4	6	1	5	9	3	2	5	7	10	3

\_\_\_\_\_ % reject saat pengecekan akhir (final inspection)

26

5	2	1	5	10	5	1	3	5	5	5	1	5
5	5	7	5	3	4	2	3	8	6	10	5	2

\_\_\_\_\_ % dikembalikan dari pemesan

26

7	2	2	5	10	5	5	10	5	10	5	5	2
6	2	3	3	2	5	5	3	4	4	7	5	2

16. Kira-kira berapa hari biasanya dibutuhkan dalam memproses sejumlah (batch) produk yang dihitung dari awal proses produksi sampai selesai?

\_\_\_\_\_ hari **minimal** dari awal sampai selesai

26

10	30	15	20	30	30	24	12	17	14	30	30	23
10	20	20	15	25	30	25	60	55	40	35	60	60

\_\_\_\_\_ hari **maksimal** dari awal sampai selesai

26

40	60	50	40	60	60	55	20	30	20	40	40	30
15	26	30	20	30	40	50	65	60	45	45	65	63

\_\_\_\_\_ hari **biasanya** dari awal sampai selesai

26

15	25	20	25	40	35	40	15	20	20	37	36	30
12	22	24	17	30	32	30	60	60	40	42	60	60

17. Dari waktu (hari) yang diberikan seperti pada pertanyaan 16, kira-kira berapa persentase waktu yang dihabiskan pada proses produksi aktual? (contoh, set-up time, waktu tunggu, negosiasi, tidak dihitung).

\_\_\_\_\_ % dari waktu yang diberikan dihabiskan pada proses produksi aktual.

26

90	90	90	80	77	88	78	75	87	90	95	86	96
94	92	95	94	87	79	90	83	94	89	78	93	98

18. Kira-kira berapa hari biasanya dibutuhkan dalam menyelesaikan pesanan yang dihitung dari mulai disetujuinya order pesanan sampai produk dikirim (shipment)?

\_\_\_\_\_ hari **minimal** dari mulai pesanan ke pengiriman

26

20	30	20	30	30	30	30	20	20	20	35	40	30
15	25	25	20	35	35	45	70	70	55	50	68	65

\_\_\_\_\_ hari **maksimal** dari mulai pesanan ke pengiriman

26

60	60	60	50	70	60	60	30	30	30	60	60	40
20	30	35	30	40	40	50	72	75	60	57	70	68

\_\_\_\_\_ hari **biasanya** dari mulai pesanan ke pengiriman

26

50	45	50	50	40	55	55	30	24	27	45	45	35
17	24	30	24	40	38	50	70	73	55	56	69	65

19. Berapa persentase pesanan yang dapat diselesaikan tepat waktu atau lebih awal dari Penjadualan Produksi?

\_\_\_\_\_ % dari pesanan diselesaikan tepat waktu atau lebih awal.

26

95	85	63	30	5	15	80	70	95	95	90	70	89
73	95	75	85	89	94	85	78	89	93	82	97	91

20. Berikan perkiraan persentase dari kegiatan operasi manufaktur yang menggunakan standar waktu?

\_\_\_\_\_ % dari semua operasi manufaktur memiliki standar waktu.

26

95	75	70	75	95	80	90	80	100	80	100	100	100
100	95	100	100	100	87	100	100	100	100	87	100	100

21. Kira-kira berapa persentase keakuratan standar waktu tersebut?

\_\_\_\_\_ % dari standar waktu adalah akurat.

26

100	85	95	95	100	90	95	85	100	90	95	90	95
95	85	90	95	100	100	95	87	100	100	90	100	95

22. Bila data pada dua tahun pertama diperbandingkan, berapa persentase **tahunan** perubahan yang telah terjadi pada hal dibawah ini? Untuk setiap pertanyaan, bubuhkan tanda "+" bila ukuran faktor tersebut naik dan bubuhkan tanda "-" bila berkurang. Bila tidak ada perubahan, bubuhkan nol (0).

Bubuhi tanda +, - atau 0

Perubahan

◆ Ukuran output fisik (meter, dll.) ( )

( )

_____ % per tahun	
+	19
0	6
-	1

◆ Produktivitas ( )

( )

\_\_\_\_\_ % per tahun



◆ Biaya per unit	3	7	11	4	1	26
	1	2	3	4	5	
◆ ukuran transportasi	0	1	6	9	10	26
	1	2	3	4	5	
◆ Kualitas yang diinginkan	4	11	6	3	2	26
	1	2	3	4	5	
◆ Reliabilitas pengiriman	0	0	3	12	11	26
	1	2	3	4	5	
◆ Jumlah yang ditawarkan oleh supplier	0	1	6	11	8	26
	1	2	3	4	5	
◆ Pengalaman lalu	0	7	15	4	0	26
	1	2	3	4	5	
	2	10	7	5	2	26

2. Berikan perkiraan persentase parts atau komponen dari produk yang dibuat atau difabrikasi didalam perusahaan?

\_\_\_\_\_ % di fabrikasi didalam perusahaan.

												26
55	70	80	60	95	75	90	75	80	95	65	90	75
60	85	90	95	76	68	78	94	85	75	92	76	25

3. Berapa persen dari biaya total manufaktur dialokasikan untuk pembelian material?

\_\_\_\_\_ % dari total biaya manufaktur.

												26
15	10	20	30	25	15	25	15	10	20	20	25	30
20	25	35	15	20	25	10	34	26	28	19	17	50

4. Seringkah perusahaan memakai kebijakan dibawah ini saat melakukan transaksi pembelian barang? (Lingkari angka yang cocok untuk setiap kebijakan).

	jarang				Sering	
	1	2	3	4	5	
◆ order secara periodik interval (contoh, perbulan)	0	0	1	7	18	26
	1	2	3	4	5	
◆ order berdasarkan tingkat inventory	0	0	2	10	14	26
	1	2	3	4	5	
◆ order berdasarkan Perencanaan Produksi	0	2	11	10	3	26
	1	2	3	4	5	
◆ order berdasarkan Penjadualan produksi	0	1	2	15	8	26
	1	2	3	4	5	
◆ order berdasarkan kelangkaan material	1	9	13	3	0	26
	1	2	3	4	5	
◆ order berdasarkan aktual pesanan	0	0	6	13	7	26
	1	2	3	4	5	
◆ order berdasarkan pengalaman lalu	2	5	10	6	3	26

5. Pada saat pembelian material dari supplier, berapa persentase order pembelian dilihat dari tiga kondisi waktu dibawah ini? (**jumlah ketiganya harus 100%**)  
 \_\_\_\_\_ % diterima lebih awal

												<b>26</b>
40	15	20	25	15	15	5	17	17	20	35	19	30
40	60	70	70	67	20	10	5	5	10	23	12	30

\_\_\_\_\_ % diterima tepat waktu

												<b>26</b>
50	80	70	70	80	80	60	80	80	75	60	80	60
40	30	20	30	20	45	50	70	67	60	70	80	40

\_\_\_\_\_ % diterima terlambat

												<b>26</b>
10	5	10	5	5	5	35	3	3	5	5	1	10
20	10	10	0	13	35	40	25	28	30	7	8	30

6. Bila order material terlambat dikirimkan oleh supplier, berapakah rata-rata keterlambatan tersebut (dalam satuan hari)?

Rata-rata \_\_\_\_\_ hari terlambat.

												<b>26</b>
4	10	5	10	3	3	10	1	3	7	2	1	3
6	5	5	5	5	7	3	9	6	4	9	10	3

7. Kira-kira berapa jumlah supplier yang terlibat dalam pembuatan satu part/komponen?

Kira-kira \_\_\_\_\_ suppliers per part/komponen.

												<b>26</b>
5	5	10	15	10	10	7	10	20	15	10	5	30
20	10	5	15	25	32	12	30	26	21	27	20	350

8. Berapa kira-kira jumlah **penomoran part** dari sistem material inventory pada perusahaan anda dilihat dari ketiga bagian (segment) dibawah ini?

\_\_\_\_\_ penomoran part untuk raw material

												<b>26</b>
1000	1035	450	500	450	329	788	600	734	350	200	500	400
670	550	539	700	670	450	321	458	700	678	453	260	1080

\_\_\_\_\_ penomoran untuk komponen

												<b>26</b>
300	550	563	600	890	764	900	700	678	700	430	500	700
890	1120	1200	1500	786	250	563	783	800	453	580	760	1296

\_\_\_\_\_ penomoran untuk produk jadi (finished goods)

												<b>26</b>
2000	2500	902	900	1500	1290	1300	1200	1876	1500	600	1679	1050
1700	1500	1700	1600	1099	540	890	900	1500	2100	670	1200	2538

9. Berapa nilai total inventory perusahaan anda?

Rp. \_\_\_\_\_ (dalam juta rupiah)

**26**

250	100	90	50	100	50	150	100	100	150	200	150	550
700	300	400	500	200	450	300	250	320	255	320	280	800

10. Berapa persentase distribusi nilai inventory perusahaan? (ketiganya berjumlah 100%)

\_\_\_\_\_ % dari nilai inventory berada pada pembelian material dan part.

**26**

40	20	20	10	10	20	10	10	10	10	30	20	10
25	30	20	15	27	25	45	20	35	25	20	25	30

\_\_\_\_\_ % dari nilai inventory berada pada proses yang sedang berlangsung (work-in-process).

**26**

30	10	40	30	50	30	50	70	70	70	30	50	70
70	60	60	50	54	60	35	56	40	43	40	38	50

\_\_\_\_\_ % dari nilai inventory berada pada produk jadi.

**26**

30	70	40	60	40	50	40	20	20	20	40	30	20
5	10	20	35	19	15	20	24	25	32	40	37	20

January 10, 2000

Herwan Yusmira  
7/85 Linton Street  
Paimerton North  
NEW ZEALAND

Yth. Direktur Perusahaan  
Yang berpartisipasi dalam mengisi kuisioner

PERIHAL: PRAKTEK GLOBAL MANUFAKTUR

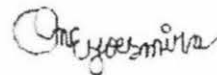
Yth. Bapak/Ibu pengisi kuisioner,

Polman-ITB dengan misinya untuk mewujudkan sebagai institusi yang bergerak di Education Center, Production Center, dan Engineering Center di Indonesia tidak hanya cukup dengan melalui strategy Production Based Education, tetapi juga dengan pendekatan pengembangan staffnya. Dalam mengemban tugas inilah, saya mendapat kesempatan pendidikan lanjut dengan thesis akhir membahas masalah praktek global manufaktur. Dalam format pencarian bentuk umum proses manufaktur ini diperlukan partisipasi industri melalui proses kuisioner.

Kuisioner ini terdiri dari 15 halaman yang terbagi dalam 5 bagian: Latar Belakang Perusahaan, Sales Forecasting, Perencanaan Produksi dan Penjadualan, Shop Floor Control, dan Material Manajemen (penjelasan lebih lanjut kelima bagian ini ada pada lembar kuisioner).

Semua data yang terkumpul, tidak akan digunakan untuk mengidentifikasi seseorang (pengisi kuisioner) atau perusahaannya. Informasi yang diberikan hanya akan dipakai untuk keperluan riset dan publikasinya serta menjaga kerahasiannya.

Demikian pemberitahuan ini, terimakasih atas partisipasinya.



Herwan Yusmira  
NIP. 131 654 508

Catatan:

Batas waktu pengembalian kuisioner adalah tanggal 30 Februari 2000.

## LEMBAR KETERANGAN RISET

Pelaksana Riset:

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Pekerjaan:

Pelaksana riset adalah pengajar di Politeknik Manufaktur Bandung-ITB (POLMAN-ITB) yang saat ini sedang belajar di Massey University, NEW ZEALAND.

Status Riset:

Master of Technology (M.Tech.)

Sumber Dana:

Ministry of Foreign Affairs and Trade, New Zealand

Supervisor:

Mr. Alan Wright  
Senior Lecturer in Industrial Production  
Institute of Technology and Industrial Engineering  
Massey University

Judul Riset:

Praktek Global Manufaktur (Global Manufacturing Practices)

## Pendahuluan

Kuisisioner ini bertujuan untuk mempelajari hubungan antara karakteristik suatu perusahaan dengan praktek proses manufaktur yang dipakai didalam perusahaan tersebut. Informasi yang terkumpul dan diberikan oleh pengisi kuisisioner tidak akan digunakan untuk mengidentifikasi suatu perusahaan.

Pengisi kuisisioner mengerti, bahwa dia berhak untuk menarik diri sebagai partisipan dalam penelitian ini setiap saat.

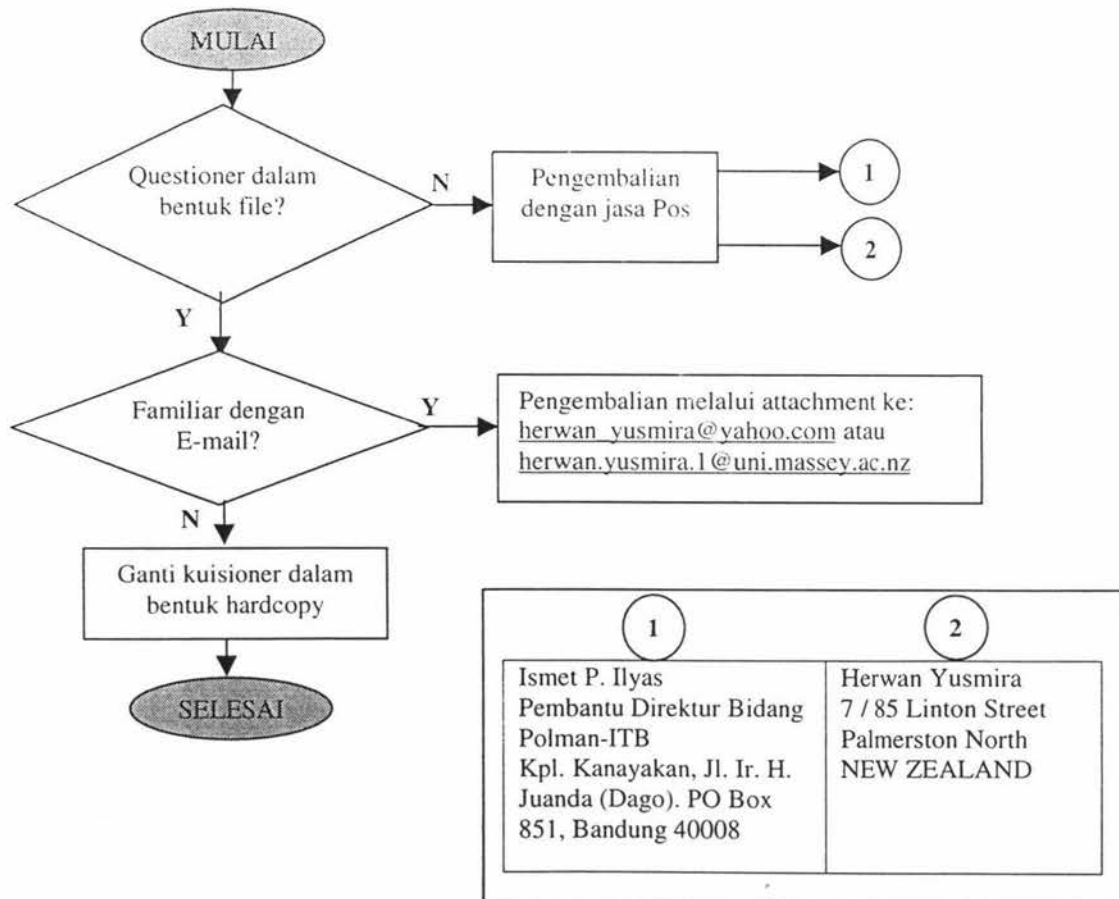
Pengisi kuisisioner setuju untuk menyediakan informasi kepada peneliti dengan persetujuan bahwa nama diri atau perusahaannya tidak akan digunakan tanpa persetujuan, dan informasi yang diberikan akan digunakan hanya untuk keperluan penelitian dan publikasinya. Informasi yang diberikan hanya akan dipakai untuk keperluan riset dan tetap terjaga kerahasiaannya.

Dalam mengisi, jangan ragu untuk menjawab berdasarkan perkiraan karena dalam banyak hal ternyata jawaban perkiraan jauh lebih baik daripada tidak sama sekali.

## Cara Pengembalian Kuestioner

Kuisisioner dibuat dalam dua bentuk, hardcopy atau file dalam format Microsoft Word 97.

Pengembalian kuisisioner bisa dilakukan dalam berbagai cara hal ini tergantung apakah anda menerima kuisisioner ini dalam bentuk file atau hardcopy. Secara diagram bisa dilihat sebagai berikut:



## KUISIONER PRAKTEK MANUFACTUR

### 1. Latar Belakang Perusahaan

Informasi yang dikumpulkan pada survei manufaktur ini dimaksudkan untuk mempelajari hubungan antara karakteristik suatu perusahaan dengan praktek manufaktur yang diterapkan. Pertanyaan pada bagian ini berisi tentang latar belakang umum perusahaan termasuk data kepemilikan, kapasitas produksi, dan lainnya.

1. Berapa jumlah total pekerja pada perusahaan anda? \_\_\_\_\_ orang.
2. Dari jumlah tersebut, diatas, berapa yang bekerja pada bagian produksi? \_\_\_\_\_ orang.
3. Berapa jumlah shift produksi per hari? \_\_\_\_\_ shift produksi per hari.
4. Dalam satu tahun, berapa jumlah total jam kerja seseorang yang bekerja dibagian produksi? \_\_\_\_\_ jam kerja per tahun
5. Berapa persen dari total biaya manufaktur (manufacturing cost) dialokasikan untuk membiayai pekerja tidak tetap, bila itu ada? \_\_\_\_\_ %
6. Berapa total penjualan tahun lalu? (dalam unit Juta Rupiah)  
\_\_\_\_\_ penjualan domestik (domestic sales)  
\_\_\_\_\_ penjualan ekspor (export sales)
7. Berapa jumlah alur produksi (product lines) atau produk sejenis (product families) didalam perusahaan anda?  
\_\_\_\_\_ alur produksi atau produk sejenis.
8. Berapa persentase penjualan (company sales) yang dihasilkan dari penjualan produk andalan?  
\_\_\_\_\_ % dari penjualan
9. Berapa persentase pembuatan produk dibuat berdasarkan pesanan (make-to-order) dan berapa persentase pembuatan produk dibuat berdasarkan persediaan (make-to-stock)? (jumlah keduanya harus 100%)  
\_\_\_\_\_ % berdasarkan pesanan  
\_\_\_\_\_ % berdasarkan persediaan
10. Berapa persentase kepemilikan perusahaan dikuasai oleh kedua jenis pemilik dibawah ini ? (jumlah keduanya 100%)  
\_\_\_\_\_ % domestik (pemilik berdomisili didalam negeri)  
\_\_\_\_\_ % asing (pemilik berdomisili diluar negeri)
11. Berapa persentase mesin produksi dikelompokkan kedalam kedua kelompok dibawah ini?  
\_\_\_\_\_ % mesin dikelompokkan berdasarkan jenis (contoh, kelompok mesin bubut)  
\_\_\_\_\_ % mesin dikelompokkan berdasarkan gabungan antara alur produksi dan produk families
12. Berapa rata-rata persentase perubahan kapasitas utilisasi dari plant permesinan atau peralatan (machinery or equipment)?  
\_\_\_\_\_ % kapasitas perubahan utilisasi (capacity of utilization rate)
13. Dalam dua tahun terakhir, kira-kira berapa persentase penjualan tahunan (annual sales) dialokasikan untuk membeli peralatan produksi baru?

\_\_\_\_\_ % dari penjualan tahunan

14. Berapa total investasi dialokasikan untuk peralatan produksi? (**dalam juta Rupiah**)  
Rp. \_\_\_\_\_

15. Berapa rata-rata umur mesin/peralatan produksi pada perusahaan anda?  
\_\_\_\_\_ tahun

16. Berapa persen total biaya manufaktur dari total hasil penjualan?  
\_\_\_\_\_ % dari hasil penjualan

17. Seberapa jauh, perusahaan menggunakan komputer untuk hal dibawah ini? (**lingkari angka yang cocok**)

◆ Sales forecasting	1	2	3	4	5
◆ Perencanaan Produksi	1	2	3	4	5
◆ Penjadualan produksi	1	2	3	4	5
◆ Manajemen inventory	1	2	3	4	5
◆ Pembelian	1	2	3	4	5
◆ Desain produksi	1	2	3	4	5

<- tidak

Sangat tergantung ->

18. Untuk setiap karakteristik dibawah ini, bagaimana anda membandingkan perusahaan anda terhadap perusahaan kompetitor (**lingkari angka yang cocok untuk setiap karakteristik**)

	1 Sangat Buruk dari kompetitor	2	3	4	5 Sangat Bagus dari kompetitor
◆ Unit biaya manufaktur	1	2	3	4	5
◆ Kualitas produk	1	2	3	4	5
◆ Kecepatan waktu proses produksi	1	2	3	4	5
◆ Kecepatan pengiriman produk	1	2	3	4	5
◆ Pengiriman produk sesuai perjanjian	1	2	3	4	5
◆ Fleksibilitas terhadap perubahan produk	1	2	3	4	5
◆ Fleksibilitas terhadap perubahan output (volume)	1	2	3	4	5
◆ Waktu desain produk	1	2	3	4	5

19. Dalam dua tahun terakhir, sejauhmana perusahaan menginvestasikan sumber (resources) (uang, waktu, dan/atau, orang) untuk mengikuti pelatihan pada bidang dibawah ini? (**lingkari angka yang cocok untuk setiap karakteristik.**)

	Tidak sama sekali			Sangat diperhatikan	
	1	2	3	4	5
◆ Selular manufactur	1	2	3	4	5
◆ Perangkat lunak/keras Komputer	1	2	3	4	5
◆ Pelatihan umum untuk karyawan	1	2	3	4	5
◆ Factory automation (FA)	1	2	3	4	5
◆ Just-in-time (JIT)	1	2	3	4	5
◆ Manufacturing time reduction	1	2	3	4	5
◆ Material Requirements Planning (MRP)	1	2	3	4	5
◆ Productivity improvement	1	2	3	4	5
◆ Setup time reduction	1	2	3	4	5

◆ Process analysis	1	2	3	4	5
◆ Statistical Process Control (SPC)	1	2	3	4	5
◆ Supplier partnership	1	2	3	4	5
◆ Total Quality Management (TQM)	1	2	3	4	5
◆ Daur ulang material	1	2	3	4	5

## II. Sales Forecasting

Sales forecasting membahas cara-cara yang digunakan oleh perusahaan dalam mengantisipasi pesanan atau demand terhadap produk yang dinasirkannya. Dalam mengantisipasi hal ini biasanya perusahaan memiliki cara, formal atau informal) yang cukup efektif. Seperti halnya bagian pertama dari kuisioner ini, jawaban yang anda berikan akan memberikan pengertian mendalam tentang praktek manufaktur. Perlu juga diingat bahwa pertanyaan yang memerlukan jawaban secara numerik, jawaban anda bisa berupa perkiraan atau pendekatan.

1. Dari daftar dibawah ini, jabatan mana yang memiliki kewenangan dalam merumuskan sales forecast ?

**Posisi (pilih satu)**

- Presiden/CEO/ direktur
- Wakil presiden/ wakil direktur
- Departemen/Kepala divisi
- Group/manager bagian
- Pemilik perusahaan

2. Dari daftar dibawah ini, bagian mana yang memiliki kewenangan utama dalam menentukan sales forecast?

**Bagian (pilih satu)**

- Administrasi
- Perencana (Planning)
- Produksi
- Enjineri
- Penjualan (Sales)
- Pemasaran (Marketing)
- Akuntansi (Accounting)

3. Sejahterama perusahaan memanfaatkan metode dibawah ini dalam menentukan sales forecast? **(Lingkari angka untuk setiap metode)**

	Tidak samasekali			Sangat	
	1	2	3	4	5
◆ Time series model	1	2	3	4	5
◆ Causal models (contoh, regression)	1	2	3	4	5
◆ Metode Kualitatif (contoh, delphi)	1	2	3	4	5
◆ Pengalaman lalu	1	2	3	4	5

4. Sejahterama faktor dibawah ini diperhitungkan dalam menentukan forecast? **(lingkari angka untuk setiap faktor).**

Tidak sama sekali

Sangat diperhatikan

◆ Situasi ekonomi saat ini	1	2	3	4	5
◆ Situasi politik saat ini	1	2	3	4	5
◆ Situasi umum perusahaan	1	2	3	4	5
◆ Situasi industri keseluruhan	1	2	3	4	5
◆ Informasi dari pelanggan	1	2	3	4	5
◆ Informasi dari supplier	1	2	3	4	5
◆ Hasil riset pasar	1	2	3	4	5
◆ Data penjualan lalu (demand)	1	2	3	4	5
◆ Catatan order saat ini	1	2	3	4	5

5. Apakah sales forecast dibuat berdasarkan individual produk atau alur produk? (**Pilih satu atau gabungan keduanya**).

- Individual produk  
 Alur produk (Produk lines)

6. Untuk berapa individual produk atau alur produk, perusahaan mengembangkan forecast?  
 \_\_\_\_\_ produk dimasukkan dalam mengembangkan forecast  
 \_\_\_\_\_ alur produk dimasukkan dalam mengembangkan forecast

7. Bagaimana sales forecast dinyatakan? (**Pilih satu atau keduanya**).

- Dalam nilai mata uang dari produk  
 Dalam unit fisik dari produk

8. Berapa jauh jangkauan forecast diproyeksikan kedepan? \_\_\_\_\_ bulan

9. Forecast biasanya dirancang berdasarkan unit waktu, apakah satuan terkecil unit waktu tersebut? (**Pilih satu**).

- hari  
 Minggu  
 Bulan  
 Tahun

10. Berapa kali dalam setahun, forecast dirubah atau dimodifikasi?  
 \_\_\_\_\_ kali perubahan pertahun

11. Dari data aktual dalam dua tahun terakhir, berapa rata-rata persentase kesalahan dalam menentukan forecast?  
 \_\_\_\_\_ rata-rata persentase kesalahan forecast.

12. Sejauh mana sales forecast digunakan dalam menentukan atau merumuskan aktivitas dibawah ini? (**Lingkari angka yang cocok untuk setiap aktivitas**).

	Tidak sama sekali			Sangat diperhatikan	
◆ Persiapan budget	1	2	3	4	5
◆ Perencanaan produksi	1	2	3	4	5
◆ Keputusan sub-kontrak	1	2	3	4	5
◆ Perencanaan material/inventory	1	2	3	4	5
◆ Perencanaan penjualan (sales)	1	2	3	4	5

◆ Perencanaan sumber daya manusia	1	2	3	4	5
◆ Perencanaan pengembangan produk baru	1	2	3	4	5
◆ Perencanaan fasilitas	1	2	3	4	5
◆ Perencanaan pembelian peralatan	1	2	3	4	5

13. Seberapa sering sales forecast dirubah atau disesuaikan dengan keadaan aktual perencanaan produksi (production planning) oleh bagian produksi? **(Lingkari angka yang cocok).**

	jarang				Sering
◆ forecast dirubah oleh bag. produksi	1	2	3	4	5

### III. Perencanaan Produksi Dan Penjadualan

Bagian ini membahas bagaimana praktek perencanaan produksi dan detail jadwal produksi pada perusahaan anda. Yang dimaksud perencanaan disini adalah aktivitas yang dilihat secara garis besar untuk menentukan jumlah dan kapasitas output dari produk. Sedangkan yang dimaksud penjadualan adalah aktivitas lebih terinci (lebih dikenal dengan sebutan master production scheduling) yang digunakan untuk menentukan waktu Dan produk output atau komponen secara lebih spesifik.

1. Apakah Perencanaan Produksi dibuat untuk individual produk atau alur produk? **(Pilih satu atau keduanya).**

- Individual produk  
 Alur produk

2. Untuk berapa individual produk atau alur produk Perencanaan Produksi dibuat?

\_\_\_\_\_ produk dibuat berdasarkan perencanaan produksi  
 \_\_\_\_\_ alur produk dibuat berdasarkan perencanaan produksi

3. Bagaimana Perencanaan Produksi secara keseluruhan dirumuskan? **(Pilih semua yang cocok).**

- Nilai jual produk  
 Unit fisik dari produk  
 Waktu pekerjaan (contoh: jam, hari)  
 Waktu permesinan (contoh: jam, hari )

4. Berapa jauh jangkauan Perencanaan Produksi diproyeksikan kedepan?  
 \_\_\_\_\_ bulan

5. Perencanaan Produksi biasanya dirancang berdasarkan unit waktu, apakah satuan terkecil unit waktu tersebut? **(Pilih hanya satu).**

- Hari  
 Minggu  
 Bulan  
 Tahun

6. Dalam setahun, berapa kali Perencanaan Produksi ditinjau ulang?  
 \_\_\_\_\_ kali setahun

7. Sejauh mana faktor dibawah ini dipertimbangkan dalam mengembangkan Perencanaan Produksi? (Lingkari angka yang cocok untuk setiap faktor).

	Tidak sama sekali			Sangat dipertimbangkan	
♦ Catatan order pelanggan	1	2	3	4	5
♦ Data penjualan lalu	1	2	3	4	5
♦ Kapasitas mesin	1	2	3	4	5
♦ Kapasitas pekerja	1	2	3	4	5
♦ Perencanaan mendatang dari pelanggan	1	2	3	4	5
♦ Tingkat inventory	1	2	3	4	5
♦ Forecast	1	2	3	4	5

8. Bila permintaan melewati kapasitas, bagaimana tindakan perusahaan menyikapi hal dibawah ini. (Lingkari angka yang cocok untuk setiap alternatif).

	jarang			Sering	
♦ Menambah tenaga kerja	1	2	3	4	5
♦ Menambah jam lembur	1	2	3	4	5
♦ menambah shift	1	2	3	4	5
♦ Pekerjaan disub-kontrakan	1	2	3	4	5
♦ order pelanggan dihentikan	1	2	3	4	5
♦ Menyewa kapasitas lain untuk sementara	1	2	3	4	5

9. Bila permintaan kurang dari kapasitas, bagaimana tindakan perusahaan menyikapi hal dibawah ini. (Lingkari angka yang cocok untuk setiap alternatif).

	jarang			Sering	
♦ Memberhentikan pekerja	1	2	3	4	5
♦ Membiarkan kapasitas terhenti	1	2	3	4	5
♦ Mengurangi jumlah shifts	1	2	3	4	5
♦ Mengurangi jumlah hari kerja	1	2	3	4	5
♦ Menimbun bahan (inventory)	1	2	3	4	5
♦ Menyewakan kapasitas ke yang lain	1	2	3	4	5

10. Seberapa jauh pengaruh Perencanaan Produksi terhadap hal dibawah ini? (Lingkari angka yang cocok untuk setiap faktor pengaruh).

	Tidak sama sekali			Sangat berpengaruh	
♦ Persiapan budget	1	2	3	4	5
♦ Jadwal produksi	1	2	3	4	5
♦ Keputusan sub-kontrak	1	2	3	4	5
♦ Perencanaan material/inventory	1	2	3	4	5
♦ Perencanaan penjualan	1	2	3	4	5
♦ Perencanaan sumber daya manusia	1	2	3	4	5
♦ Perencanaan fasilitas	1	2	3	4	5
♦ Perencanaan pembelian peralatan	1	2	3	4	5

11. Dalam melakukan sub-kontrak, seringkah pertimbangan pengaruh faktor dibawah ini diperhatikan? (Lingkari angka yang cocok untuk setiap faktor).

	jarang			sering	
♦ Kekurangan kapasitas produksi	1	2	3	4	5
♦ Kesulitan proses produksi	1	2	3	4	5
♦ pengaruh dari top manajemen	1	2	3	4	5

◆ sub-kontrak bisa menjamin delivery date lebih awal	1	2	3	4	5
◆ biaya sub-kontrak lebih murah	1	2	3	4	5
◆ kualitas sub-kontrak lebih tinggi	1	2	3	4	5

12. Bagaimana Penjadualan Produksi secara keseluruhan dinyatakan? (**pilih salah satu**).

- Nilai jual produk
- Unit fisik dari produk
- Unit dari alur produksi
- Output produk berdasarkan jam kerja (labor hours)
- Output produk berdasarkan waktu mesin (machine hours)

13. Se jauh mana Penjadualan Produksi diproyeksikan kedepan?  
\_\_\_\_\_ minggu

14. Unit terkecil dari satuan waktu untuk Penjadualan Produksi adalah? (**Pilih satu**).

- Hari
- Minggu
- Bulan
- Tahun

15. Bisakah penjadualan Produksi dirubah ? (**Pilih ya atau tidak**).

- Ya
- Tidak

16. Apakah perusahaan memiliki alat ukur formal untuk mengukur tingkat keberhasilan hal dibawah ini? (**Pilih ya atau tidak untuk setiap pertanyaan**).

	Ya	Tidak
◆ Keakuratan data inventory	<input type="checkbox"/>	<input type="checkbox"/>
◆ Keakuratan Bill of Material (BOM)	<input type="checkbox"/>	<input type="checkbox"/>
◆ Keakuratan alur produksi di bengkel	<input type="checkbox"/>	<input type="checkbox"/>
◆ Keakuratan standar waktu produksi	<input type="checkbox"/>	<input type="checkbox"/>
◆ Keakuratan Forecast	<input type="checkbox"/>	<input type="checkbox"/>
◆ Keterlambatan delivery	<input type="checkbox"/>	<input type="checkbox"/>
◆ Kecepatan delivery	<input type="checkbox"/>	<input type="checkbox"/>
◆ Waktu proses manufaktur	<input type="checkbox"/>	<input type="checkbox"/>
◆ Waktu desain produk	<input type="checkbox"/>	<input type="checkbox"/>
◆ Kualitas bahan baku	<input type="checkbox"/>	<input type="checkbox"/>
◆ Kualitas pekerjaan yang sedang berlangsung	<input type="checkbox"/>	<input type="checkbox"/>
◆ Kualitas produk jadi	<input type="checkbox"/>	<input type="checkbox"/>
◆ Kepuasan pelanggan atau pemesan	<input type="checkbox"/>	<input type="checkbox"/>
◆ Produktivitas	<input type="checkbox"/>	<input type="checkbox"/>

- ◆ Tingkat inventory
- ◆ Setup time
- ◆ Pergantian pekerja (employee turnover).
- ◆ Ketidakhadiran pekerja
- ◆ Format usulan perbaikan dari pekerja

#### IV. SHOP FLOOR CONTROL

Shop floor control adalah pengaturan aktivitas dalam menterjemahkan detail dari Penjadwalan Produksi. Termasuk juga dalam menentukan ukuran besarnya kapasitas, kapan memulai urutan produksi, pengaturan pemakaian mesin, dan keputusan kapan harus melakukan perubahan dari penjadwalan yang telah ditentukan. Seperti pertanyaan-pertanyaan sebelumnya, setiap jawaban yang anda berikan akan membantu memberikan pengertian dalam mempelajari aktual praktek manufaktur pada perusahaan anda.

1. Posisi jabatan mana yang memiliki kewenangan mengeluarkan perintah agar shop-floor (bengkel) memulai menjalankan order? (**Pilih satu saja**).

- Presiden/CEO/Manajer/ direktur
- Wakil presiden/direktur
- Departemen/kepala divisi
- Group/Kepala seksi
- Pemilik perusahaan

2. Dari daftar dibawah ini, bagian mana yang memiliki kewenangan mengeluarkan perintah agar shop-floor (bengkel) memulai menjalankan order? (**pilih satu saja**).

- Administrasi
- Perencanaan
- Produksi
- Enjinering
- Penjualan
- Pemasaran
- Keuangan
- Akuntansi (accounting)

3. Bagaimana pengaruh faktor dibawah ini terhadap keputusan agar shop-floor (bengkel) memulai untuk melaksanakan order? (**Lingkari angka yang cocok untuk setiap factor**).

	Tidak sama sekali			Sangat berpengaruh	
	1	2	3	4	5
◆ Aktual order pelanggan	1	2	3	4	5
◆ Perencanaan Produksi	1	2	3	4	5
◆ Detail jadual produksi	1	2	3	4	5
◆ Kelangkaan part atau komponen	1	2	3	4	5
◆ Tingkat inventory	1	2	3	4	5
◆ Kepentingan pelanggan	1	2	3	4	5

4. Seringkah kelompok orang dibawah ini menentukan pengaturan alur produk yang akan dibuat pada mesin atau work-centers? (**Lingkari angka yang cocok untuk setiap kelompok**).

	jarang				sering
♦ Top manajemen perusahaan	1	2	3	4	5
♦ staf dari kontrol produksi	1	2	3	4	5
♦ supervisor mesin center	1	2	3	4	5
♦ operator	1	2	3	4	5

5. Seringkah urutan pengerjaan proses permesinan atau work center ditentukan oleh kriteria dibawah ini? (**Lingkari angka yang cocok untuk setiap kriteria**).

	jarang				sering
♦ Urutan order pekerjaan yang datang	1	2	3	4	5
♦ Dateline order pelanggan	1	2	3	4	5
♦ Waktu proses pekerjaan	1	2	3	4	5
♦ Sisa pekerjaan pada urutan stasion	1	2	3	4	5
♦ Meminimalkan jumlah set-up	1	2	3	4	5
♦ pengarahan dari top manajemen	1	2	3	4	5
♦ tergantung mudah atau tidaknya pekerjaan	1	2	3	4	5
♦ Pengalaman lalu	1	2	3	4	5

6. Seringkah setiap faktor dibawah ini **merubah** prioritas pekerjaan pada Penjadualan Produksi padahal mesin **telah** berjalan mengerjakan order? (**Lingkari angka yang cocok untuk setiap factor**).

	jarang				sering
♦ Tekanan dari bag. pemasaran	1	2	3	4	5
♦ Tekanan dari pelanggan	1	2	3	4	5
♦ Kesulitan tenaga kerja (labor shortage)	1	2	3	4	5
♦ Kesulitan material	1	2	3	4	5
♦ Kesulitan energi (kapasitas listrik)	1	2	3	4	5
♦ Problem proses manufaktur	1	2	3	4	5
♦ Kapasitas mesin tidak memadai	1	2	3	4	5
♦ Mesin rusak (breakdown)	1	2	3	4	5
♦ Rencana penjualan berubah	1	2	3	4	5
♦ Waktu pengiriman berubah	1	2	3	4	5
♦ Perubahan demand	1	2	3	4	5
♦ Desain enjineriing berubah	1	2	3	4	5
♦ Pengarahan dari top manajemen	1	2	3	4	5

7. Seringkah waktu penyelesaian pembuatan produk (dateline) yang dijanjikan terhadap pemesan ditentukan oleh setiap kelompok dibawah ini? (**Lingkari angka yang cocok untuk setiap kelompok**).

	jarang				sering
♦ Pemesan	1	2	3	4	5
♦ Perusahaan	1	2	3	4	5
♦ Negosiasi dengan pemesan	1	2	3	4	5
♦ Kebijakan pemerintah	1	2	3	4	5

8. Ketika pemesan memberikan order, kira-kira berapa hari kedepan ditambahkan sebelum waktu pengiriman yang dijanjikan datang?

\_\_\_\_\_ hari **minimum** ke hari yang dijanjikan.

\_\_\_\_\_ hari **maximum** ke hari yang dijanjikan.

**biasanya** \_\_\_\_\_ hari kehari yang dijanjikan.

9. Berapa rata-rata persentase keterlambatan penyelesaian produk yang dijanjikan terhadap pemesan pada perusahaan anda?  
 \_\_\_\_\_ % dari produk diselesaikan **setelah** hari yang dijanjikan
10. Untuk pekerjaan yang **tidak bisa diselesaikan tepat waktu**, berapa hari rata-rata keterlambatan tersebut?  
 Rata-rata keterlambatan adalah \_\_\_\_\_ hari
11. Ketika produk terlambat diselesaikan, berapa besar pengaruh dari hal dibawah ini yang menyebabkan keterlambatan tersebut? (**Lingkari angka yang cocok untuk setiap penyebab**).

	jarang			Sering	
♦ Kapasitas mesin tidak cukup	1	2	3	4	5
♦ mesin rusak (breakdown)	1	2	3	4	5
♦ kekurangan material	1	2	3	4	5
♦ kekurangan energi (kapasitas listrik)	1	2	3	4	5
♦ kapasitas pekerja kurang	1	2	3	4	5
♦ problem kualitas material	1	2	3	4	5
♦ problem kualitas produksi	1	2	3	4	5
♦ bottleneck pada proses produksi	1	2	3	4	5
♦ kesalahan penjadualan	1	2	3	4	5
♦ terjadi perubahan prioritas penjadualan	1	2	3	4	5
♦ problem transportasi	1	2	3	4	5
♦ terjadi perubahan due date pesanan	1	2	3	4	5

12. Berikan perkiraan persentase perubahan dari pesanan dikarenakan oleh terjadinya perubahan penjadualan oleh pelanggan yang terjadi setelah produksi berjalan?

\_\_\_\_\_ % dari pesanan berubah

13. Dari sejumlah pesanan, kira kira berapa persentase terjadi perubahan desain atau perubahan engineering padahal produksi telah berjalan?

\_\_\_\_\_ % dari pesanan

14. Seberapa jauh faktor dibawah ini mempengaruhi ukuran kapasitas produksi? (**Lingkari angka yang cocok untuk setiap faktor**).

	Tidak sama sekali			Sangat berpengaruh	
♦ waktu set-up permesinan	1	2	3	4	5
♦ biaya set-up	1	2	3	4	5
♦ waktu proses	1	2	3	4	5
♦ kuantitas order	1	2	3	4	5
♦ biaya gudang	1	2	3	4	5
♦ kapasitas ruang gudang	1	2	3	4	5
♦ kapasitas material handling	1	2	3	4	5
♦ biaya per unit	1	2	3	4	5
♦ pengalaman lalu	1	2	3	4	5

15. Berikan perkiraan persentase reject (penolakan dan barang dikembalikan oleh pemesan) yang disebabkan oleh kondisi dibawah ini? (**beri jawaban untuk setiap kondisi**).

\_\_\_\_\_ % reject disebabkan kesalahan material

\_\_\_\_\_ % reject disebabkan kegagalan proses di bengkel (scrap rate)

\_\_\_\_\_ % reject saat pengecekan akhir (final inspection)

- \_\_\_\_\_ % dikembalikan dari pemesan
16. Kira-kira berapa hari biasanya dibutuhkan dalam memproses sejumlah (batch) produk yang dihitung dari awal proses produksi sampai selesai?  
 \_\_\_\_\_ hari minimal dari awal sampai selesai  
 \_\_\_\_\_ hari maksimal dari awal sampai selesai  
 \_\_\_\_\_ hari biasanya dari awal sampai selesai
17. Dari waktu (hari) yang diberikan seperti pada pertanyaan 16, kira-kira berapa persentase waktu yang dihabiskan pada proses produksi aktual? (contoh, set-up time, waktu tunggu, negosiasi, tidak dihitung).  
 \_\_\_\_\_ % dari waktu yang diberikan dihabiskan pada proses produksi aktual.
18. Kira-kira berapa hari biasanya dibutuhkan dalam menyelesaikan pesanan yang dihitung dari mulai disetujuinya order pesanan sampai produk dikirim (shipment)?  
 \_\_\_\_\_ hari minimal dari mulai pesanan ke pengiriman  
 \_\_\_\_\_ hari maksimal dari mulai pesanan ke pengiriman  
 \_\_\_\_\_ hari biasanya dari mulai pesanan ke pengiriman
19. Berapa persentase pesanan yang dapat diselesaikan tepat waktu atau lebih awal dari Penjadwalan Produksi?  
 \_\_\_\_\_ % dari pesanan diselesaikan tepat waktu atau lebih awal.
20. Berikan perkiraan persentase dari kegiatan operasi manufaktur yang menggunakan standar waktu?  
 \_\_\_\_\_ % dari semua operasi manufaktur memiliki standar waktu.
21. Kira-kira berapa persentase keakuratan standar waktu tersebut?  
 \_\_\_\_\_ % dari standar waktu adalah akurat.
22. Bila data pada dua tahun pertama diperbandingkan, berapa persentase tahunan perubahan yang telah terjadi pada hal dibawah ini? Untuk setiap pertanyaan, bubuhkan tanda "+" bila ukuran faktor tersebut naik dan bubuhkan tanda "-" bila berkurang. Bila tidak ada perubahan, bubuhkan nol (0).

	Bubuhi tanda +, - atau 0	Perubahan
◆ Ukuran output fisik (meter, dll.)	( )	_____ % per tahun
◆ Produktivitas	( )	_____ % per tahun
◆ Waktu disain produk	( )	_____ % per tahun
◆ Biaya proses manufaktur	( )	_____ % per tahun
◆ kualitas produk	( )	_____ % per tahun
◆ Waktu proses manufaktur	( )	_____ % per tahun
◆ Kecepatan pengiriman	( )	_____ % per tahun
◆ Pengiriman tepat waktu	( )	_____ % per tahun

## V. MATERIAL MANAJEMEN

Material manajemen adalah aktivitas yang diasosiasikan sebagai pembelian, pengaturan, pendistribusian, dan pengontrolan inventory didalam suatu perusahaan. Inventory disini termasuk raw material, produk bagian atau komponen, pengerjaan yang sedang berlangsung, dan produk jadi (finished good). Seperti halnya pada bagian kuisioner terdahulu, bagian ini kami tertarik untuk mengetahui bagaimana praktek yang

diterapkan oleh perusahaan anda menanggapi masalah material manajemen diatas. Karenanya, pada survei ini, tidak ada jawaban yang betul atau salah.

1. Seberapa jauh perusahaan anda memikirkan setiap faktor dibawah ini dalam menentukan **kuantitas** pembelian barang? (**Lingkari angka yang cocok untuk setiap faktor**).

	Tidak sama sekali			Sangat difikirkan	
	1	2	3	4	5
◆ Biaya pemesanan	1	2	3	4	5
◆ Kesulitan dalam pemesanan	1	2	3	4	5
◆ Diskon kuantitas	1	2	3	4	5
◆ Jumlah pesanan yang dibutuhkan	1	2	3	4	5
◆ Biaya transportasi	1	2	3	4	5
◆ Jarak transportasi	1	2	3	4	5
◆ Biaya penyimpanan	1	2	3	4	5
◆ Ruang penyimpanan	1	2	3	4	5
◆ Biaya per unit	1	2	3	4	5
◆ ukuran transportasi	1	2	3	4	5
◆ Kualitas yang diinginkan	1	2	3	4	5
◆ Reliabilitas pengiriman	1	2	3	4	5
◆ Jumlah yang ditawarkan oleh supplier	1	2	3	4	5
◆ Pengalaman lalu	1	2	3	4	5

2. Berikan perkiraan persentase parts atau komponen dari produk yang dibuat atau difabrikasi didalam perusahaan?

\_\_\_\_\_ % di fabrikasi didalam perusahaan.

3. Berapa persen dari biaya total manufaktur dialokasikan untuk pembelian material?

\_\_\_\_\_ % dari total biaya manufaktur.

4. Seringkah perusahaan memakai kebijakan dibawah ini saat melakukan transaksi pembelian barang? (**Lingkari angka yang cocok untuk setiap kebijakan**).

	jarang			Sering	
	1	2	3	4	5
◆ order secara periodik interval (contoh, perbulan)	1	2	3	4	5
◆ order berdasarkan tingkat inventory	1	2	3	4	5
◆ order berdasarkan Perencanaan Produksi	1	2	3	4	5
◆ order berdasarkan Penjadualan produksi	1	2	3	4	5
◆ order berdasarkan kelangkaan material	1	2	3	4	5
◆ order berdasarkan aktual pesanan	1	2	3	4	5
◆ order berdasarkan pengalaman lalu	1	2	3	4	5

5. Pada saat pembelian material dari supplier, berapa persentase order pembelian dilihat dari tiga kondisi waktu dibawah ini? (**jumlah ketiganya harus 100%**)

\_\_\_\_\_ % diterima lebih awal

\_\_\_\_\_ % diterima tepat waktu

\_\_\_\_\_ % diterima terlambat

6. Bila order material terlambat dikirimkan oleh supplier, berapakah rata-rata keterlambatan tersebut (dalam satuan hari)?

Rata-rata \_\_\_\_\_ hari terlambat.

7. Kira-kira berapa jumlah supplier yang terlibat dalam pembuatan satu part/komponen?  
Kira-kira \_\_\_\_\_ suppliers per part/komponen.
8. Berapa kira-kira jumlah **penomoran part** dari sistem material inventory pada perusahaan anda dilihat dari ketiga bagian (segment) dibawah ini?  
\_\_\_\_\_ penomoran part untuk raw material  
\_\_\_\_\_ penomoran untuk komponen  
\_\_\_\_\_ penomoran untuk produk jadi (finished goods)
9. Berapa nilai total inventory perusahaan anda?  
Rp. \_\_\_\_\_ (dalam juta rupiah)
10. Berapa persentase distribusi nilai inventory perusahaan? (ketiganya berjumlah 100%)  
\_\_\_\_\_ % dari nilai inventory berada pada pembelian material dan part.  
\_\_\_\_\_ % dari nilai inventory berada pada proses yang sedang berlangsung (work-in-process).  
\_\_\_\_\_ % dari nilai inventory berada pada produk jadi.

## Catatan

Terimakasih atas partisipasi anda dalam mengisi lembar pertanyaan ini. Partisipasi tersebut memberikan kontribusi yang sangat berarti dalam mempelajari praktek manufaktur. Bila anda memiliki usulan atau saran untuk memperbaiki format dari kuisioner ini dimasa yang akan datang, silahkan tulis pada halaman kosong berikut.

## Usul Dan Saran:

**SURVEI PRAKTEK GLOBAL MANUFAKTUR**  
**Global Manufacturing Research Survey**

(Halaman ini terpisah dari kuisisioner)

Nama Perusahaan:	
Berikan beberapa contoh produk yang dihasilkan :	
<b>SURVEI KORDINATOR</b> Nama: Jabatan: Alamat surat:  Telephon: E-mail:	
Berapa tahun anda telah bekerja di perusahaan?:	
Berapa tahun anda menduduki posisi tercantum diatas?:	
Tanggal pengisian:	

## MANUFACTURING PRACTICES SURVEY

### I. *Company Description and Background Information*

The information in this section of the survey will be useful to researchers in studying relationships between company characteristics and manufacturing practices. As with the answers to questions in subsequent section of the survey, the information that you provide will not be used to identify individual companies. Please feel comfortable giving **approximate** responses; in most cases, the researchers has shown that it is more important to have approximate answers than none at all.

1. Approximately how many employees work for the company? \_\_\_\_\_ persons.
2. How many of these employees are production workers? \_\_\_\_\_ persons.
3. How many production shifts are there per day? \_\_\_\_\_ production shifts per day.
4. In this company, how many hours per year does a production employee work? \_\_\_\_\_ hours per year
5. About what percent of the company's total manufacturing cost is for labor? \_\_\_\_\_ % cost.
6. What were the company's sales last year?  
     \_\_\_\_\_ in domestic sales  
     \_\_\_\_\_ in export sales
7. How many product lines or product families are produced by the company? \_\_\_\_\_ product lines or product families
8. What percentage of company sales is represented by the company's largest selling product line?  
     \_\_\_\_\_ % of sales
9. About what percentage of the company's products are make-to-order ?  
     About what percentage of the company's products are make-to-stock? (these should sum to 100%)  
     \_\_\_\_\_ % Make-to-stock  
     \_\_\_\_\_ % Make-to-order
10. What percentage of the ownership of the company is represented by each of the following? (these should sum to 100%)  
     \_\_\_\_\_ % domestic (within the country)  
     \_\_\_\_\_ % foreign (outside the country)
11. What percentage of the machines in the company are grouped as follow?  
     \_\_\_\_\_ % of machines are grouped by machine type (e.g. all lathes together)  
     \_\_\_\_\_ % of machines are grouped in combinations for products or product families
12. What is the company's average capacity utilization rate for plant machinery or equipment?  
     \_\_\_\_\_ % capacity of utilization rate
13. Over the last two years, about what percentage of annual sales has the company spent on new production equipment?  
     \_\_\_\_\_ % of annual sales
14. What is the company's total investment in production equipment?

\_\_\_\_\_ investment in equipment

15. What is the approximate average age of the company's production equipment?  
 \_\_\_\_\_ years

16. About what percent of sales is the total manufacturing cost? \_\_\_\_\_ % of sales

17. To what extent does the company use computers for the following? (Circle a number for each use.)

◆ Sales forecasting	1	2	3	4	5
◆ Production Planning	1	2	3	4	5
◆ Production scheduling	1	2	3	4	5
◆ Inventory management	1	2	3	4	5
◆ Purchasing	1	2	3	4	5
◆ Product design	1	2	3	4	5

<- Not at all

To a great extent ->

18. For each of the characteristics listed below, how does the company compare with its competitors? (Circle a number from 1 to 5 for each characteristic.)

	Far worse than competitor	than	About the same as competitor	Far better than competitor
◆ Unit cost of manufacturing	1	2	3	4 5
◆ Quality of product	1	2	3	4 5
◆ Manufacturing throughput time (speed)	1	2	3	4 5
◆ Delivery speed	1	2	3	4 5
◆ Delivery as promised	1	2	3	4 5
◆ Flexibility to change product	1	2	3	4 5
◆ Flexibility to change output volume	1	2	3	4 5
◆ Product design time	1	2	3	4 5

19. In the last two years, to what extent has the company invested resources (money, time, and/or people) in programs in the following areas? (Circle a number from 1 to 5 for each characteristic.)

	Not at all			To a great extent	
◆ Cellular manufacturing	1	2	3	4	5
◆ Computer hardware/software	1	2	3	4	5
◆ Employee participation programs	1	2	3	4	5
◆ Factory automation	1	2	3	4	5
◆ Just-in-time system	1	2	3	4	5
◆ Manufacturing time reduction	1	2	3	4	5
◆ Material requirements planning	1	2	3	4	5
◆ Productivity improvement	1	2	3	4	5
◆ Setup time reduction	1	2	3	4	5
◆ Process analysis	1	2	3	4	5
◆ Statistical process control	1	2	3	4	5
◆ Supplier partnership	1	2	3	4	5
◆ Total quality management	1	2	3	4	5
◆ Recycling of materials	1	2	3	4	5

## II. Sales Forecasting

This section of the survey is about the methods that the company uses to anticipate demand for its products. We have found that a wide range of methods are used by manufacturing firms and that both formal and informal approaches are effective. Thus, as with the other sections, your answers will provide us with insights about actual company practices, and there are no right or wrong answers. Please remember, also, that for questions that ask for numerical answers, your answers may be **approximate**.

1. Which of the following best describes the position (level) of the person who has primary authority for producing the company's sales forecast?

**Position (mark only one)**

- President/CEO/Managing director
- Vice president/director
- Department/division head
- Group/section manager
- owner

2. Which of the following best describe the function of the person who has primary authority for producing the company's sales forecast?

**Position (mark only one)**

- Administration
- Planning
- Production
- Engineering
- Sales
- Marketing finance
- accounting

3. To what extent does the company use each of the following for sales forecasting?

(Circle a number for each method)

	Not at all			To a great extent	
◆ Time series model (e.g., moving average)	1	2	3	4	5
◆ Causal models (e.g., regression)	1	2	3	4	5
◆ Qualitative methods (e.g., delphi)	1	2	3	4	5
◆ Past experience	1	2	3	4	5

4. To what extent is each of the following factors considered in the company's forecast?

(Circle a number for each method)

	Not at all			To a great extent	
◆ Current economic conditions	1	2	3	4	5
◆ Current political conditions	1	2	3	4	5
◆ General company situation	1	2	3	4	5
◆ General industry situation	1	2	3	4	5
◆ Customer information	1	2	3	4	5
◆ Supplier information	1	2	3	4	5
◆ Result of market research	1	2	3	4	5
◆ Past sales (demand) history	1	2	3	4	5



(Circle a number )

- |                                  |       |   |   |   |            |
|----------------------------------|-------|---|---|---|------------|
|                                  | never |   |   |   | Very often |
| ◆ forecast changes by production | 1     | 2 | 3 | 4 | 5          |

### III. Production Planning And Scheduling

This section is about your company practices in the areas of production planning and detailed production scheduling. Planning refers to activities which express units of production and inventory in aggregated terms for the purpose of specifying overall output and capacity requirements. Scheduling refers to detailed scheduling (often known as master production scheduling) that is used to determine the timing and output levels for specific products or components.

1. Is the company production **plan** developed for individual or product lines?

(mark one or both)

- Individual products  
 Product lines

2. For about how many individual products or product lines does the company develop production **plans**?  
 \_\_\_\_\_ products in production **plan**  
 \_\_\_\_\_ product lines in production **plan**

3. How is the company's overall production plan expressed?

(mark all that are appropriate)

- Monetary value of products  
 Physical unit of products  
 Labor time (e.g., hours, days)  
 Machine time (e.g., hours, days)

4. How far into the future does the company's production **plan** extend? \_\_\_\_\_ months

5. What is the smallest increment into which the company's production **plan** is divided?

(mark one only)

- Days  
 Weeks  
 Months  
 Years

6. About how many times per year is the company's production plan revised? \_\_\_\_\_ times per year

7. To what extent is each of the following factors considered in the development of the company's production **plan**?

(Circle a number for each factor)

- |                           |            |   |   |   |                   |
|---------------------------|------------|---|---|---|-------------------|
|                           | Not at all |   |   |   | To a great extent |
| ◆ Customer order backlogs | 1          | 2 | 3 | 4 | 5                 |
| ◆ Previous sales          | 1          | 2 | 3 | 4 | 5                 |
| ◆ Machine capacity        | 1          | 2 | 3 | 4 | 5                 |

◆ Labor capacity	1	2	3	4	5
◆ Customers' future plans	1	2	3	4	5
◆ Inventory levels	1	2	3	4	5
◆ The forecast	1	2	3	4	5

8. When **demand exceed capacity**, how often does the company respond in each of the following ways?

(Circle a number for each alternative.)

	never			Very often	
◆ Hire more workers	1	2	3	4	5
◆ Use overtime	1	2	3	4	5
◆ Add shifts	1	2	3	4	5
◆ Subcontract production work	1	2	3	4	5
◆ Backlog customer orders	1	2	3	4	5
◆ Lease temporary capacity	1	2	3	4	5

9. when **demand is less than capacity**, how often does the company respond in each of the following ways?

(Circle a number for each alternative.)

	never			Very often	
◆ Lay off workers	1	2	3	4	5
◆ Allow idle capacity	1	2	3	4	5
◆ Eliminate shifts	1	2	3	4	5
◆ Reduce work day or week	1	2	3	4	5
◆ Build inventory	1	2	3	4	5
◆ Lease capacity to others	1	2	3	4	5

10. to what extent is the company's production plan used for the following purposes?

(Circle a number for each purpose.)

	Not at all			To a great extent	
◆ budget preparation	1	2	3	4	5
◆ production scheduling	1	2	3	4	5
◆ subcontracting decisions	1	2	3	4	5
◆ material/inventory planning	1	2	3	4	5
◆ sales planning	1	2	3	4	5
◆ human resources planning	1	2	3	4	5
◆ facilities planning	1	2	3	4	5
◆ equipment purchase planning	1	2	3	4	5

11. how often does the company consider the following when subcontracting work?

(Circle a number for each.)

	Not at all			To a great extent	
◆ excess production load at your company	1	2	3	4	5
◆ production difficulty at your company	1	2	3	4	5
◆ top management directive	1	2	3	4	5
◆ subcontracting allows earlier delivery date	1	2	3	4	5
◆ subcontractor's costs are lower	1	2	3	4	5
◆ subcontractor's quality is higher	1	2	3	4	5

**Production scheduling questions**

12. How is the company's overall production schedule expressed?

(mark one only)

- Monetary value of products
- Physical units of products
- Units of product lines
- Labor hours of output
- Machine hours of output

13. how far into the future does the company's production schedule extend? \_\_\_\_\_ weeks

14. what is the **smallest** time increment of the company's production **schedule**?

(mark one only)

- Days
- Weeks
- Months
- Years

15. Is part of the company's production schedule frozen or otherwise made difficult to change in the near future?

(mark yes or no)

- Yes
- No

16. Does the company have formal measurements of the following?

(mark yes or no for each one.)

	Yes	No
◆ Inventory record accuracy	<input type="checkbox"/>	<input type="checkbox"/>
◆ Bill of material accuracy	<input type="checkbox"/>	<input type="checkbox"/>
◆ Shop floor routing accuracy	<input type="checkbox"/>	<input type="checkbox"/>
◆ Time standard accuracy	<input type="checkbox"/>	<input type="checkbox"/>
◆ Forecast accuracy	<input type="checkbox"/>	<input type="checkbox"/>
◆ Late deliveries	<input type="checkbox"/>	<input type="checkbox"/>
◆ Delivery speed	<input type="checkbox"/>	<input type="checkbox"/>
◆ Manufacturing throughput time	<input type="checkbox"/>	<input type="checkbox"/>
◆ Product design time	<input type="checkbox"/>	<input type="checkbox"/>
◆ Raw material quality	<input type="checkbox"/>	<input type="checkbox"/>
◆ Work in process quality	<input type="checkbox"/>	<input type="checkbox"/>
◆ Finished goods quality	<input type="checkbox"/>	<input type="checkbox"/>
◆ Customer satisfaction	<input type="checkbox"/>	<input type="checkbox"/>
◆ Productivity	<input type="checkbox"/>	<input type="checkbox"/>

- ◆ Inventory levels
- ◆ Setup time
- ◆ Employee turnover
- ◆ Employee absenteeism
- ◆ Number of employee suggestions

#### IV. SHOP FLOOR CONTROL

**Shop floor control** refers to the set of operating-level activities associated with the implementation of detailed production schedules. This includes decisions about lot sizes, when to start a production order, sequencing at work centers, and when to make change in the schedule. Our research has shown that a wide range of practices are used. As with the other sections, your answers to these questions will assist us in understanding actual practices.

1. which of the following best describes the **position** of the person in the company who authorizes the plant to start work on an order?

**Position (mark only one)**

- President/CEO/Managing director
- Vice president/director
- Department/division head
- Group/section manager
- owner

2. Which of the following best describes the **function group** in the company that authorizes the plant to start work on an order?

**Position (mark only one)**

- Administration
- Planning
- Production
- Engineering
- Sales
- Marketing
- Finance
- accounting

3. To what extent is each of the following considered in company decision to authorize start of work on an order?

(Circle a number for each factor.)

	Not at all			To a great extent	
◆ Actual customer order	1	2	3	4	5
◆ Production plan	1	2	3	4	5
◆ Detailed production schedule	1	2	3	4	5
◆ Part shortage list	1	2	3	4	5
◆ Inventory level	1	2	3	4	5



8. when a customer places an order, approximately how many days into the future does the company promises delivery?

\_\_\_\_\_ **minimum** days to delivery promises date  
 \_\_\_\_\_ **maximum** days to delivery promises date  
 \_\_\_\_\_ **usual days** to delivery promises date

9. on average, what percentage of the company's orders are delivered to customers after the promised delivery date?

\_\_\_\_\_ % of orders are delivered **after** promised date

10. For customer orders that are **not delivered on time**, what is the average number of days late?

\_\_\_\_\_ days late

11. when the company's finished goods are delivered late to the customers, how often does each of the following occurs as the cause of lateness?

(Circle a number for each possible cause.)

	never			Very often	
◆ insufficient machine capacity	1	2	3	4	5
◆ machine breakdown	1	2	3	4	5
◆ material shortage	1	2	3	4	5
◆ energy shortage	1	2	3	4	5
◆ insufficient labor capacity	1	2	3	4	5
◆ material quality problem	1	2	3	4	5
◆ production quality problem	1	2	3	4	5
◆ production bottleneck	1	2	3	4	5
◆ scheduling error	1	2	3	4	5
◆ change of schedule priorities	1	2	3	4	5
◆ finished goods transportation problem	1	2	3	4	5
◆ change in customer due date	1	2	3	4	5

12. On approximately what percent of its orders do **customer schedule changes** occur after the start of production?

\_\_\_\_\_ % of orders

13. On approximately what portion of the company's orders do engineering or design changes occur after the start of production?

\_\_\_\_\_ % of orders

14. to what extent does each of the following determine the size of the company's production lots?

(Circle a number for each.)

	Not at all			To a great extent	
◆ set up time	1	2	3	4	5
◆ set up cost	1	2	3	4	5
◆ processing time	1	2	3	4	5
◆ size of the order	1	2	3	4	5
◆ storage cost	1	2	3	4	5
◆ storage space	1	2	3	4	5
◆ material handling capacity	1	2	3	4	5
◆ cost per unit	1	2	3	4	5
◆ past experience	1	2	3	4	5

15. what are the company's approximate reject or return percentages at each of the following stages? (provide an answer for each one).

CODE	EMPLS	PROD	SHIFT	HOURS	LABOR	DOMEST	XPORTS	ALUR	%PROD	STK	ORDER	DOM	ASING	JENIS	GABUNG	UTL	ANNUAL	EQPMT	
1	75	59	3	1680	60.00	511.000	0.000		8	20.00	13.00	87.00	100.00	0.00	30.00	70.00	87.00	45.00	200.00
2	73	65	2	1800	15.00	630.000	0.000		14	35.00	0.00	100.00	100.00	0.00	50.00	50.00	30.00	60.00	150.00
3	65	47	2	1800	10.00	320.000	0.000		11	72.00	10.00	90.00	100.00	0.00	68.00	32.00	90.00	35.00	330.00
4	70	51	3	1800	30.00	350.000	200.000		10	85.00	85.00	15.00	100.00	0.00	50.00	50.00	40.00	20.00	100.00
5	74	45	2	1800	20.00	700.000	0.000		8	80.00	95.00	5.00	100.00	0.00	45.00	55.00	30.00	35.00	150.00
6	94	77	1	1760	15.00	300.000	0.000		17	95.00	100.00	0.00	100.00	0.00	75.00	25.00	10.00	20.00	50.00
7	60	48	1	1600	10.00	380.000	0.000		20	75.00	50.00	50.00	100.00	0.00	50.00	50.00	10.00	10.00	50.00
8	70	55	1	1800	30.00	450.000	300.000		12	80.00	75.00	25.00	100.00	0.00	45.00	55.00	15.00	10.00	100.00
9	25	22	2	1800 ?		500.000	0.000		20	95.00	85.00	15.00	100.00	0.00	20.00	80.00	10.00	10.00	150.00
10	85	65	3	1800	40.00	850.000	400.000		15	80.00	80.00	20.00	100.00	0.00	30.00	70.00	15.00	40.00	250.00
11	71	60	2	1800 ?		200.000	200.000		12	65.00	80.00	20.00	100.00	0.00	30.00	70.00	5.00	10.00	50.00
12	84	64	3	1680 ?		1000.000	500.000		17	60.00	95.00	5.00	100.00	0.00	15.00	85.00	25.00	20.00	200.00
13	84	53	1	1800	70.00	1000.000	500.000		10	70.00	0.00	100.00	100.00	0.00	38.00	62.00	92.00	50.00	400.00
14	71	59	1	1800	90.00	2500.000	1000.000		5	90.00	0.00	100.00	100.00	0.00	25.00	75.00	90.00	30.00	300.00
15	70	60	1	1800	30.00	700.000	1500.000		7	95.00	30.00	70.00	100.00	0.00	45.00	55.00	85.00	55.00	60.00
16	40	35	2	1800	25.00	500.000	2500.000		10	60.00	0.00	100.00	100.00	0.00	47.00	53.00	76.00	30.00	300.00
17	97	68	3	1800	75.00	800.000	300.000		12	70.00	0.00	100.00	100.00	0.00	53.00	47.00	80.00	45.00	40.00
18	95	80	2	1800	10.00	2400.000	500.000		20	80.000	25.00	75.00	100.00	0.00	20.00	80.00	75.00	40.00	100.00
19	100	90	2	1800	25.00	3000.000	2500.000		10	85.000	20.00	80.00	100.00	0.00	10.00	90.00	86.00	56.00	200.00
20	75	60	2	1800	14.00	2500.000	2450.000		15	75.000	25.00	75.00	100.00	0.00	35.00	65.00	65.00	35.00	230.00
21	87	80	1	1800	18.00	1500.000	300.000		12	90.000	10.00	90.00	100.00	0.00	56.00	44.00	76.00	40.00	120.00
22	98	80	2	1800	20.00	4000.000	2500.000		16	78.000	0.00	100.00	100.00	0.00	32.00	68.00	60.00	20.00	200.00
23	100	75	2	1800	11.00	2000.000	2500.000		20	89.000	5.00	95.00	100.00	0.00	67.00	33.00	56.00	25.00	250.00
24	94	78	2	1800	17.00	2400.000	1000.000		25	95.000	16.00	84.00	100.00	0.00	32.00	68.00	45.00	10.00	350.00
25	90	83	2	1800	14.00	2600.000	1300.000		16	80.000	22.00	78.00	100.00	0.00	12.00	88.00	58.00	24.00	200.00
26	240	99	2	1992	2.00	3500.000	1700.000		15	80.000	80.00	20.00	100.00	0.00	80.00	20.00	75.00	12.00	150.00

UMUR	B-man	17-A	17-b	17-c	17-d	17-e	17-f	18-a	18-b	18-c	18-d	18-f	18-g	18-h	18-l	19-a	19-b	19-c	19-d	19-e	19-f	19-g	19-h	19-l	19-j	19-k	19-l	19- 19-	19-n
6.00	73.00	4	4	4	3	4	5	3	4	5	5	5	2	2	3	3	5	3	2	2	2	3	5	3	3	1	2	5	2
3.00	45.00	2	2	3	2	3	3	4	4	4	4	4	2	2	3	2	5	4	2	3	2	3	2	2	3	4	4	4	5
7.00	40.00	5	5	4	4	4	5	4	4	5	4	4	5	5	5	4	5	5	5	5	4	4	4	4	5	5	4	5	5
5.00 ?		5	5	5	4	5	5	4	4	4	4	4	3	3	3	4	3	3	4	4	3	4	5	5	5	4	3	4	4
4.00	70.00	2	3	3	3	4	5	3	4	4	4	5	2	2	3	3	5	3	3	3	2	3	3	3	3	3	2	3	5
3.00	65.00	5	5	5	4	5	5	4	4	4	3	4	3	3	3	2	2	3	2	3	2	1	2	3	2	2	2	4	3
6.00	50.00	4	4	3	3	4	4	3	5	5	5	4	3	3	3	3	3	4	3	3	4	4	5	4	3	3	2	3	2
5.00	60.00	4	4	5	3	5	5	4	5	4	4	4	5	5	5	4	5	3	4	4	4	4	5	4	4	5	4	5	5
4.00 ?		5	5	5	5	5	5	4	4	4	3	4	5	5	5	5	5	4	4	5	5	4	5	5	4	4	4	5	5
7.50	60.00	5	4	4	3	5	5	4	5	4	4	5	5	5	5	4	5	4	3	4	4	3	5	5	4	3	4	5	5
9.00	45.00	2	2	2	2	4	3	3	3	4	3	3	2	3	3	2	4	2	2	2	3	2	3	3	2	2	2	4	3
5.00	50.00	4	5	5	5	5	5	4	5	5	5	4	5	5	5	4	4	5	5	5	5	5	5	5	3	4	3	4	3
4.00	40.00	4	4	3	4	5	5	5	4	4	4	5	4	5	5	5	5	3	3	3	2	5	5	4	3	4	5	5	5
6.00	30.00	3	5	4	3	4	4	4	3	3	3	4	3	4	4	5	4	4	5	5	5	5	5	3	3	4	3	3	5
8.00	60.00	3	3	4	2	2	2	5	3	3	4	3	3	4	3	5	4	4	3	3	3	5	5	5	5	3	3	4	3
5.00	60.00	4	5	3	5	5	4	4	4	5	4	4	3	4	5	3	5	3	5	4	3	4	2	2	4	2	3	4	5
7.00	30.00	5	4	5	4	5	5	4	5	4	3	3	4	3	5	4	3	3	5	2	5	4	3	2	3	5	4	4	5
2.00	56.00	5	5	5	3	5	5	4	5	4	5	4	4	5	5	4	5	4	4	5	4	5	5	3	4	3	3	5	5
6.00	75.00	4	5	4	4	4	5	4	4	3	5	4	3	4	4	5	5	3	4	5	4	4	5	2	4	2	2	4	4
8.00	78.00	5	5	4	3	4	5	4	4	3	5	4	3	4	4	3	5	3	3	5	4	4	5	3	4	2	3	4	4
12.00	65.00	5	5	5	3	4	5	5	4	4	5	5	4	4	4	3	5	3	3	5	5	4	5	2	5	2	3	4	4
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4.00	70.00	4	5	5	4	4	5	5	4	4	5	3	3	4	4	3	5	4	3	4	3	4	5	4	4	2	4	5	3
20.00	50.00	4	5	5	5	5	5	5	5	4	5	5	4	5	4	3	5	4	3	4	5	4	3	3	4	1	4	3	5

CODE	POSIT	FUNCT	3-a	3-b	3-c	3-d	4-a	4-b	4-c	4-d	4-e	4-f	4-g	4-h	4-l	5-a	5-b	6-a	6-b	7-a	7-b	proj	unit	MOD	error	12-a	12-b	12-c	12-d	12-e
1	4	2	3	2	2	5	4	5	4	3	2	2	5	3	4	1	0	10	1		3	3	6	5.00	4	4	2	2	3	
2	3	2	3	2	2	5	5	5	3	5	3	3	1	2	2	1	30	10	1		5	3	3	15.00	4	3	3	3	3	
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19	3	2	5	3	3	2	4	4	4	5	2	3	3	2	2	1	21	20		1	18	3	6	8.00	4	4	3	3	5	
20	3	6	5	3	3	3	5	4	3	5	3	2	3	4	4	1	17	18		1	6	3	6	3.00	3	4	3	3	5	
21	5	6	5	4	2	3	4	4	3	4	3	2	3	3	3	1	30	24		1	12	3	6	9.00	5	4	4	3	4	
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23	3	5	4	5	3	2	5	5	4	5	4	5	4	3	4	1	16	23		1	6	2	3	6.00	3	5	4	3	3	
24	5	2	4	3	4	2	5	5	4	5	5	4	4	2	4	1	18	14		1	6	3	6	10.00	5	5	5	5	5	
25	2	2	5	4	3	2	5	5	4	3	3	4	4	4	3	1	20	18		1	10	2	3	14.00	5	5	5	4	5	
26	2	5	5	5	2	4	5	5	5	4	3	2	4	3	3	1	11	20		1	9	2	6	8.00	5	5	4	4	4	

12-f	12-g	12-h	12-l	13
2	2	2	2	4
2	3	4	4	2
2	2	3	4	4
2	4	3	3	3
3	3	4	3	3
3	4	4	4	4
4	4	3	4	2
4	4	4	3	4
2	3	2	2	1
5	5	5	5	5
3	4	4	3	1
4	5	5	5	1
5	5	4	4	5
4	5	5	5	5
5	3	4	4	5
5	5	4	5	5
3	3	4	4	3
3	4	3	4	4
2	3	4	3	3
3	4	3	3	3
3	4	3	3	4
3	5	3	4	3
2	4	4	4	5
4	5	4	4	5
3	5	3	3	4
3	5	3	2	3

CODE	1-a	1-b	2-a	2-b	3-a	3-b	3-c	3-d	proj	unit	6	7-a	7-b	7-c	7-d	7-e	7-f	7-g	8-a	8-b	8-c	8-d	8-e	8-f	9-a	9-b	9-c	9-d	9-e	9-f	10-a	10-b	10-c
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10-d	10-e	10-f	10-g	10-h	11-a	11-b	11-c	11-d	11-e	11-f	12	Proj	unit	ubah	16-a	16-b	16-c	16-d	16-e	16-f	16-g	16-h	16-l	16-j	16-k	16-l	16-m	16-n
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CODE	jab	bag	3-a	3-b	3-c	3-d	3-e	3-f	4-a	4-b	4-c	4-d	5-a	5-b	5-c	5-d	5-e	5-f	5-g	5-h	6-a	6-b	6-c	6-d	6-e	6-f	6-g	6-h	6-l	6-j	6-k	6-l	6-m	7-a	
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7-b	7-c	7-d	8-a	8-b	8-c	late	rata	11-a	11-b	11-c	11-d	11-e	11-f	11-g	11-h	11-l	11-j	11-k	11-l	ppop	pdpe	14-a	14-b	14-c	14-d	14-e	14-f	14-g
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4	2	1	3	3	3	60	65	60	83	70	72	70	78.00	100.00	87.00	0	10	8	3	9	2	8	0
4	2	1	2	8	4	55	60	60	94	70	75	73	89.00	100.00	100.00	3	10	10	3	0	0	0	
3	1	1	5	6	4	40	45	40	89	55	60	55	93.00	100.00	100.00	6	15	12	8	4	5	4	
4	1	3	7	10	7	35	45	42	78	50	57	56	82.00	87.00	90.00	0	5	5	5	5	3	10	
5	1	2	10	5	5	60	65	60	93	68	70	69	97.00	100.00	100.00	0	12	5	10	8	6	3	
5	2	2	3	2	2	60	63	60	98	65	68	65	91.00	100.00	95.00	2	20	7	5	7	0	6	3

22b- 22c- 22d- 22e- 22f- 22g- 22h-

		2		3	10	
2	2			5		
		2		5		
	10	5		5		
	15	10		10		0
				5		
				10		
	5					
						5
						3
						2
						1
						2

CODE	1-a	1-b	1-c	1-d	1-e	1-f	1-g	1-h	1-l	1-j	1-k	1-l	1-m	1-n	own	beli	4-a	4-b	4-c	4-d	4-e	4-f	4-g	5-a	5-b	5-c	hari	supply	8-a
1	1	1	4	3	1	1	2	3	3	1	3	2	3	5	55.00	15.00	5	3	3	3	2	3	5	40.00	50.00	10.00	4	5	1000
2	3	3	5	5	2	1	2	2	5	2	4	4	3	4	70.00	10.00	3	3	5	5	3	4	4	15.00	80.00	5.00	10	5	1035
3	1	1	4	3	3	2	2	2	3	1	4	3	4	3	80.00	20.00	4	4	4	4	3	3	3	20.00	70.00	10.00	5	10	450
4	1	1	4	3	1	1	1	1	3	1	3	3	2	3	60.00	30.00	4	4	4	5	2	3	3	25.00	70.00	5.00	10	15	500
5	1	2	4	4	3	3	2	2	5	2	5	5	3	4	95.00	25.00	5	5	5	5	4	5	3	15.00	30.00	5.00	3	10	450
6	3	3	5	3	3	3	2	2	2	2	4	4	3	3	75.00	15.00	5	4	3	4	3	4	2	15.00	80.00	5.00	3	10	329
7	2	2	5	5	4	4	2	2	5	4	5	5	4	5	90.00	25.00	4	5	5	5	3	5	5	5.00	60.00	35.00	10	7	788
8	1	1	4	4	2	2	2	2	4	5	5	5	4	3	75.00	15.00	5	5	4	5	2	5	3	17.00	80.00	3.00	1	10	600
9	1	1	3	3	2	3	2	1	4	4	4	4	2	4	80.00	10.00	5	5	3	4	3	5	3	17.00	80.00	3.00	3	20	734
10	1	1	5	4	2	2	1	1	4	1	4	4	3	3	95.00	20.00	4	4	4	5	2	4	3	20.00	75.00	5.00	7	15	350
11	2	2	4	4	3	3	4	5	5	5	5	5	3	4	65.00	20.00	5	4	4	4	4	5	5	35.00	60.00	5.00	2	10	200
12	2	2	4	4	3	3	3	3	4	3	3	4	2	2	90.00	25.00	5	5	3	4	3	5	4	19.00	80.00	1.00	1	5	500
13	3	3	4	4	3	2	3	3	4	3	4	5	3	3	75.00	30.00	5	5	3	4	3	5	3	30.00	60.00	10.00	3	30	400
14	3	3	4	3	3	2	3	3	3	3	5	5	3	2	60.00	20.00	5	5	3	4	3	4	2	40.00	40.00	20.00	6	20	670
15	4	3	5	4	3	3	3	3	5	3	5	4	3	2	85.00	25.00	4	5	4	4	3	3	2	60.00	30.00	10.00	5	10	550
16	2	3	5	5	2	3	3	3	3	4	4	4	2	2	90.00	35.00	5	5	4	3	4	4	4	70.00	20.00	10.00	5	5	539
17	3	3	5	4	3	2	4	3	3	2	5	5	3	2	95.00	15.00	5	5	4	5	3	4	4	70.00	30.00	0.00	5	15	700
18	2	5	5	3	3	1	3	3	5	3	4	3	3	3	76.00	20.00	5	5	3	5	3	4	3	67.00	20.00	13.00	5	25	670
19	2	4	5	4	2	3	3	4	5	2	5	4	3	2	68.00	25.00	5	4	2	4	2	4	2	20.00	45.00	35.00	7	32	450
20	3	3	5	4	2	4	3	4	5	2	4	4	3	2	78.00	10.00	5	4	4	4	2	4	2	10.00	50.00	40.00	3	12	321
21	3	3	4	4	2	3	3	3	5	2	4	4	3	2	94.00	34.00	5	4	4	4	2	4	1	5.00	70.00	25.00	9	30	458
22	3	3	4	4	2	2	3	3	4	2	4	3	3	2	85.00	26.00	5	5	3	4	3	4	1	5.00	67.00	28.00	6	26	700
23	3	3	3	4	3	1	3	4	4	2	5	3	4	1	75.00	28.00	4	5	3	4	3	3	4	10.00	60.00	30.00	4	21	678
24	3	5	4	5	3	1	5	2	4	2	5	3	2	1	92.00	19.00	5	5	3	4	2	3	3	23.00	70.00	7.00	9	27	453
25	2	5	4	3	4	1	4	3	5	3	5	5	2	2	76.00	17.00	5	4	3	4	1	4	4	12.00	80.00	8.00	10	20	260
26	4	4	4	3	4	4	2	4	4	2	4	4	2	4	25.00	50.00	4	4	2	2	2	4	3	30.00	40.00	30.00	3	350	1080

8-b	8-c	total	10-a	10-b	10-c
300	2000	250.00	40.00	30.00	30.00
550	2500	100.00	20.00	10.00	70.00
563	902	90.00	20.00	40.00	40.00
600	900	50.00	10.00	30.00	60.00
890	1500	100.00	10.00	50.00	40.00
764	1290	50.00	20.00	30.00	50.00
900	1300	150.00	10.00	50.00	40.00
700	1200	100.00	10.00	70.00	20.00
678	1876	100.00	10.00	70.00	20.00
700	1500	150.00	10.00	70.00	20.00
430	600	200.00	30.00	30.00	40.00
500	1679	150.00	20.00	50.00	30.00
700	1050	550.00	10.00	70.00	20.00
890	1700	700.00	25.00	70.00	5.00
1120	1500	300.00	30.00	60.00	10.00
1200	1700	400.00	20.00	60.00	20.00
1500	1600	500.00	15.00	50.00	35.00
786	1099	200.00	27.00	54.00	19.00
250	540	450.00	25.00	60.00	15.00
563	890	300.00	45.00	35.00	20.00
783	900	250.00	20.00	56.00	24.00
800	1500	320.00	35.00	40.00	25.00
453	2100	255.00	25.00	43.00	32.00
580	670	320.00	20.00	40.00	40.00
760	1200	280.00	25.00	38.00	37.00
1296	2538	800.00	30.00	50.00	20.00

CODE	STK	ORDER	UTL	17-A	17-b	17-c	17-d	17-e	17-f	19-a	19-b	19-c	19-d	19-e	19-f	19-g	19-h	19-i	19-j	19-k	19-l	19-m	19-n	
	26	80.00	20.00	75.00	4	5	5	5	5	3	5	4	3	4	5	4	3	3	4	1	4	3	5	
	1	13.00	87.00	87.00	4	4	4	3	4	3	5	3	2	2	2	3	5	3	3	1	2	5	2	
Diff		67.00	67.00	12.00	0.00	1.00	1.00	2.00	1.00	0.00	0.00	1.00	1.00	2.00	3.00	1.00	2.00	0.00	1.00	0.00	2.00	2.00	3.00	
index		0.84	3.35	0.16	0.00	0.20	0.20	0.40	0.20	0.00	0.00	0.25	0.33	0.50	0.60	0.25	0.67	0.00	0.25	0.00	0.50	0.67	0.60	
real index 1		0.43																						
	2	0.00	100.00	80.00	2	2	3	2	3	2	5	4	2	3	2	3	2	2	3	4	4	4	5	
Diff		80	80	5	2	3	2	3	2	2	1	0	1	1	3	1	1	1	1	3	0	1	0	
Index		1.00	4.00	0.07	0.50	0.60	0.40	0.60	0.40	0.33	0.00	0.00	0.33	0.25	0.60	0.25	0.33	0.33	0.25	3.00	0.00	0.33	0.00	
Real index		0.61																						
	3	10.00	90.00	90.00	5	5	4	4	4	5	4	5	5	5	4	4	4	4	5	5	4	5	5	
Diff		70.00	70.00	15.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	2.00	1.00	1.00	0.00	1.00	1.00	1.00	4.00	0.00	2.00	0.00
Index		0.88	3.50	0.20	0.25	0.00	0.20	0.20	0.20	0.00	0.33	0.00	0.25	0.67	0.25	0.20	0.00	0.33	0.33	0.25	4.00	0.00	0.67	0.00
Real index		0.55																						
	4	85.00	15.00	40.00	5	5	5	4	5	5	4	3	3	4	4	3	4	5	5	5	4	3	4	4
Diff		5	5	35	1	0	0	1	0	0	1	2	1	1	0	2	0	2	2	1	3	1	1	1
Index		0.06	0.25	0.47	0.25	0.00	0.00	0.20	0.00	0.00	0.33	0.40	0.25	0.33	0.00	0.40	0.00	0.67	0.67	0.25	3.00	0.25	0.33	0.20
Real index		0.36																						
	5	95.00	5.00	30.00	2	3	3	3	4	5	3	5	3	3	2	3	3	3	3	3	2	3	5	
Diff		15.00	15.00	45.00	2.00	2.00	2.00	2.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00	3.00	1.00	0.00	0.00	1.00	2.00	2.00	0.00	0.00
Index		0.19	0.75	0.60	0.50	0.40	0.40	0.40	0.20	0.00	0.00	0.00	0.25	0.00	0.25	0.60	0.25	0.00	0.00	0.25	2.00	0.50	0.00	0.00
Real Index		0.33																						
	6	100.00	0.00	10.00	5	5	5	4	5	5	2	2	3	2	3	2	1	2	3	2	2	2	4	3
Diff		20.00	20.00	65.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	3.00	1.00	1.00	1.00	3.00	3.00	1.00	0.00	2.00	1.00	2.00	1.00	2.00
Index		0.25	1.00	0.87	0.25	0.00	0.00	0.20	0.00	0.00	0.33	0.60	0.25	0.33	0.25	0.60	0.75	0.33	0.00	0.50	1.00	0.50	0.33	0.40
Real index		0.38																						
	7	50.00	50.00	10.00	4	4	3	3	4	4	3	3	4	3	3	4	4	5	4	3	3	2	3	2
Diff		30.00	30.00	65.00	0.00	1.00	2.00	2.00	1.00	1.00	0.00	2.00	0.00	0.00	1.00	1.00	0.00	2.00	1.00	1.00	2.00	2.00	0.00	3.00
Index		0.38	1.50	0.87	0.00	0.20	0.40	0.40	0.20	0.20	0.00	0.40	0.00	0.00	0.25	0.20	0.00	0.67	0.33	0.25	2.00	0.50	0.00	0.60
Real index		0.40																						

	8	75.00	25.00	15.00	4	4	5	3	5	5	4	5	3	4	4	4	4	5	4	4	5	4	5	5
Diff		5.00	5.00	10.00	0.00	1.00	1.00	2.00	1.00	2.00	1.00	1.00	2.00	0.00	1.00	1.00	4.00	5.00	4.00	4.00	5.00	4.00	5.00	5.00
Index		0.06	0.25	0.13	0.00	0.20	0.20	0.40	0.20	0.40	0.33	0.20	0.50	0.00	0.25	0.20	1.00	1.67	1.33	1.00	5.00	1.00	1.67	1.00
Real index		0.74																						

	9	85.00	15.00	10.00	5	5	5	5	5	5	5	5	4	4	5	5	4	5	5	4	4	4	5	5
Diff		5.00	5.00	65.00	1.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	1.00	1.00	0.00	0.00	2.00	2.00	0.00	3.00	0.00	2.00	0.00
Index		0.06	0.25	0.87	0.25	0.00	0.00	0.00	0.00	0.00	0.67	0.00	0.00	0.33	0.25	0.00	0.00	0.67	0.67	0.00	3.00	0.00	0.37	0.00
Real index		0.33																						

	10	80.00	20.00	15.00	5	4	4	3	5	5	4	5	4	3	4	4	3	5	5	4	3	4	5	5
Diff		0.00	0.00	60.00	1.00	1.00	1.00	2.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	2.00	2.00	0.00	2.00	0.00	2.00	0.00
Index		0.00	0.00	0.80	0.25	0.20	0.20	0.40	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.20	0.25	0.67	0.67	0.00	2.00	0.00	0.67	0.00
Real index		0.29																						

	11	80.00	20.00	5.00	2	2	2	2	4	3	2	4	2	2	2	3	2	3	3	2	2	2	4	3
Diff		0.00	0.00	70.00	2.00	3.00	3.00	3.00	1.00	2.00	1.00	1.00	2.00	1.00	2.00	2.00	2.00	0.00	0.00	2.00	1.00	2.00	1.00	2.00
Index		0.00	0.00	0.93	0.50	0.60	0.60	0.60	0.20	0.40	0.33	0.20	0.50	0.33	0.50	0.40	0.50	0.00	0.00	0.50	1.00	0.50	0.33	0.40
Real index		0.41																						

	12	95.00	5.00	25.00	4	5	5	5	5	5	4	4	5	5	5	5	5	5	5	3	4	3	4	3
Diff		15.00	15.00	50.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	2.00	1.00	0.00	1.00	2.00	2.00	1.00	3.00	1.00	1.00	2.00
Index		0.19	0.75	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.20	0.25	0.67	0.25	0.00	0.25	0.67	0.67	0.25	3.00	0.25	0.33	0.40
Real index		0.40																						

	13	0.00	100.00	92.00	4	4	3	4	5	5	5	5	3	3	3	2	5	5	4	3	4	5	5	5
Diff		80	80	17	0	1	2	1	0	0	2	0	1	0	1	3	1	2	1	1	3	1	2	0
Index		1.00	4.00	0.23	0.00	0.20	0.40	0.20	0.00	0.00	0.67	0.00	0.25	0.00	0.25	0.60	0.25	0.67	0.33	0.25	3.00	0.25	0.67	0.00
Real index		0.57																						

	14	0.00	100.00	90.00	3	5	4	3	4	4	5	4	4	5	5	5	5	5	3	3	4	3	3	5
Diff		80	80	15	1	0	1	2	1	1	2	1	0	2	1	0	1	2	0	1	3	1	0	0
Index		1.00	4.00	0.20	0.25	0.00	0.20	0.40	0.20	0.20	0.67	0.20	0.00	0.67	0.25	0.00	0.25	0.67	0.00	0.25	3.00	0.25	0.00	0.00
Real index		0.55																						

	15	30.00	70.00	85.00	3	3	4	2	3	2	5	4	4	3	3	3	5	5	5	5	3	3	4	3
Diff		50	50	10	1	2	1	3	2	3	2	1	0	0	1	2	1	2	2	1	2	1	1	2
Index		0.63	2.50	0.13	0.25	0.40	0.20	0.60	0.40	0.60	0.67	0.20	0.00	0.00	0.25	0.40	0.25	0.67	0.67	0.25	2.00	0.25	0.33	0.40
Real index		0.52																						
	16	0.00	100.00	76.00	4	5	3	5	5	4	3	5	3	5	4	3	4	2	2	4	2	3	4	5
Diff		80.00	80.00	1.00	0.00	0.00	2.00	0.00	0.00	1.00	0.00	0.00	1.00	2.00	0.00	2.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Index		1.00	4.00	0.01	0.00	0.00	0.40	0.00	0.00	0.20	0.00	0.00	0.25	0.67	0.00	0.40	0.00	0.33	0.33	0.00	1.00	0.25	0.33	0.00
Real index		0.40																						
	17	0.00	100.00	80.00	5	4	5	4	5	5	4	3	3	5	2	5	4	3	2	3	5	4	4	5
Diff		80.00	80.00	5.00	1.00	1.00	0.00	1.00	0.00	0.00	1.00	2.00	1.00	2.00	2.00	0.00	0.00	0.00	1.00	1.00	4.00	0.00	1.00	0.00
Index		1.00	4.00	0.07	0.25	0.20	0.00	0.20	0.00	0.00	0.33	0.40	0.25	0.67	0.50	0.00	0.00	0.00	0.33	0.25	4.00	0.00	0.33	0.00
Real index		0.56																						
	18	25.00	75.00	75.00	5	5	5	3	5	5	4	5	4	4	5	4	5	5	3	4	3	3	5	5
Diff		55.00	55.00	0.00	1.00	0.00	0.00	2.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	2.00	0.00	0.00	2.00	1.00	2.00	0.00
Index		0.69	2.75	0.00	0.25	0.00	0.00	0.40	0.00	0.00	0.33	0.00	0.00	0.33	0.25	0.20	0.25	0.67	0.00	0.00	2.00	0.25	0.67	0.00
Realindex		0.39																						
	19	20.00	80.00	86.00	4	5	4	4	4	5	5	5	3	4	5	4	4	5	2	4	2	2	4	4
Diff		60.00	60.00	11.00	0.00	0.00	1.00	1.00	1.00	0.00	2.00	0.00	1.00	1.00	1.00	1.00	0.00	2.00	1.00	0.00	1.00	2.00	1.00	1.00
Index		0.75	3.00	0.15	0.00	0.00	0.20	0.20	0.20	0.00	0.67	0.00	0.25	0.33	0.25	0.20	0.00	0.67	0.33	0.00	1.00	0.50	0.33	0.20
Realindex		0.40																						
	20	25.00	75.00	65.00	5	5	4	3	4	5	3	5	3	3	5	4	4	5	3	4	2	3	4	4
Diff		55.00	55.00	10.00	1.00	0.00	1.00	2.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	2.00	0.00	0.00	1.00	1.00	1.00	1.00
Index		0.69	2.75	0.13	0.25	0.00	0.20	0.40	0.20	0.00	0.00	0.00	0.25	0.00	0.25	0.20	0.00	0.67	0.00	0.00	1.00	0.25	0.33	0.20
Realindex		0.34																						
	21	10.00	90.00	76.00	5	5	5	3	4	5	3	5	3	3	5	5	4	5	2	5	2	3	4	4
Diff		70.00	70.00	1.00	1.00	0.00	0.00	2.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Index		0.88	3.50	0.01	0.25	0.00	0.00	0.40	0.20	0.00	0.00	0.00	0.25	0.00	0.25	0.00	0.00	0.67	0.33	0.25	1.00	0.25	0.33	0.20
Realindex		0.38																						

	22	0.00	100.00	60.00	5	5	5	3	5	5	3	5	3	3	5	5	3	5	2	5	3	3	4	4	
Diff		80.00	80.00	15.00	1.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00	2.00	1.00	1.00	2.00	1.00	1.00	1.00
Index		1.00	4.00	0.20	0.25	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.25	0.00	0.25	0.00	0.25	0.67	0.33	0.25	2.00	0.25	0.33	0.20	
Realindex		0.46																							

	23	5.00	95.00	56.00	4	5	5	2	5	5	4	5	4	2	5	4	5	5	3	4	3	2	5	3
Diff		75.00	75.00	19.00	0.00	0.00	0.00	3.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	2.00	0.00	0.00	2.00	2.00	2.00	2.00
Index		0.94	3.75	0.25	0.00	0.00	0.00	0.60	0.00	0.00	0.33	0.00	0.00	0.33	0.25	0.20	0.25	0.67	0.00	0.00	2.00	0.50	0.67	0.40
realindex		0.48																						

	24	16.00	84.00	45.00	5	5	5	3	4	5	3	5	4	3	5	4	3	5	4	4	3	4	5	4
Diff		64.00	64.00	30.00	1.00	0.00	0.00	2.00	1.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	2.00	1.00	0.00	2.00	0.00	2.00	1.00
Index		0.80	3.20	0.40	0.25	0.00	0.00	0.40	0.20	0.00	0.00	0.00	0.00	0.00	0.25	0.20	0.25	0.67	0.33	0.00	2.00	0.00	0.67	0.20
Realindex		0.43																						

CODE	STK	ORDER	UTL	17-A	17-b	17-c	17-d	17-e	17-f	19-a	19-b	19-c	19-d	19-e	19-f	19-g	19-h	19-i	19-j	19-k	19-l	19-m	19-n	
	25	22.00	78.00	58.00	4	5	5	4	4	5	3	5	4	3	4	3	4	5	4	4	2	4	5	3
Diff		58.00	58.00	17.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	1.00	0.00	1.00	0.00	2.00	2.00	
Index		0.73	2.90	0.23	0.00	0.00	0.00	0.20	0.20	0.00	0.00	0.00	0.00	0.00	0.40	0.00	0.67	0.33	0.00	1.00	0.00	0.67	0.40	
Realindex		0.34																						



CODE	3-a	3-b	3-c	3-d	4-a	4-b	4-c	4-d	4-e	4-f	4-g	4-h	4-l	5-a	5-b	6-a	6-b	7-a	7-b	proj	unit	MOD	error	12-a	12-b	12-c	12-d	12-e	12-f	12-g	12-h	12-l	13
26	5	5	2	4	5	5	5	4	3	2	4	3	3	1	1	11	20	1	1	9	2	6	8.00	5	5	4	4	4	3	5	3	2	3
Diff	3	2	2	5	4	5	4	3	2	2	5	3	4			1	0	10	1	3	3	6	5.00	4	4	2	2	3	2	2	2	4	
Index	0.40	0.60	0.00	0.25	0.20	0.00	0.20	0.25	0.33	0.00	0.25	0.00	0.33	1.00	0.00	1.00	0.50	0.00	1.00	0.67	0.50	0.00	0.38	0.20	0.20	0.50	0.50	0.25	0.33	0.60	0.33	0.00	
Realindex	0.34																																
2	3	2	2	5	5	5	3	5	3	3	1	2	2		1	30	10	1		5	3	3	15.00	4	3	3	3	3	2	3	4	4	2
Diff	2	3	0	1	0	0	2	1	0	1	3	1	1	1	0	19	10	0	1	4	1	3	7	1	2	1	1	1	1	2	1	2	
Index	0.40	0.60	0.00	0.25	0.00	0.00	0.40	0.25	0.00	0.50	0.75	0.33	0.33	1.00	0.00	1.73	0.50	0.00	1.00	0.44	0.50	0.50	0.88	0.20	0.40	0.25	0.25	0.25	0.33	0.40	0.33	1.00	
Realindex	0.43																																
3	3	2	2	5	5	5	4	4	1	1	4	4	3		1	25	10	1		8	3	4	3.00	3	4	3	3	3	2	3	4	4	3
Diff	2	3	0	1	0	0	1	0	2	1	0	1	0	1	0	14	10	0	1	1	1	2	5	2	1	1	1	1	1	3	0	2	
Index	0.40	0.60	0.00	0.25	0.00	0.00	0.20	0.00	0.67	0.50	0.00	0.33	0.00	1.00	0.00	1.27	0.50	0.00	1.00	0.11	0.50	0.33	0.63	0.40	0.20	0.25	0.25	0.25	0.33	0.60	0.00	1.00	
Realindex	0.36																																
4	3	3	4	4	5	5	3	3	2	2	5	3	3		1	5	15		1	3	2	12	10.00	3	3	3	3	4	2	4	3	3	3
Diff	2	2	2	0	0	0	2	1	1	0	1	0	0	1	0	6	5	1	0	6	0	6	2	2	2	1	1	0	1	1	0	1	
Index	0.40	0.40	1.00	0.00	0.00	0.00	0.40	0.25	0.33	0.00	0.25	0.00	0.00	1.00	0.00	0.55	0.25	1.00	0.00	0.67	0.00	1.00	0.25	0.40	0.40	0.25	0.25	0.00	0.33	0.20	0.00	0.50	
Realindex	0.31																																
5	2	2	2	5	4	5	3	3	2	2	5	3	3		1	10	25		1	6	3	6	10.00	3	4	2	3	5	3	3	4	3	3
Diff	3	3	0	1	1	0	2	1	1	0	1	0	0	1	0	1	5	1	0	3	1	0	2	2	1	2	1	1	0	2	1	1	
Index	0.60	0.60	0.00	0.25	0.20	0.00	0.40	0.25	0.33	0.00	0.25	0.00	0.00	1.00	0.00	0.09	0.25	1.00	0.00	0.33	0.50	0.00	0.25	0.40	0.20	0.50	0.25	0.25	0.00	0.40	0.33	0.50	
Realindex	0.29																																
6	4	4	5	5	5	5	5	4	4	3	5	5	5		1	20	30		1	8	3	12	5.00	5	5	5	4	5	3	4	4	4	4
Diff	1	1	3	1	0	0	0	0	1	1	1	2	2	1	0	9	10	1	0	1	1	6	3	0	0	1	0	1	0	1	1	2	
Index	0.20	0.20	1.50	0.25	0.00	0.00	0.00	0.00	0.33	0.50	0.25	0.67	0.67	1.00	0.00	0.82	0.50	1.00	0.00	0.11	0.50	1.00	0.38	0.00	0.00	0.25	0.00	0.25	0.00	0.20	0.33	1.00	
Realindex	0.37																																
7	3	3	4	5	5	5	4	4	4	4	5	4	4		1	5	10		1	3	3	3	10.00	4	4	3	3	3	4	4	3	4	2
Diff	2	2	2	1	0	0	1	0	1	2	1	1	1	1	0	6	10	1	0	6	1	3	2	1	1	1	1	1	1	1	0	2	
Index	0.40	0.40	1.00	0.25	0.00	0.00	0.20	0.00	0.33	1.00	0.25	0.33	0.33	1.00	0.00	0.55	0.50	1.00	0.00	0.67	0.50	0.50	0.25	0.20	0.20	0.25	0.25	0.25	0.33	0.20	0.00	1.00	
Realindex	0.38																																
8	4	3	4	5	5	5	4	4	3	3	5	4	5		1	10	30		1	12	3	4	10.00	3	3	4	4	3	4	4	4	3	4
Diff	1	2	2	1	0	0	1	0	0	1	1	1	2	1	0	1	10	1	0	3	1	2	2	2	2	0	0	1	1	1	1	1	
Index	0.20	0.40	1.00	0.25	0.00	0.00	0.20	0.00	0.00	0.50	0.25	0.33	0.67	1.00	0.00	0.09	0.50	1.00	0.00	0.33	0.50	0.33	0.25	0.40	0.40	0.00	0.00	0.25	0.33	0.20	0.33	0.50	
Realindex	0.32																																
9	5	1	1	5	5	5	3	5	4	2	5	5	5		1	50	0		1	3	3	12	5.00	3	4	4	3	4	2	3	2	2	1
Diff	0	4	1	1	0	0	2	1	1	0	1	2	2	0	1	39	20	1	0	6	1	6	3	2	1	0	1	0	1	2	1	0	
Index	0.00	0.80	0.50	0.25	0.00	0.00	0.40	0.25	0.33	0.00	0.25	0.67	0.67	0.00	1.00	3.55	1.00	1.00	0.00	0.67	0.50	1.00	0.38	0.40	0.20	0.00	0.25	0.00	0.33	0.40	0.33	0.00	
Realindex	0.47																																
10	5	2	2	4	5	5	5	3	3	3	5	4	4		1	0	20		1	3	4	2	5.00	5	5	3	3	4	5	5	5	5	5
Diff	0	3	0	0	0	0	0	1	0	1	1	1	1	1	0	11	0	1	0	6	2	4	3	0	0	1	1	0	2	0	2	3	
Index	0.00	0.60	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.50	0.25	0.33	0.33	1.00	0.00	1.00	0.00	1.00	0.00	0.67	1.00	0.67	0.38	0.00	0.00	0.25	0.25	0.00	0.67	0.00	0.67	1.50	
Realindex	0.35																																
11	5	3	2	3	5	5	3	3	2	2	4	3	4		1	0	25		1	6	3	12	15.00	4	4	3	4	4	3	4	4	3	1

Diff	0	2	0	1	0	0	2	1	1	0	0	0	1	1	0	11	5	1	0	3	1	6	7	1	1	1	0	0	0	1	1	1	
Index	0.00	0.40	0.00	0.25	0.00	0.00	0.40	0.25	0.33	0.00	0.00	0.00	0.33	1.00	0.00	1.00	0.25	1.00	0.00	0.33	0.50	1.00	0.88	0.20	0.20	0.25	0.00	0.00	0.00	0.20	0.33	0.50	
Realindex	0.30																																
Diff	12	4	4	3	5	5	5	3	3	5	5	5	3	4	1	0	5	1	6	3	2	15.00	4	4	4	3	4	4	5	5	5	1	
Index	0.20	0.20	0.50	0.25	0.00	0.00	0.40	0.25	0.67	1.50	0.25	0.00	0.33	1.00	0.00	1.00	0.75	1.00	0.00	0.33	0.50	0.67	0.88	0.20	0.20	0.00	0.25	0.00	0.33	0.00	0.67	1.50	
Realindex	0.43																																
Diff	13	3	5	4	4	4	4	4	4	3	3	5	3	4	1	30	40	1	12	2	2	10.00	5	5	4	3	5	5	5	4	4	5	
Index	0.40	0.00	1.00	0.00	0.20	0.20	0.20	0.00	0.00	0.50	0.25	0.00	0.33	1.00	0.00	1.73	1.00	1.00	0.00	0.33	0.00	0.67	0.25	0.00	0.00	0.00	0.25	0.25	0.67	0.00	0.33	1.00	
Realindex	0.36																																
Diff	14	4	5	5	3	5	3	5	3	4	4	2	2	5	1	60	20	1	9	2	4	25.00	4	3	3	4	3	4	5	5	5	5	5
Index	0.20	0.00	1.50	0.25	0.00	0.40	0.00	0.25	0.33	1.00	0.50	0.33	0.67	1.00	0.00	4.45	0.00	1.00	0.00	0.00	0.00	0.33	2.13	0.20	0.40	0.25	0.00	0.25	0.33	0.00	0.67	1.50	
Realindex	0.56																																
Diff	15	4	3	2	2	4	2	5	4	5	3	4	2	5	1	50	30	1	12	3	5	15.00	5	3	3	4	5	5	3	4	4	5	
Index	0.20	0.40	0.00	0.50	0.20	0.60	0.00	0.00	0.67	0.50	0.00	0.33	0.67	1.00	0.00	3.55	0.50	1.00	0.00	0.33	0.50	0.17	0.88	0.00	0.40	0.25	0.00	0.25	0.67	0.40	0.33	1.00	
Realindex	0.48																																
Diff	16	3	4	2	5	3	4	3	5	3	5	5	5	5	1	30	20	1	24	2	3	5.00	3	3	3	5	5	5	5	4	5	5	
Index	0.40	0.20	0.00	0.25	0.40	0.20	0.40	0.25	0.00	1.50	0.25	0.67	0.67	1.00	0.00	1.73	0.00	1.00	0.00	1.67	0.00	0.50	0.38	0.40	0.40	0.25	0.25	0.25	0.67	0.00	0.33	1.50	
Realindex	0.48																																
Diff	17	5	2	4	4	5	5	2	4	4	4	3	5	4	1	30	15	1	15	2	6	3.00	3	4	5	5	5	3	3	4	4	3	
Index	0.00	0.60	1.00	0.00	0.00	0.00	0.60	0.00	0.33	1.00	0.25	0.67	0.33	1.00	0.00	1.73	0.25	1.00	0.00	0.67	0.00	0.00	0.63	0.40	0.20	0.25	0.25	0.25	0.00	0.40	0.33	1.00	
Realindex	0.41																																
Diff	18	4	4	3	2	5	3	3	5	3	3	4	3	2	1	10	30	1	12	3	6	10.00	4	5	3	4	4	3	4	3	4	4	
Index	0.20	0.20	0.50	0.50	0.00	0.40	0.40	0.25	0.00	0.50	0.00	0.00	0.33	1.00	0.00	0.09	0.50	1.00	0.00	0.33	0.50	0.00	0.25	0.20	0.00	0.25	0.00	0.00	0.00	0.20	0.00	1.00	
Realindex	0.27																																
Diff	19	5	3	3	2	4	4	4	5	2	3	3	2	2	1	21	20	1	1	18	3	6	8.00	4	4	3	3	5	2	3	4	3	3
Index	0.00	0.40	0.50	0.50	0.20	0.20	0.20	0.25	0.33	0.50	0.25	0.33	0.33	1.00	0.00	0.91	0.00	0.00	0.00	1.00	0.50	0.00	0.00	0.20	0.20	0.25	0.25	0.25	0.33	0.40	0.33	0.50	
Realindex	0.32																																
Diff	20	5	3	3	3	5	4	3	5	3	2	3	4	4	1	17	18	1	6	3	6	3.00	3	4	3	3	5	3	4	3	3	3	
Index	0.00	0.40	0.50	0.25	0.00	0.20	0.40	0.25	0.00	0.00	0.25	0.33	0.33	1.00	0.00	0.55	0.10	1.00	0.00	0.33	0.50	0.00	0.63	0.40	0.20	0.25	0.25	0.25	0.00	0.20	0.00	0.50	
Realindex	0.28																																
Diff	21	5	4	2	3	4	4	3	4	3	2	3	3	3	1	30	24	1	12	3	6	9.00	5	4	4	3	4	3	4	3	3	4	
Index	0.00	0.20	0.00	0.25	0.20	0.20	0.40	0.00	0.00	0.00	0.25	0.00	0.00	1.00	0.00	1.73	0.20	1.00	0.00	0.33	0.50	0.00	0.13	0.00	0.20	0.00	0.25	0.00	0.00	0.20	0.00	0.50	
Realindex	0.24																																

22	5	4	2	2	5	5	3	5	2	2	4	3	4	1	12	10	1	6	3	6	9.00	5	4	5	3	3	3	5	3	4	3	
Diff	0	1	0	2	0	0	2	1	1	0	0	0	1	1	0	1	10	1	0	3	1	0	1	0	1	1	1	1	0	0	0	2
Index	0.00	0.20	0.00	0.50	0.00	0.00	0.40	0.25	0.33	0.00	0.00	0.00	0.33	1.00	0.00	0.09	0.50	1.00	0.00	0.33	0.50	0.00	0.13	0.00	0.20	0.25	0.25	0.00	0.00	0.00	1.00	
Realindex	0.23																															

23	4	5	3	2	5	5	4	5	4	5	4	3	4	1	16	23	1	1	6	2	3	6.00	3	5	4	3	3	2	4	4	4	5
Diff	1	0	1	2	0	0	1	1	1	3	0	0	1	1	0	5	3	0	0	3	0	3	2	2	0	0	1	1	1	1	1	2
Index	0.20	0.00	0.50	0.50	0.00	0.00	0.20	0.25	0.33	1.50	0.00	0.00	0.33	1.00	0.00	0.45	0.15	0.00	0.00	0.33	0.00	0.50	0.25	0.40	0.00	0.00	0.25	0.25	0.33	0.20	0.33	1.00
Realindex	0.29																															

24	4	3	4	2	5	5	4	5	5	4	4	2	4	1	18	14	1	6	3	6	10.00	5	5	5	5	5	4	5	4	4	5	
Diff	1	2	2	2	0	0	1	1	2	2	0	1	1	1	0	7	6	1	0	3	1	0	2	0	0	1	1	1	1	0	1	2
Index	0.20	0.40	1.00	0.50	0.00	0.00	0.20	0.25	0.67	1.00	0.00	0.33	0.33	1.00	0.00	0.64	0.30	1.00	0.00	0.33	0.50	0.00	0.25	0.00	0.00	0.25	0.25	0.25	0.33	0.00	0.33	1.00
Realindex	0.35																															

25	5	4	3	2	5	5	4	3	3	4	4	4	3	1	20	18	1	1	10	2	3	14.00	5	5	5	4	5	3	5	3	3	4
Diff	0	1	1	2	0	0	1	1	0	2	0	1	0	1	0	9	2	0	0	1	0	3	6	0	0	1	0	1	0	0	0	1
Index	0.00	0.20	0.50	0.50	0.00	0.00	0.20	0.25	0.00	1.00	0.00	0.33	0.00	1.00	0.00	0.82	0.10	0.00	0.00	0.11	0.00	0.50	0.75	0.00	0.00	0.25	0.00	0.25	0.00	0.00	0.00	0.50
Realindex	0.23																															

CODE	proj	unit	6	7-a	7-b	7-c	7-d	7-e	7-f	7-g	8-a	8-b	8-c	8-d	8-e	8-f	9-a	9-b	9-c	9-d	9-e	9-f	11-a	11-b	11-c	11-d	11-e	11-f	Proj	unit	
26	3	2	9	4	3	5	3	2	3	3	2	5	5	3	1	4	1	3	4	3	3	3	5	4	2	3	2	2	4	1	
Diff	1	3	12	3	4	5	5	1	3	4	3	5	5	5	2	4	1	1	5	5	2	5	5	4	3	2	4	3	3	1	
Index	0	1	3	1	1	0	2	1	0	1	1	0	0	2	1	0	0	2	1	2	1	2	0	0	1	1	2	1	1	0	
Realindex	0.00	0.50	0.33	0.25	0.33	0.00	0.67	0.50	0.00	0.33	0.50	0.00	0.00	0.67	1.00	0.00	0.00	0.67	0.25	0.67	0.33	0.67	0.00	0.00	0.50	0.33	1.00	0.50	0.25	0.00	
2	1	1	3	3	5	5	5	3	3	3	1	4	3	5	3	1	1	3	5	2	3	5	5	4	2	3	4	1	1	1	
Diff	2	1	6	1	2	0	2	1	0	0	1	1	2	2	2	3	0	0	1	1	0	2	0	0	0	0	0	2	1	3	0
Index	0.67	0.50	0.67	0.25	0.67	0.00	0.67	0.50	0.00	0.00	0.50	0.20	0.40	0.67	2.00	0.75	0.00	0.00	0.25	0.33	0.00	0.67	0.00	0.00	0.00	0.00	0.00	1.00	0.50	0.75	0.00
Realindex	0.67	0.50	0.67	0.25	0.67	0.00	0.67	0.50	0.00	0.00	0.50	0.20	0.40	0.67	2.00	0.75	0.00	0.00	0.25	0.33	0.00	0.67	0.00	0.00	0.00	0.00	1.00	0.50	0.75	0.00	
3	3	2	12	4	4	5	5	5	4	4	3	5	5	5	2	3	1	2	5	4	3	2	4	4	3	4	2	4	4	1	
Diff	0	0	3	0	1	0	2	3	1	1	1	0	0	2	1	1	0	1	1	1	0	1	1	0	1	1	0	2	0	0	
Index	0.00	0.00	0.33	0.00	0.33	0.00	0.67	1.50	0.33	0.33	0.50	0.00	0.00	0.67	1.00	0.25	0.00	0.33	0.25	0.33	0.00	0.33	0.20	0.00	0.50	0.33	0.00	1.00	0.00	0.00	
Realindex	0.00	0.00	0.33	0.00	0.33	0.00	0.67	1.50	0.33	0.33	0.50	0.00	0.00	0.67	1.00	0.25	0.00	0.33	0.25	0.33	0.00	0.33	0.20	0.00	0.50	0.33	0.00	1.00	0.00	0.00	
4	5	2	12	3	3	4	4	2	4	3	2	5	5	5	2	4	1	1	3	3	4	3	4	4	3	4	3	3	4	1	
Diff	2	0	3	1	0	1	1	0	1	0	0	0	0	0	2	1	0	0	2	1	0	1	0	1	0	1	1	1	1	0	0
Index	0.67	0.00	0.33	0.25	0.00	0.20	0.33	0.00	0.33	0.00	0.00	0.00	0.00	0.67	1.00	0.00	0.00	0.67	0.25	0.00	0.33	0.00	0.20	0.00	0.50	0.33	0.50	0.50	0.00	0.00	
Realindex	0.67	0.00	0.33	0.25	0.00	0.20	0.33	0.00	0.33	0.00	0.00	0.00	0.00	0.67	1.00	0.00	0.00	0.67	0.25	0.00	0.33	0.00	0.20	0.00	0.50	0.33	0.50	0.50	0.00	0.00	
5	3	2	12	3	3	5	4	3	4	4	3	4	3	3	4	5	1	1	4	3	2	2	4	4	5	3	2	2	4	1	
Diff	0	0	3	1	0	0	1	1	1	1	1	1	1	2	0	3	1	0	2	0	0	1	1	1	0	3	0	0	0	0	
Index	0.00	0.00	0.33	0.25	0.00	0.00	0.33	0.50	0.33	0.33	0.50	0.20	0.40	0.00	3.00	0.25	0.00	0.67	0.00	0.00	0.33	0.33	0.20	0.00	1.50	0.00	0.00	0.00	0.00	0.00	
Realindex	0.00	0.00	0.33	0.25	0.00	0.00	0.33	0.50	0.33	0.33	0.50	0.20	0.40	0.00	3.00	0.25	0.00	0.67	0.00	0.00	0.33	0.33	0.20	0.00	1.50	0.00	0.00	0.00	0.00	0.00	
6	3	3	12	3	3	4	4	2	4	5	5	5	5	5	4	5	1	2	3	2	4	3	5	4	5	4	4	4	8	2	
Diff	0	1	3	1	0	1	1	0	1	2	3	0	0	2	3	1	0	1	1	1	1	0	0	0	3	1	2	2	4	1	
Index	0.00	0.50	0.33	0.25	0.00	0.20	0.33	0.00	0.33	0.67	1.50	0.00	0.00	0.67	3.00	0.25	0.00	0.33	0.25	0.33	0.33	0.00	0.00	0.00	1.50	0.33	1.00	1.00	1.00	1.00	
Realindex	0.00	0.50	0.33	0.25	0.00	0.20	0.33	0.00	0.33	0.67	1.50	0.00	0.00	0.67	3.00	0.25	0.00	0.33	0.25	0.33	0.33	0.00	0.00	0.00	1.50	0.33	1.00	1.00	1.00	1.00	
7	3	3	3	4	3	5	5	3	4	3	3	5	5	5	5	4	1	1	1	1	1	2	5	4	4	4	3	2	2	4	1
Diff	0	1	6	0	0	0	2	1	1	0	1	0	0	2	4	0	0	2	3	2	1	2	1	0	2	0	0	0	0	0	
Index	0.00	0.50	0.67	0.00	0.00	0.00	0.67	0.50	0.33	0.00	0.50	0.00	0.00	0.67	4.00	0.00	0.00	0.67	0.75	0.67	0.33	0.67	0.20	0.00	1.00	0.00	0.00	0.00	0.00	0.00	
Realindex	0.00	0.50	0.67	0.00	0.00	0.00	0.67	0.50	0.33	0.00	0.50	0.00	0.00	0.67	4.00	0.00	0.00	0.67	0.75	0.67	0.33	0.67	0.20	0.00	1.00	0.00	0.00	0.00	0.00	0.00	
8	6	2	4	3	4	4	3	4	5	5	5	5	5	5	5	5	1	4	3	4	2	5	4	5	5	5	3	4	8	2	
Diff	3	0	5	1	1	1	0	2	2	2	3	0	0	2	4	1	0	1	1	1	1	2	1	1	3	2	1	2	4	1	
Index	1.00	0.00	0.56	0.25	0.33	0.20	0.00	1.00	0.67	0.67	1.50	0.00	0.00	0.67	4.00	0.25	0.00	0.33	0.25	0.33	0.33	0.67	0.20	0.25	1.50	0.67	0.50	1.00	1.00	1.00	
Realindex	1.00	0.00	0.56	0.25	0.33	0.20	0.00	1.00	0.67	0.67	1.50	0.00	0.00	0.67	4.00	0.25	0.00	0.33	0.25	0.33	0.33	0.67	0.20	0.25	1.50	0.67	0.50	1.00	1.00	1.00	
9	6	2	6	5	3	3	3	3	3	3	3	5	5	5	5	5	5	5	5	5	4	2	1	5	4	4	4	5	5	4	2
Diff	3	0	3	1	0	2	0	1	0	0	3	0	0	2	4	1	4	2	1	1	1	2	0	0	2	1	3	3	0	1	
Index	1.00	0.00	0.33	0.25	0.00	0.40	0.00	0.50	0.00	0.00	1.50	0.00	0.00	0.67	4.00	0.25	4.00	0.67	0.25	0.33	0.33	0.67	0.00	0.00	1.00	0.33	1.50	1.50	0.00	1.00	
Realindex	1.00	0.00	0.33	0.25	0.00	0.40	0.00	0.50	0.00	0.00	1.50	0.00	0.00	0.67	4.00	0.25	4.00	0.67	0.25	0.33	0.33	0.67	0.00	0.00	1.00	0.33	1.50	1.50	0.00	1.00	
10	6	3	6	3	3	5	5	3	4	3	3	5	5	5	5	3	1	3	5	3	2	5	4	3	3	3	4	2	8	1	
Diff	3	1	3	1	0	0	2	1	1	0	1	0	0	2	4	1	0	0	1	0	1	2	1	1	1	1	0	2	0	4	0
Index	1.00	0.50	0.33	0.25	0.00	0.00	0.67	0.50	0.33	0.00	0.50	0.00	0.00	0.67	4.00	0.25	0.00	0.00	0.25	0.00	0.33	0.67	0.20	0.25	0.50	0.00	1.00	0.00	1.00	0.00	
Realindex	1.00	0.50	0.33	0.25	0.00	0.00	0.67	0.50	0.33	0.00	0.50	0.00	0.00	0.67	4.00	0.25	0.00	0.00	0.25	0.00	0.33	0.67	0.20	0.25	0.50	0.00	1.00	0.00	1.00	0.00	

Realindex 0.44

Diff	11	3	2	3	4	3	4	3	2	4	3	4	5	5	5	5	3	1	2	3	2	3	4	4	4	5	2	4	3	4	1
Index		0	0	6	0	0	1	0	0	1	0	2	0	0	2	4	1	0	1	1	1	0	1	1	0	3	1	2	1	0	0
Realindex		0.00	0.00	0.67	0.00	0.00	0.20	0.00	0.00	0.33	0.00	1.00	0.00	0.00	0.67	4.00	0.25	0.00	0.33	0.25	0.33	0.00	0.33	0.20	0.00	1.50	0.33	1.00	0.50	0.00	0.00

Diff	12	3	1	3	3	4	5	5	2	3	3	3	4	4	4	5	3	1	1	5	5	1	1	4	4	5	5	1	2	4	1
Index		0	1	6	1	1	0	2	0	0	0	1	1	1	1	4	1	0	2	1	2	2	2	1	0	3	2	1	0	0	0
Realindex		0.00	0.50	0.67	0.25	0.33	0.00	0.67	0.00	0.00	0.00	0.50	0.20	0.20	0.33	4.00	0.25	0.00	0.67	0.25	0.67	0.67	0.67	0.20	0.00	1.50	0.67	0.50	0.00	0.00	0.00

Diff	13	3	2	6	4	5	4	4	4	3	5	2	3	2	5	3	4	1	3	4	1	4	3	5	5	3	5	3	4	2	2
Index		0	0	3	0	2	1	1	2	0	2	0	2	3	2	2	0	0	0	0	2	1	0	0	1	1	2	1	2	2	1
Realindex		0.00	0.00	0.33	0.00	0.67	0.20	0.33	1.00	0.00	0.67	0.00	0.40	0.60	0.67	2.00	0.00	0.00	0.00	0.00	0.67	0.33	0.00	0.00	0.25	0.50	0.67	0.50	1.00	0.50	1.00

Diff	14	2	2	3	5	4	4	4	5	5	5	2	4	2	4	2	4	1	2	3	2	5	2	5	4	3	4	2	5	2	1
Index		1	0	6	1	1	1	1	3	2	2	0	1	3	1	1	0	0	1	1	1	2	1	0	0	1	1	0	3	2	0
Realindex		0.33	0.00	0.67	0.25	0.33	0.20	0.33	1.50	0.67	0.67	0.00	0.20	0.60	0.33	1.00	0.00	0.00	0.33	0.25	0.33	0.67	0.33	0.00	0.00	0.50	0.33	0.00	1.50	0.50	0.00

Diff	15	2	2	6	4	3	4	3	5	3	4	1	5	1	5	1	4	1	3	4	2	4	1	5	4	2	4	3	5	4	1	
Index		1	0	3	0	0	1	0	3	0	1	1	0	4	2	0	0	0	0	0	1	1	2	0	0	0	1	1	3	0	0	
Realindex		0.33	0.00	0.33	0.00	0.00	0.20	0.00	1.50	0.00	0.33	0.50	0.00	0.80	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.33	0.67	0.00	0.00	0.00	0.33	0.50	1.50	0.00	0.00

Diff	16	3	2	12	4	4	4	3	3	5	5	2	5	1	5	4	5	1	3	3	1	4	1	5	4	3	4	4	4	2	2
Index		0	0	3	0	1	1	0	1	2	2	0	0	4	2	3	1	0	0	1	2	1	2	0	0	1	1	2	2	2	1
Realindex		0.00	0.00	0.33	0.00	0.33	0.20	0.00	0.50	0.67	0.67	0.00	0.00	0.80	0.67	3.00	0.25	0.00	0.00	0.25	0.67	0.33	0.67	0.00	0.00	0.50	0.33	1.00	1.00	0.50	1.00

Diff	17	3	1	6	3	4	5	3	5	4	4	2	3	1	5	3	4	1	2	5	1	5	3	4	5	3	5	3	3	2	2
Index		0	1	3	1	1	0	0	3	1	1	0	2	4	2	2	0	0	1	1	2	2	0	1	1	1	2	1	1	2	1
Realindex		0.00	0.50	0.33	0.25	0.33	0.00	0.00	1.50	0.33	0.33	0.00	0.40	0.80	0.67	2.00	0.00	0.00	0.33	0.25	0.67	0.67	0.00	0.20	0.25	0.50	0.67	0.50	0.50	0.50	1.00

Diff	18	1	3	12	3	4	4	2	3	4	4	2	4	4	3	4	3	1	4	4	4	4	3	4	3	2	4	3	4	4	1
Index		2	1	3	1	1	1	1	1	1	1	0	1	1	0	3	1	0	1	0	1	1	0	1	1	0	1	1	2	0	0
Realindex		0.67	0.50	0.33	0.25	0.33	0.20	0.33	0.50	0.33	0.33	0.00	0.20	0.20	0.00	3.00	0.25	0.00	0.33	0.00	0.33	0.33	0.00	0.20	0.25	0.00	0.33	0.50	1.00	0.00	0.00

Diff	19	3	2	12	4	4	4	2	3	3	5	2	4	4	4	4	4	1	3	4	5	5	3	5	3	2	4	3	3	4	2
Index		0	0	3	0	1	1	1	1	0	2	0	1	1	1	3	0	0	0	0	2	2	0	0	1	0	1	1	1	0	1
Realindex		0.00	0.00	0.33	0.00	0.33	0.20	0.33	0.50	0.00	0.67	0.00	0.20	0.20	0.33	3.00	0.00	0.00	0.00	0.00	0.67	0.67	0.00	0.00	0.25	0.00	0.33	0.50	0.50	0.00	1.00

Diff	20	3	2	12	2	4	4	2	2	3	5	2	3	4	3	4	3	1	3	5	5	4	3	5	2	3	3	3	3	6	2	
Index		0	0	3	2	1	1	1	0	0	2	0	2	1	0	3	1	0	0	1	2	1	0	0	2	1	0	1	1	1	2	1
Realindex		0.00	0.00	0.33	0.50	0.33	0.20	0.33	0.00	0.00	0.67	0.00	0.40	0.20	0.00	3.00	0.25	0.00	0.00	0.25	0.67	0.33	0.00	0.00	0.50	0.50	0.00	0.50	0.50	0.50	1.00	

Realindex 0.37

21	3	2	5	2	3	5	3	2	4	4	2	4	3	3	3	2	3	5	3	4	2	5	4	2	5	3	2	4	2	
Diff	0	0	4	2	0	0	0	0	1	1	0	1	2	0	2	1	1	0	1	0	1	1	0	0	0	2	1	0	0	1
Index	0.00	0.00	0.44	0.50	0.00	0.00	0.00	0.00	0.33	0.33	0.00	0.20	0.40	0.00	2.00	0.25	1.00	0.00	0.25	0.00	0.33	0.33	0.00	0.00	0.67	0.50	0.00	0.00	1.00	
Realindex	0.28																													

22	2	3	9	3	5	5	3	2	2	3	2	4	3	3	2	3	1	2	5	3	3	3	3	3	3	4	2	2	4	1	
Diff	1	1	0	1	2	0	0	0	0	1	0	0	1	2	0	1	1	0	1	1	0	0	0	2	1	1	1	0	0	0	0
Index	0.33	0.50	0.00	0.25	0.67	0.00	0.00	0.00	0.33	0.00	0.00	0.20	0.40	0.00	1.00	0.25	0.00	0.33	0.25	0.00	0.00	0.00	0.40	0.25	0.50	0.33	0.00	0.00	0.00	0.00	
Realindex	0.20																														

23	1	3	6	3	3	5	2	2	3	4	3	5	5	3	3	3	1	2	5	3	3	2	4	3	2	4	3	2	3	1
Diff	2	1	3	1	0	0	1	0	0	1	1	0	0	0	2	1	0	1	1	0	0	1	1	1	0	1	1	0	1	0
Index	0.67	0.50	0.33	0.25	0.00	0.00	0.33	0.00	0.00	0.33	0.50	0.00	0.00	0.00	2.00	0.25	0.00	0.33	0.25	0.00	0.00	0.33	0.20	0.25	0.00	0.33	0.50	0.00	0.25	0.00
Realindex	0.25																													

24	1	3	9	3	3	5	3	3	4	4	2	5	4	4	2	2	1	3	5	3	4	2	4	2	3	4	3	3	2	2
Diff	2	1	0	1	0	0	0	1	1	1	0	0	1	1	1	2	0	0	1	0	1	1	1	2	1	1	1	1	2	1
Index	0.67	0.50	0.00	0.25	0.00	0.00	0.00	0.50	0.33	0.33	0.00	0.00	0.20	0.33	1.00	0.50	0.00	0.00	0.25	0.00	0.33	0.33	0.20	0.50	0.50	0.33	0.50	0.50	0.50	1.00
Realindex	0.32																													

CODE	proj	unit	6	7-a	7-b	7-c	7-d	7-e	7-f	7-g	8-a	8-b	8-c	8-d	8-e	8-f	9-a	9-b	9-c	9-d	9-e	9-f	11-a	11-b	11-c	11-d	11-e	11-f	Proj	unit
25	2	3	6	3	2	5	4	2	3	4	3	3	4	4	2	4	1	4	5	4	4	3	5	2	4	5	3	3	4	1
Diff	1	1	3	1	1	0	1	0	0	1	1	2	1	1	1	0	0	1	1	1	1	0	0	2	2	2	1	1	0	0
Index	0.33	0.50	0.33	0.25	0.33	0.00	0.33	0.00	0.00	0.33	0.50	0.40	0.20	0.33	1.00	0.00	0.00	0.33	0.25	0.33	0.33	0.00	0.00	0.50	1.00	0.67	0.50	0.50	0.00	0.00
Realindex	0.31																													

CODE	3-a	3-b	3-c	3-d	3-e	3-f	4-a	4-b	4-c	4-d	5-a	5-b	5-c	5-d	5-e	5-f	5-g	5-h	6-a	6-b	6-c	6-d	6-e	
26	5	4	5	3	3	5	4	2	3	3	5	4	3	3	4	4	2	3	3	3	1	1	1	
Diff	1	3	5	5	2	2	3	4	3	2	1	3	4	4	2	3	4	3	3	3	3	2	3	1
Index	0.40	0.25	0.00	0.33	0.33	0.40	0.00	0.50	0.33	0.67	0.40	0.00	0.33	0.33	0.25	0.00	0.50	0.00	0.00	0.00	1.00	2.00	0.00	
Real index	0.46																							
2	4	4	5	2	2	5	5	3	2	1	4	4	3	1	2	5	1	5	4	4	1	3	1	
Diff	1	0	0	1	1	0	1	1	1	2	1	0	0	2	2	1	1	2	1	1	0	2	0	
Index	0.20	0.00	0.00	0.33	0.33	0.00	0.25	0.50	0.33	0.67	0.20	0.00	0.00	0.67	0.50	0.25	0.50	0.67	0.33	0.33	0.00	2.00	0.00	
Real index	0.42																							
3	3	4	5	2	3	4	4	3	1	1	4	4	3	2	3	5	4	5	4	4	2	2	1	
Diff	2	0	0	1	0	1	0	1	2	2	1	0	0	1	1	1	2	2	1	1	1	1	0	
Index	0.40	0.00	0.00	0.33	0.00	0.20	0.00	0.50	0.67	0.67	0.20	0.00	0.00	0.33	0.25	0.25	1.00	0.67	0.33	0.33	1.00	1.00	0.00	
Real index	0.42																							
4	4	4	5	2	3	3	4	4	3	3	3	3	3	2	2	4	4	3	4	3	3	4	3	
Diff	1	0	0	1	0	2	0	2	0	0	2	1	0	1	2	0	2	0	1	0	2	3	2	
Index	0.20	0.00	0.00	0.33	0.00	0.40	0.00	1.00	0.00	0.00	0.40	0.25	0.00	0.33	0.50	0.00	1.00	0.00	0.33	0.00	2.00	3.00	2.00	
Real index	0.57																							
5	5	2	3	2	2	3	5	4	3	3	4	4	3	3	2	2	4	3	4	4	2	2	2	
Diff	0	2	2	1	1	2	1	2	0	0	1	0	0	0	2	2	2	0	1	1	1	1	1	
Index	0.00	0.50	0.40	0.33	0.33	0.40	0.25	1.00	0.00	0.00	0.20	0.00	0.00	0.00	0.50	0.50	1.00	0.00	0.33	0.33	1.00	1.00	1.00	
Real index	0.55																							
6	5	5	5	5	4	3	5	4	2	2	4	3	3	4	3	4	4	2	5	5	3	3	1	
Diff	0	1	0	2	1	2	1	2	1	1	1	1	0	1	1	0	2	1	2	2	2	2	0	
Index	0.00	0.25	0.00	0.67	0.33	0.40	0.25	1.00	0.33	0.33	0.20	0.25	0.00	0.33	0.25	0.00	1.00	0.33	0.67	0.67	2.00	2.00	0.00	
Real index	0.45																							
7	4	5	5	4	5	3	5	4	4	3	5	5	4	3	2	5	5	5	5	5	3	3	1	
Diff	1	1	0	1	2	2	1	2	1	0	0	1	1	0	2	1	3	2	2	2	2	2	0	
Index	0.20	0.25	0.00	0.33	0.67	0.40	0.25	1.00	0.33	0.00	0.00	0.25	0.33	0.00	0.50	0.25	1.50	0.67	0.67	0.67	2.00	2.00	0.00	
Real index	0.51																							
8	5	5	5	2	3	5	5	4	3	3	5	5	3	3	4	5	5	5	5	4	2	2	1	
Diff	0	1	0	1	0	0	1	2	0	0	0	1	0	0	0	1	3	2	2	1	1	1	0	
Index	0.00	0.25	0.00	0.33	0.00	0.00	0.25	1.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.25	1.50	0.67	0.67	0.33	1.00	1.00	0.00	

Real index 0.59

	9	5	5	5	2	4	5	5	5	3	3	5	5	4	4	2	5	5	5	5	5	3	3	1	
Diff		0	1	0	1	1	0	1	3	0	0	0	1	1	1	2	1	3	2	2	2	2	2	2	0
Index		0.00	0.25	0.00	0.33	0.33	0.00	0.25	1.50	0.00	0.00	0.00	0.25	0.33	0.33	0.50	0.25	1.50	0.67	0.67	0.67	2.00	2.00	0.00	
Real index		1																							

	10	5	5	5	3	3	3	5	3	2	2	3	4	4	3	2	5	4	3	5	4	2	2	1
Diff		0	1	0	0	0	2	1	1	1	1	2	0	1	0	2	1	2	0	2	1	1	1	0
Index		0.00	0.25	0.00	0.00	0.00	0.40	0.25	0.50	0.33	0.33	0.40	0.00	0.33	0.00	0.50	0.25	1.00	0.00	0.67	0.33	1.00	1.00	0.00
Real index		0.52																						

	11	5	5	5	3	4	5	5	3	2	2	5	4	5	5	3	4	4	3	3	5	3	3	2
Diff		0	1	0	0	1	0	1	1	1	1	0	0	2	2	1	0	2	0	0	2	2	2	1
Index		0.00	0.25	0.00	0.00	0.33	0.00	0.25	0.50	0.33	0.33	0.00	0.00	0.67	0.67	0.25	0.00	1.00	0.00	0.00	0.67	2.00	2.00	1.00
Real index		0.48																						

	12	5	5	5	3	4	5	5	2	2	2	5	4	4	4	3	5	4	4	5	5	3	3	2
Diff		0	1	0	0	1	0	1	0	1	1	0	0	1	1	1	1	2	1	2	2	2	2	1
Index		0.00	0.25	0.00	0.00	0.33	0.00	0.25	0.00	0.33	0.33	0.00	0.00	0.33	0.33	0.25	0.25	1.00	0.33	0.67	0.67	2.00	2.00	1.00
Real index		0.47																						

	13	4	5	3	4	4	5	4	2	1	3	5	5	3	2	4	5	5	4	5	4	3	3	2
Diff		1	1	2	1	1	0	0	0	2	0	0	1	0	1	0	1	3	1	2	1	2	2	1
Index		0.20	0.25	0.40	0.33	0.33	0.00	0.00	0.00	0.67	0.00	0.00	0.25	0.00	0.33	0.00	0.25	1.50	0.33	0.67	0.33	2.00	2.00	1.00
Real index		0.42																						

	14	5	4	4	3	5	5	3	2	1	2	5	5	3	3	4	4	4	3	4	3	3	4	1
Diff																								
Index																								
Real index																								

	15	4	3	5	2	4	4	3	1	1	3	4	5	4	4	3	4	4	3	4	5	3	5	1
Diff																								
Index																								
Real index																								

	16	3	4	4	3	4	4	3	1	1	1	4	4	5	3	5	4	3	3	4	5	2	4	1
Diff																								
Index																								

Real index																								
Diff	17	4	4	4	2	4	5	4	1	1	3	5	5	3	2	4	5	5	2	3	3	1	3	1
Index																								
Real index																								
Diff	18	4	3	5	3	3	4	3	3	3	4	4	4	3	4	4	3	3	2	2	3	2	2	1
Index																								
Real index																								
Diff	19	3	3	5	2	3	4	3	2	3	5	5	4	4	3	3	4	2	2	3	4	1	2	1
Index																								
Real index																								
Diff	20	3	4	5	3	2	5	4	3	3	4	5	3	4	3	3	3	2	2	3	4	1	1	1
Index																								
Real index																								
Diff	21	4	5	5	3	3	5	4	3	3	4	5	4	3	2	3	3	2	3	2	4	2	1	1
Index																								
Real index																								
Diff	22	4	5	5	3	2	4	4	3	2	4	5	4	3	3	4	3	3	4	4	3	1	3	1
Index																								
Real index																								
Diff	23	2	4	4	4	4	3	4	2	3	3	4	4	4	2	3	4	2	3	3	5	1	1	1
Index																								
Real index																								
Diff	24	4	4	4	2	3	4	4	4	3	4	4	3	4	2	3	4	3	2	4	5	1	1	1
Index																								

Real index

	25	5	4	5	2	3	5	3	2	2	5	4	3	5	2	3	3	2	2	4	4	1	4	2	
Diff																									
Index																									
Real index	26	5	4	5	3	3	5	4	2	3	3	5	4	3	3	4	4	2	3	3	3	1	1	1	

Appendix:E, Calculation of Company Compatibility Index

6-f	6-g	6-h	6-l	6-j	6-k	6-l	6-m	7-a	7-b	7-c	7-d	8-a	8-b	8-c	late	rata	11-a	11-b	11-c	11-d	11-e	11-f	11-g	
3	4	2	2	3	3	3	3	3	4	3	5	2	5	10	7	7.00	4	3	2	2	1	1	2	2
3	2	2	4	4	2	3	3	4	2	4	2	2	5	10	7	5.00	3	4	4	2	2	3	2	2
0	2	0	2	1	1	0	0	0	0	1	1	0	0	0	0	2	1	1	2	0	1	2	0	0
0.00	0.50	0.00	1.00	0.33	0.33	0.00	0.00	0.00	0.33	0.20	0.00	0.00	0.00	0.00	0.00	0.29	0.25	0.33	1.00	0.00	1.00	2.00	0.00	0.00
4	4	1	1	1	2	3	2	3	3	5	1	3	5	4	5.00	2	3	2	4	2	3	4	4	
1	0	1	1	2	1	0	1	1	0	0	1	2	5	3	2	2	0	0	2	1	2	2	2	
0.33	0.00	0.50	0.50	0.67	0.33	0.00	0.33	0.25	0.00	0.00	0.50	0.40	0.50	0.43	0.29	0.50	0.00	0.00	1.00	1.00	2.00	1.00	1.00	
4	5	2	2	2	2	4	5	5	4	4	1	3	7	5	3.00	4	3	2	2	2	2	3	3	
1	1	0	0	1	1	1	2	1	1	1	1	2	3	2	4	0	0	0	0	1	1	1	1	
0.33	0.25	0.00	0.00	0.33	0.33	0.33	0.67	0.25	0.33	0.20	0.50	0.40	0.30	0.29	0.57	0.00	0.00	0.00	0.00	1.00	1.00	0.50	0.50	
3	5	4	4	4	3	4	4	3	5	5	1	7	14	10	40.00	7	3	4	4	2	3	4	3	
0	1	2	2	1	0	1	1	1	2	0	1	2	4	3	33	3	0	2	2	1	2	2	1	
0.00	0.25	1.00	1.00	0.33	0.00	0.33	0.33	0.25	0.67	0.00	0.50	0.40	0.40	0.43	4.71	0.75	0.00	1.00	1.00	1.00	2.00	1.00	0.50	
4	3	2	2	1	1	3	5	4	5	5	1	10	14	10	5.00	7	3	4	5	1	3	4	4	
1	1	0	0	2	2	0	2	0	2	0	1	5	4	3	2	3	0	2	3	0	2	2	2	
0.33	0.25	0.00	0.00	0.67	0.67	0.00	0.67	0.00	0.67	0.00	0.50	1.00	0.40	0.43	0.29	0.75	0.00	1.00	1.50	0.00	2.00	1.00	1.00	
3	3	4	3	4	3	3	5	5	5	5	3	5	10	5	5.00	7	3	4	3	2	2	2	2	
0	1	2	1	1	0	0	2	1	2	0	1	0	0	2	2	3	0	2	1	1	1	0	0	
0.00	0.25	1.00	0.50	0.33	0.00	0.00	0.67	0.25	0.67	0.00	0.50	0.00	0.00	0.29	0.29	0.75	0.00	1.00	0.50	1.00	1.00	0.00	0.00	
4	5	4	4	2	2	4	5	4	5	5	2	3	10	7	10.00	2	4	5	5	2	4	2	2	
1	1	2	2	1	1	1	2	0	2	0	0	2	0	0	3	2	1	3	3	1	3	0	0	
0.33	0.25	1.00	1.00	0.33	0.33	0.33	0.67	0.00	0.67	0.00	0.00	0.40	0.00	0.00	0.43	0.50	0.33	1.50	1.50	1.00	3.00	0.00	0.00	
4	5	5	2	2	2	3	5	4	5	3	1	3	14	8	10.00	5	5	5	5	3	3	2	2	
1	1	3	0	1	1	0	2	0	2	2	1	2	4	1	3	1	2	3	3	2	2	0	0	
0.33	0.25	1.50	0.00	0.33	0.33	0.00	0.67	0.00	0.67	0.40	0.50	0.40	0.40	0.14	0.43	0.25	0.67	1.50	1.50	2.00	2.00	0.00	0.00	

2	4	2	1	4	4	4	4	3	5	4	2	3	10	5	10.00	3	1	4	2	1	5	2	2
1	0	0	1	1	1	1	1	1	2	1	0	2	0	2	3	1	2	2	0	0	4	0	0
0.33	0.00	0.00	0.50	0.33	0.33	0.33	0.33	0.25	0.67	0.20	0.00	0.40	0.00	0.29	0.43	0.25	0.67	1.00	0.00	0.00	4.00	0.00	0.00
3	5	2	2	2	3	4	4	5	5	5	2	3	7	4	15.00	3	2	3	4	1	4	3	3
0	1	0	0	1	0	1	1	1	2	0	0	2	3	3	8	1	1	1	2	0	3	1	1
0.00	0.25	0.00	0.00	0.33	0.00	0.33	0.33	0.25	0.67	0.00	0.00	0.40	0.30	0.43	1.14	0.25	0.33	0.50	1.00	0.00	3.00	0.50	0.50
4	4	4	4	4	4	4	5	4	4	5	1	3	7	5	10.00	7	5	4	5	1	4	3	3
1	0	2	2	1	1	1	2	0	1	0	1	2	3	2	3	3	2	2	3	0	3	1	1
0.33	0.00	1.00	1.00	0.33	0.33	0.33	0.67	0.00	0.33	0.00	0.50	0.40	0.30	0.29	0.43	0.75	0.67	1.00	1.50	0.00	3.00	0.50	0.50
5	4	4	3	3	3	4	4	4	5	5	1	10	20	7	10.00	7	5	5	3	1	2	3	4
2	0	2	1	0	0	1	1	0	2	0	1	5	10	0	3	3	2	3	1	0	1	1	2
0.67	0.00	1.00	0.50	0.00	0.00	0.33	0.33	0.00	0.67	0.00	0.50	1.00	1.00	0.00	0.43	0.75	0.67	1.50	0.50	0.00	1.00	0.50	1.00
5	4	3	5	4	4	4	4	3	3	5	1	5	10	7	12.00	7	5	3	3	1	2	3	3
2	0	1	3	1	1	1	1	1	0	0	1	0	0	0	5	3	2	1	1	0	1	1	1
0.67	0.00	0.50	1.50	0.33	0.33	0.33	0.33	0.25	0.00	0.00	0.50	0.00	0.00	0.00	0.71	0.75	0.67	0.50	0.50	0.00	1.00	0.50	0.50
4	3	3	4	5	4	3	4	4	2	5	1	5	7	7	4.00	7	3	3	2	2	1	4	4
3	3	2	3	4	4	3	3	4	3	5	1	10	15	10	3.00	7	4	3	2	1	1	4	4
4	4	4	4	3	5	3	4	3	3	5	1	4	7	5	7.00	5	4	3	4	1	1	3	3

3 3 4 5 2 4 4 4 5 3 5 1 3 5 5 4.00 4 4 3 3 2 1 3 3

4 5 2 2 3 3 4 1 4 3 5 1 7 10 7 10.00 7 3 2 4 3 3 4 4

3 4 1 1 2 3 3 2 3 2 4 2 5 12 8 20.00 10 4 2 3 2 2 3 4

4 4 2 2 3 3 4 4 4 2 5 1 3 7 5 5.00 7 3 3 5 2 2 3 3

4 3 3 3 2 2 4 3 4 3 4 1 6 12 10 9.00 7 3 3 4 2 1 3 3

4 4 4 3 2 4 4 1 4 2 5 1 6 14 10 12.00 7 3 2 3 2 1 3 3

3 4 3 3 2 4 4 2 3 2 5 1 7 14 9 4.00 5 4 3 3 1 2 4 3

5 4 5 3 3 3 3 2 5 4 4 1 7 14 7 8.00 7 5 2 3 1 3 4 3

4 4 3 3 4 5 5 2 3 3 4 1 5 12 8 15.00 5 3 4 5 1 2 3 3

3 4 2 2 3 3 3 3 4 3 5 2 5 10 7 7.00 4 3 2 2 1 1 2 2

11-h	11-l	11-j	11-k	11-l	ppop	pdpe	14-a	14-b	14-c	14-d	14-e	14-f	14-g	14-h	14-l	15-a	15-b	15-c	15-d	16-a	16-b	16-c	aktual
3	2	2	2	3	8.00	6.00	3	2	4	3	1	2	3	5	2	2	3	2	2	60	63	60	98
4	2	1	1	1	3.00	10.00	1	1	3	5	2	1	2	3	3	10	2	5	7	10	40	15	90
1	0	1	1	2	5	4	2	1	1	2	1	1	1	2	1	8	1	3	5	50	23	45	8
0.33	0.00	0.50	0.50	0.67	0.63	0.67	0.67	0.50	0.25	0.67	1.00	0.50	0.33	0.40	0.50	4.00	0.33	1.50	2.50	0.83	0.37	0.75	0.08
5	3	4	2	4	20.00	10.00	3	2	3	5	2	2	2	3	4	5	5	2	2	30	50	25	90
2	1	2	0	1	12	4	0	0	1	2	1	0	1	2	2	3	2	0	0	30	3	35	8
0.67	0.50	1.00	0.00	0.33	1.50	0.67	0.00	0.00	0.25	0.67	1.00	0.00	0.33	0.40	1.00	1.50	0.67	0.00	0.00	0.50	0.05	0.58	0.08
5	2	2	1	4	10.00	10.00	3	4	3	3	2	2	2	4	4	10	10	1	2	15	50	20	90
2	0	0	1	1	2	4	0	2	1	0	1	0	1	1	2	8	7	1	0	45	13	40	8
0.67	0.00	0.00	0.50	0.33	0.25	0.67	0.00	1.00	0.25	0.00	1.00	0.00	0.33	0.20	1.00	4.00	2.33	0.50	0.00	0.75	0.21	0.67	0.08
4	2	2	2	3	5.00	5.00	4	4	3	4	2	1	2	3	3	5	5	5	5	20	40	25	80
1	0	0	0	0	3	1	1	2	1	1	1	1	1	2	1	3	2	3	3	40	23	35	18
0.33	0.00	0.00	0.00	0.00	0.38	0.17	0.33	1.00	0.25	0.33	1.00	0.50	0.33	0.40	0.50	1.50	0.67	1.50	1.50	0.67	0.37	0.58	0.18
4	3	1	4	4	5.00	10.00	3	3	3	5	2	2	3	5	3	5	5	10	10	30	60	40	77
1	1	1	2	1	3	4	0	1	1	2	1	0	0	0	1	3	2	8	8	30	2	20	21
0.33	0.50	0.50	1.00	0.33	0.38	0.67	0.00	0.50	0.25	0.67	1.00	0.00	0.00	0.00	0.50	1.50	0.67	4.00	4.00	0.50	0.05	0.33	0.21
4	3	2	2	1	10.00	10.00	2	2	4	5	2	2	2	4	4	3	10	5	5	30	60	35	88
1	1	0	0	2	2	4	1	0	0	2	1	0	1	1	2	1	7	3	3	30	3	25	10
0.33	0.50	0.00	0.00	0.67	0.25	0.67	0.33	0.00	0.00	0.67	1.00	0.00	0.33	0.20	1.00	0.50	2.33	1.50	1.50	0.50	0.05	0.42	0.10
5	2	1	1	2	5.00	3.00	3	1	5	5	2	2	2	5	5	5	5	1	5	24	55	40	78
2	0	1	1	1	3	3	0	1	1	2	1	0	1	0	3	3	2	1	3	36	8	20	20
0.67	0.00	0.50	0.50	0.33	0.38	0.50	0.00	0.50	0.25	0.67	1.00	0.00	0.33	0.00	1.50	1.50	0.67	0.50	1.50	0.60	0.13	0.33	0.20
5	5	4	2	3	15.00	10.00	3	2	5	5	3	2	2	4	3	5	15	3	10	12	20	15	75
2	3	2	0	0	7	4	0	0	1	2	2	0	1	1	1	3	12	1	8	48	43	45	23
0.67	1.50	1.00	0.00	0.00	0.88	0.67	0.00	0.00	0.25	0.67	2.00	0.00	0.33	0.20	0.50	1.50	4.00	0.50	4.00	0.80	0.68	0.75	0.23

5	2	1	1	1	10.00	5.00	1	2	5	5	2	1	1	5	5	5	15	5	5	17	30	20	87
2	0	1	1	2	2	1	2	0	1	2	1	1	2	0	3	3	12	3	3	43	33	40	11
0.67	0.00	0.50	0.50	0.67	0.25	0.17	0.67	0.00	0.25	0.67	1.00	0.50	0.67	0.00	1.50	1.50	4.00	1.50	1.50	0.72	0.52	0.67	0.11
4	2	2	2	2	10.00	10.00	4	4	4	5	3	2	2	4	4	10	5	5	10	14	20	20	90
1	0	0	0	1	2	4	1	2	0	2	2	0	1	1	2	8	2	3	8	46	43	40	8
0.33	0.00	0.00	0.00	0.33	0.25	0.67	0.33	1.00	0.00	0.67	2.00	0.00	0.33	0.20	1.00	4.00	0.67	1.50	4.00	0.77	0.68	0.67	0.08
5	1	1	1	3	5.00	10.00	3	2	4	4	2	2	2	5	5	3	2	5	5	30	40	37	95
2	1	1	1	0	3	4	0	0	0	1	1	0	1	0	3	1	1	3	3	30	23	23	3
0.67	0.50	0.50	0.50	0.00	0.38	0.67	0.00	0.00	0.00	0.33	1.00	0.00	0.33	0.00	1.50	0.50	0.33	1.50	1.50	0.50	0.37	0.38	0.03
5	2	2	3	3	10.00	20.00	4	4	5	5	2	2	3	4	4	1	2	1	5	30	40	36	86
2	0	0	1	0	2	14	1	2	1	2	1	0	0	1	2	1	1	1	3	30	23	24	12
0.67	0.00	0.00	0.50	0.00	0.25	2.33	0.33	1.00	0.25	0.67	1.00	0.00	0.00	0.20	1.00	0.50	0.33	0.50	1.50	0.50	0.37	0.40	0.12
4	2	3	2	3	12.00	10.00	3	2	4	5	3	3	4	4	2	5	3	5	2	23	30	30	96
1	0	1	0	0	4	4	0	0	0	2	2	1	1	1	0	3	0	3	0	37	33	30	2
0.33	0.00	0.50	0.00	0.00	0.50	0.67	0.00	0.00	0.00	0.67	2.00	0.50	0.33	0.20	0.00	1.50	0.00	1.50	0.00	0.62	0.52	0.50	0.02
3	3	3	3	2	20.00	5.00	3	2	5	5	2	3	5	5	3	10	5	5	6	10	15	12	94
5	3	3	3	2	5.00	5.00	3	3	5	5	3	3	3	5	2	3	4	5	2	20	26	22	92
5	3	2	2	3	5.00	4.00	2	3	4	5	1	2	5	5	2	2	4	7	3	20	30	24	95

5 2 4 1 3 14.00 3.00 3 2 3 5 2 3 4 4 1 5 6 5 3 15 20 17 94

4 3 2 2 4 3.00 5.00 3 3 4 3 1 3 4 5 2 2 1 3 2 25 30 30 87

4 4 3 3 3 6.00 12.00 3 3 5 2 2 2 4 5 3 2 5 4 5 30 40 32 79

4 4 3 2 4 6.00 7.00 3 3 5 4 2 2 3 4 3 1 9 2 5 25 50 30 90

5 4 4 1 4 4.00 4.00 3 3 5 4 2 2 2 4 2 1 3 3 3 60 65 60 83

4 4 3 1 3 8.00 9.00 3 3 5 3 2 3 2 4 2 1 2 8 4 55 60 60 94

3 3 3 1 3 10.00 15.00 3 3 4 2 3 2 2 3 1 1 5 6 4 40 45 40 89

4 5 4 2 3 5.00 5.00 2 3 3 4 2 3 4 4 1 3 7 10 7 35 45 42 78

3 2 2 2 5 7.00 8.00 3 3 4 2 1 2 3 5 1 2 10 5 5 60 65 60 93

3 2 2 2 3 8.00 6.00 3 2 4 3 1 2 3 5 2 2 3 2 2 60 63 60 98

CODE	1-a	1-b	1-c	1-d	1-e	1-f	1-g	1-h	1-l	1-j	1-k	1-l	1-m	1-n	own	beli	4-a	4-b	4-c	4-d	4-e	4-f	4-g	supply	
26	4	4	4	3	4	4	2	4	4	2	4	4	2	4	25.00	50.00	4	4	2	2	2	4	3	350	
Diff	1	1	1	4	3	1	1	2	3	3	1	3	2	3	5	55.00	15.00	5	3	3	3	2	2	5	
Index	0.75	0.75	0.00	0.00	0.75	0.75	0.00	0.25	0.25	0.50	0.25	0.50	0.50	0.25	1.20	0.70	0.25	0.25	0.50	0.50	0.00	0.25	0.67	0.99	
Real index	0.45																								
2	3	3	5	5	2	1	2	2	2	5	2	4	4	3	4	70.00	10.00	3	3	5	5	3	4	4	5
Diff	1	1	1	2	2	3	0	2	1	0	0	0	1	0	45	40	1	1	3	3	1	0	1	345	
Index	0.25	0.25	0.25	0.67	0.5	0.75	0	0.5	0.25	0	0	0	0.5	0	1.8	0.8	0.25	0.25	1.5	1.5	0.5	0	0.33	0.99	
Real index	0.48																								
3	1	1	4	3	3	2	2	2	2	3	1	4	3	4	3	80.00	20.00	4	4	4	4	3	3	3	10
Diff	3	3	0	0	1	2	0	2	1	1	0	1	2	1	55	30	0	0	2	2	1	1	0	340	
Index	0.75	0.75	0	0.00	0.25	0.5	0	0.5	0.25	0.5	0	0.25	1	0.25	2.2	0.6	0	0	1	1	0.5	0.25	0.00	0.97	
Real index	0.50723037																								
4	1	1	4	3	1	1	1	1	1	3	1	3	3	2	3	60.00	30.00	4	4	4	5	2	3	3	15
Diff	3	3	0	0	3	3	1	3	1	1	1	1	0	1	35	20	0	0	2	3	0	1	0	335	
Index	0.75	0.75	0	0.00	0.75	0.75	0.5	0.75	0.25	0.5	0.25	0.25	0	0.25	1.4	0.4	0	0	1	1.5	0	0.25	0.00	0.96	
Real index	0.50																								
5	1	2	4	4	3	3	2	2	2	5	2	5	5	3	4	95.00	25.00	5	5	5	5	4	5	3	10
Diff	3	2	0	1	1	1	0	2	1	0	1	1	1	1	0	70	25	1	1	3	3	2	1	0	340
Index	0.75	0.5	0	0.33	0.25	0.25	0	0.5	0.25	0	0.25	0.25	0.5	0	2.8	0.5	0.25	0.25	1.5	1.5	1	0.25	0.00	0.97	
Real index	0.536976796																								
6	3	3	5	3	3	3	2	2	2	2	2	4	4	3	3	75.00	15.00	5	4	3	4	3	4	2	10
Diff	1	1	1	0	1	1	0	2	2	2	0	0	0	1	1	50	35	1	0	1	2	1	0	1	340
Index	0.25	0.25	0.25	0.00	0.25	0.25	0	0.5	0.5	0	0	0	0.5	0.25	2	0.7	0.25	0	0.5	1	0.5	0	0.33	0.97	
Real index	0.42																								
7	2	2	5	5	4	4	2	2	2	5	4	5	5	4	5	90.00	25.00	4	5	5	5	3	5	5	7
Diff	2	2	1	2	0	0	0	2	1	2	1	1	2	1	65	25	0	1	3	3	1	1	2	343	
Index	0.5	0.5	0.25	0.67	0	0	0	0.5	0.25	1	0.25	0.25	1	0.25	2.6	0.5	0	0.25	1.5	1.5	0.5	0.25	0.67	0.98	
Real index	0.57																								
8	1	1	4	4	2	2	2	2	2	4	5	5	5	4	3	75.00	15.00	5	5	4	5	2	5	3	10
Diff	3	3	0	1	2	2	0	2	0	3	1	1	2	1	50	35	1	1	2	3	0	1	0	340	
Index	0.75	0.75	0	0.33	0.5	0.5	0	0.5	0	1.5	0.25	0.25	1	0.25	2	0.7	0.25	0.25	1	1.5	0	0.25	0.00	0.97	

Real index 0.56

	9	1	1	3	3	2	3	2	1	4	4	4	4	2	4	80.00	10.00	5	5	3	4	3	5	3	20
Diff		3	3	1	0	2	1	0	3	0	2	0	0	0	0	55	40	1	1	1	2	1	1	0	330
Index		0.75	0.75	0.25	0.00	0.5	0.25	0	0.75	0	1	0	0	0	0	2.2	0.8	0.25	0.25	0.5	1	0.5	0.25	0.00	0.94
Real index		0.46																							

	10	1	1	5	4	2	2	1	1	4	1	4	4	3	3	95.00	20.00	4	4	4	5	2	4	3	15
Diff		3	3	1	1	2	2	1	3	0	1	0	0	1	1	70	30	0	0	2	3	0	0	0	335
Index		0.75	0.75	0.25	0.33	0.5	0.5	0.5	0.75	0	0.5	0	0	0.5	0.25	2.8	0.6	0	0	1	1.5	0	0	0.00	0.96
Real index		0.53																							

	11	2	2	4	4	3	3	4	5	5	5	5	5	3	4	65.00	20.00	5	4	4	4	4	5	5	10
Diff		2	2	0	1	1	1	2	1	1	3	1	1	1	0	40	30	1	0	2	2	2	1	2	340
Index		0.5	0.5	0	0.33	0.25	0.25	1	0.25	0.25	1.5	0.25	0.25	0.5	0	1.6	0.6	0.25	0	1	1	1	0.25	0.67	0.97
Real index		0.58																							

	12	2	2	4	4	3	3	3	3	4	3	3	4	2	2	90.00	25.00	5	5	3	4	5	5	4	5
Diff		2	2	0	1	1	1	1	1	0	1	1	0	0	2	65	25	1	1	1	2	1	1	1	345
Index		0.5	0.5	0	0.33	0.25	0.25	0.5	0.25	0	0.5	0.25	0	0	0.5	2.6	0.5	0.25	0.25	0.5	1	0.5	0.25	0.33	0.99
Real index		0.48																							

	13	3	3	4	4	3	2	3	3	4	3	4	5	3	3	75.00	30.00	5	5	3	4	3	5	3	30
Diff		1	1	0	1	1	2	1	1	0	1	0	1	1	1	50	20	1	1	1	2	1	1	0	320
Index		0.25	0.25	0	0.33	0.25	0.5	0.5	0.25	0	0.5	0	0.25	0.5	0.25	2	0.4	0.25	0.25	0.5	1	0.5	0.25	0.00	0.91
Real index		0.42																							

	14	3	3	4	3	3	2	3	3	3	3	5	5	3	2	60.00	20.00	5	5	3	4	3	4	2	20
Diff		1	1	0	0	1	2	1	1	1	1	1	1	1	2	35	30	1	1	1	2	1	0	1	330
Index		0.25	0.25	0	0.00	0.25	0.5	0.5	0.25	0.25	0.5	0.25	0.25	0.5	0.5	1.4	0.6	0.25	0.25	0.5	1	0.5	0	0.33	0.94
Real index		0.40																							

	15	4	3	5	4	3	3	3	3	5	3	5	4	3	2	85.00	25.00	4	5	4	4	3	3	2	10
Diff		0	1	1	1	1	1	1	1	1	1	1	0	1	2	60	25	0	1	2	2	1	1	1	340
Index		0	0.25	0.25	0.33	0.25	0.25	0.5	0.25	0.25	0.5	0.25	0	0.5	0.5	2.4	0.5	0	0.25	1	1	0.5	0.25	0.33	0.97
Real index		0.46																							

	16	2	3	5	5	2	3	3	3	3	4	4	4	2	2	90.00	35.00	5	5	4	3	4	4	4	5
Diff		2	1	1	2	2	1	1	1	1	2	0	0	0	2	65	15	1	1	2	1	2	0	1	345
Index		0.5	0.25	0.25	0.67	0.5	0.25	0.5	0.25	0.25	1	0	0	0	0.5	2.6	0.3	0.25	0.25	1	0.5	1	0	0.33	0.99

Real index 0.48

17	3	3	5	4	3	2	4	3	3	2	5	5	3	2	95.00	15.00	5	5	4	5	3	4	4	15
Diff	1	1	1	1	1	2	2	1	1	0	1	1	1	2	70	35	1	1	2	3	1	0	1	335
Index	0.25	0.25	0.25	0.33	0.25	0.5	1	0.25	0.25	0	0.25	0.25	0.5	0.5	2.8	0.7	0.25	0.25	1	1.5	0.5	0	0.33	0.96
Real index	0.51																							

18	2	5	5	3	3	1	3	3	5	3	4	3	3	3	76.00	20.00	5	5	3	5	3	4	3	25
Diff	2	1	1	0	1	3	1	1	1	1	0	1	1	1	51	30	1	1	1	3	1	0	0	325
Index	0.5	0.25	0.25	0.00	0.25	0.75	0.5	0.25	0.25	0.5	0	0.25	0.5	0.25	2.04	0.6	0.25	0.25	0.5	1.5	0.5	0	0.00	0.93
Real index	0.47																							

19	2	4	5	4	2	3	3	4	5	2	5	4	3	2	68.00	25.00	5	4	2	4	2	4	2	32
Diff	2	0	1	1	2	1	1	0	1	0	1	0	1	2	43	25	1	0	0	2	0	0	1	318
Index	0.5	0	0.25	0.33	0.5	0.25	0.5	0	0.25	0	0.25	0	0.5	0.5	1.72	0.5	0.25	0	0	1	0	0	0.33	0.91
Real index	0.40																							

20	3	3	5	4	2	4	3	4	5	2	4	4	3	2	78.00	10.00	5	4	4	4	2	4	2	12
Diff	1	1	1	1	2	0	1	0	1	0	0	0	1	2	53	40	1	0	2	2	0	0	1	338
Index	0.25	0.25	0.25	0.33	0.5	0	0.5	0	0.25	0	0	0	0.5	0.5	2.12	0.8	0.25	0	1	1	0	0	0.33	0.97
Real index	0.44																							

21	3	3	4	4	2	3	3	3	5	2	4	4	3	2	94.00	34.00	5	4	4	4	2	4	1	30
Diff	1	1	0	1	2	1	1	1	1	0	0	0	1	2	69	16	1	0	2	2	0	0	2	320
Index	0.25	0.25	0	0.33	0.5	0.25	0.5	0.25	0.25	0	0	0	0.5	0.5	2.76	0.32	0.25	0	1	1	0	0	0.67	0.91
Real index	0.46																							

22	3	3	4	4	2	2	3	3	4	2	4	3	3	2	85.00	26.00	5	5	3	4	3	4	1	26
Diff	1	1	0	1	2	2	1	1	0	0	0	1	1	2	60	24	1	1	1	2	1	0	2	324
Index	0.25	0.25	0	0.33	0.5	0.5	0.5	0.25	0	0	0	0.25	0.5	0.5	2.4	0.48	0.25	0.25	0.5	1	0.5	0	0.67	0.93
Real index	0.45																							

23	3	3	3	4	3	1	3	4	4	2	5	3	4	1	75.00	28.00	4	5	3	4	3	3	4	21
Diff	1	1	1	1	1	3	1	0	0	0	1	1	2	3	50	22	0	1	1	2	1	1	1	329
Index	0.25	0.25	0.25	0.33	0.25	0.75	0.5	0	0	0	0.25	0.25	1	0.75	2	0.44	0	0.25	0.5	1	0.5	0.25	0.33	0.94
Real index	0.46																							

24	3	5	4	5	3	1	5	2	4	2	5	3	2	1	92.00	19.00	5	5	3	4	2	3	3	27
Diff	1	1	0	2	1	3	3	2	0	0	1	1	0	3	67	31	1	1	1	2	0	1	0	323
Index	0.25	0.25	0	0.67	0.25	0.75	1.5	0.5	0	0	0.25	0.25	0	0.75	2.68	0.62	0.25	0.25	0.5	1	0	0.25	0.00	0.92

Real index 0.51

	25	2	5	4	3	4	1	4	3	5	3	5	5	2	2	76.00	17.00	5	4	3	4	1	4	4	20
Diff		2	1	0	0	0	3	2	1	1	1	1	1	0	2	51	33	1	0	1	2	1	0	1	330
Index		0.5	0.25	0	0.00	0	0.75	1	0.25	0.25	0.5	0.25	0.25	0	0.5	2.04	0.66	0.25	0	0.5	1	0.5	0	0.33	0.94
Real index		0.47																							

18-a	18-b	18-c	on-t	time	akurat
65	68	65	91.00	100.00	95.00
20	60	50	95.00	95.00	100.00
45	8	15	4	5	5
0.69	0.12	0.23	0.04	0.05	0.05

30	60	45	85.00	75.00	85.00
35	8	20	6	25	10
0.54	0.12	0.31	0.07	0.25	0.11

20	60	50	63.00	70.00	95.00
45	8	15	28	30	0
0.69	0.12	0.23	0.31	0.30	0.00

30	50	50	30.00	75.00	95.00
35	18	15	61	25	0
0.54	0.26	0.23	0.67	0.25	0.00

30	70	40	5.00	95.00	100.00
35	2	25	86	5	5
0.54	0.03	0.38	0.95	0.05	0.05

30	60	55	15.00	80.00	90.00
35	8	10	76	20	5
0.54	0.12	0.15	0.84	0.20	0.05

30	60	55	80.00	90.00	95.00
35	8	10	11	10	0
0.54	0.12	0.15	0.12	0.10	0.00

20	30	30	70.00	80.00	85.00
45	38	35	21	20	10
0.69	0.56	0.54	0.23	0.20	0.11

20	30	24	95.00	100.00	100.00
45	38	41	4	0	5
0.69	0.56	0.63	0.04	0.00	0.05

20	30	27	95.00	80.00	90.00
45	38	38	4	20	5
0.69	0.56	0.58	0.04	0.20	0.05

35	60	45	90.00	100.00	95.00
30	8	20	1	0	0
0.46	0.12	0.31	0.01	0.00	0.00

40	60	45	70.00	100.00	90.00
25	8	20	21	0	5
0.38	0.12	0.31	0.23	0.00	0.05

30	40	35	89.00	100.00	95.00
35	28	30	2	0	0
0.54	0.41	0.46	0.02	0.00	0.00

15	20	17	73.00	100.00	95.00
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25	30	24	95.00	95.00	85.00
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25	35	30	75.00	100.00	90.00
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20	30	24	85.00	100.00	95.00
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35	40	40	89.00	100.00	100.00
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35	40	38	94.00	87.00	100.00
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45	50	50	85.00	100.00	95.00
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70	72	70	78.00	100.00	87.00
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70	75	73	89.00	100.00	100.00
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55	60	55	93.00	100.00	100.00
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50	57	56	82.00	87.00	90.00
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68	70	69	97.00	100.00	100.00
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65	68	65	91.00	100.00	95.00
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8-a	8-b	8-c	total
1080	1296	2538	800.00
1000	300	2000	250.00
80	996	538	550
0.07	0.77	0.21	0.69

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1035	550	2500	100.00
45	746	38	700
0.04	0.58	0.01	0.88

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450	563	902	90.00
630	733	1636	710
0.58	0.57	0.64	0.89

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500	600	900	50.00
580	696	1638	750
0.54	0.54	0.65	0.94

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450	890	1500	100.00
630	406	1038	700
0.58	0.31	0.41	0.88

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329	764	1290	50.00
751	532	1248	750
0.70	0.41	0.49	0.94

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788	900	1300	150.00
292	396	1238	650
0.27	0.31	0.49	0.81

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600	700	1200	100.00
480	596	1338	700
0.44	0.46	0.53	0.88

734	678	1876	100.00
346	618	662	700
0.32	0.48	0.26	0.88

350	700	1500	150.00
730	596	1038	650
0.68	0.46	0.41	0.81

200	430	600	200.00
880	866	1938	600
0.81	0.67	0.76	0.75

500	500	1679	150.00
580	796	859	650
0.54	0.61	0.34	0.81

400	700	1050	550.00
680	596	1488	250
0.63	0.46	0.59	0.31

670	890	1700	700.00
410	406	838	100
0.38	0.31	0.33	0.13

550	1120	1500	300.00
530	176	1038	500
0.49	0.14	0.41	0.63

539	1200	1700	400.00
541	96	838	400
0.50	0.07	0.33	0.50

700	1500	1600	500.00
380	204	938	300
0.35	0.16	0.37	0.38

670	786	1099	200.00
410	510	1439	600
0.38	0.39	0.57	0.75

450	250	540	450.00
630	1046	1998	350
0.58	0.81	0.79	0.44

321	563	890	300.00
759	733	1648	500
0.70	0.57	0.65	0.63

458	783	900	250.00
622	513	1638	550
0.58	0.40	0.65	0.69

700	800	1500	320.00
380	496	1038	480
0.35	0.38	0.41	0.60

678	453	2100	255.00
402	843	438	545
0.37	0.65	0.17	0.68

453	580	670	320.00
627	716	1868	480
0.58	0.55	0.74	0.60

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260	760	1200	280.00
820	536	1338	520
0.76	0.41	0.53	0.65

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CAL-1 CODE	STK	CAL-2 CODE	3-a	CAL-3 CODE	proj	CAL-4 CODE	3-a	CAL-5 CODE	1-a
26	80	26	5	26	3	26	5	26	4
1	13	1	3	1	3	1	3	1	1
Diff	67	Diff	2	Diff	0	Diff	2	Diff	3
index	0.84	Index	0.40	Index	0.00	Index	0.40	Index	0.75
real index	0.43	Realindex	0.34	Realindex	0.34	Real index	0.46	Real index	0.45
2	0	2	3	2	1	2	4	2	3
Diff	80	Diff	2	Diff	2	Diff	1	Diff	1
Index	1	Index	0.4	Index	0.666667	Index	0.2	Index	0.25
Real index	0.61	Realindex	0.43	Realindex	0.40	Real index	0.42	Real index	0.48
3	10	3	3	3	3	3	3	3	1
Diff	70	Diff	2	Diff	0	Diff	2	Diff	3
Index	0.875	Index	0.4	Index	0	Index	0.4	Index	0.75
Real index	0.55	Real index	0.36	Realindex	0.31	Real index	0.42	Real index	0.51
4	85	4	3	4	5	4	4	4	1
Diff	5	Diff	2	Diff	2	Diff	1	Diff	3
Index	0.0625	Index	0.4	Index	0.666667	Index	0.2	Index	0.75
Real index	0.36	Realindex	0.31	Realindex	0.24	Real index	0.57	Real index	0.50
5	95	5	2	5	3	5	5	5	1
Diff	15	Diff	3	Diff	0	Diff	0	Diff	3
Index	0.1875	Index	0.6	Index	0	Index	0	Index	0.75
Real Index	0.33	Realindex	0.29	Realindex	0.32	Real index	0.55	Real index	0.54
6	100	6	4	6	3	6	5	6	3
Diff	20	Diff	1	Diff	0	Diff	0	Diff	1
Index	0.25	Index	0.2	Index	0	Index	0	Index	0.25
Real index	0.38	Realindex	0.37	Realindex	0.50	Real index	0.45	Real index	0.42
7	50	7	3	7	3	7	4	7	2
Diff	30	Diff	2	Diff	0	Diff	1	Diff	2

Index	0.375	Index	0.4	Index	0	Index	0.2	Index	0.5
Real index	0.40	Realindex	0.38	Realindex	0.40	Real index	0.51	Real index	0.57
8	75	8	4	8	6	8	5	8	1
Diff	5	Diff	1	Diff	3	Diff	0	Diff	3
Index	0.06	Index	0.20	Index	1.00	Index	0.00	Index	0.75
Real index	0.94	Realindex	0.32	Realindex	0.64	Real index	0.59	Real index	0.56
9	85	9	5	9	6	9	5	9	1
Diff	5	Diff	0	Diff	3	Diff	0	Diff	3
Index	0.06	Index	0.00	Index	1.00	Index	0.00	Index	0.75
Real index	0.33	Realindex	0.47	Realindex	0.68	Real index	0.55	Real index	0.46
10	80	10	5	10	6	10	5	10	1
Diff	0	Diff	0	Diff	3	Diff	0	Diff	3
Index	0.00	Index	0.00	Index	1.00	Index	0.00	Index	0.75
Real index	0.29	Realindex	0.35	Realindex	0.44	Real index	0.52	Real index	0.53
11	80	11	5	11	3	11	5	11	2
Diff	0	Diff	0	Diff	0	Diff	0	Diff	2
Index	0.00	Index	0.00	Index	0.00	Index	0.00	Index	0.50
Real index	0.41	Realindex	0.30	Realindex	0.40	Real index	0.48	Real index	0.58
12	95	12	4	12	3	12	5	12	2
Diff	15	Diff	1	Diff	0	Diff	0	Diff	2
Index	0.19	Index	0.20	Index	0.00	Index	0.00	Index	0.50
Real index	0.40	Realindex	0.43	Realindex	0.46	Real index	0.47	Real index	0.48
13	0	13	3	13	3	13	4	13	3
Diff	80	Diff	2	Diff	0	Diff	1	Diff	1
Index	1.00	Index	0.40	Index	0.00	Index	0.20	Index	0.25
Real index	0.57	Realindex	0.36	Realindex	0.41	Real index	0.42	Real index	0.42
14	0	14	4	14	2	14	5	14	3
Diff	80	Diff	1	Diff	1	Diff		Diff	1
Index	1.00	Index	0.20	Index	0.33	Index		Index	0.25

Real index	0.55	Realindex	0.56	Realindex	0.39	Real index		Real index	0.40
15	30	15	4	15	2	15	4	15	4
Diff	50	Diff	1	Diff	1	Diff		Diff	0
Index	0.63	Index	0.20	Index	0.33	Index		Index	0.00
Real index	0.52	Realindex	0.48	Realindex	0.28	Real index		Real index	0.46
16	0	16	3	16	3	16	3	16	2
Diff	80	Diff	2	Diff	0	Diff		Diff	2
Index	1	Index	0.4	Index	0	Index		Index	0.5
Real index	0.39913	Realindex	0.484446	Realindex	0.455556	Real index		Real index	0.483603
17	0	17	5	17	3	17	4	17	3
Diff	80	Diff	0	Diff	0	Diff		Diff	1
Index	1.00	Index	0.00	Index	0.00	Index		Index	0.25
Real index	0.56	Realindex	0.41	Realindex	0.45	Real index		Real index	0.51
18	25	18	4	18	1	18	4	18	2
Diff	55	Diff	1	Diff	2	Diff		Diff	2
Index	0.69	Index	0.20	Index	0.67	Index		Index	0.50
Realindex	0.39	Realindex	0.27	Realindex	0.36	Real index		Real index	0.47
19	20	19	5	19	3	19	3	19	2
Diff	60	Diff	0	Diff	0	Diff		Diff	2
Index	0.75	Index	0.00	Index	0.00	Index		Index	0.50
Realindex	0.40	Realindex	0.32	Realindex	0.33	Real index		Real index	0.40
20	25	20	5	20	3	20	3	20	3
Diff	55	Diff	0	Diff	0	Diff		Diff	1
Index	0.69	Index	0.00	Index	0.00	Index		Index	0.25
Realindex	0.34	Realindex	0.28	Realindex	0.37	Real index		Real index	0.44
21	10	21	5	21	3	21	4	21	3
Diff	70	Diff	0	Diff	0	Diff		Diff	1
Index	0.88	Index	0.00	Index	0.00	Index		Index	0.25
Realindex	0.38	Realindex	0.24	Realindex	0.28	Real index		Real index	0.46

Diff	22	0	22	5	22	2	22	4	22	3
Index	80	1.00	Diff	0	Diff	1	Diff	22	1	
Realindex	0.46	Realindex	0.23	Realindex	0.20	Real index	Real index	0.25	0.45	
Diff	23	5	23	4	23	1	23	2	23	3
Index	75	0.94	Diff	1	Diff	2	Diff	23	1	
realindex	0.48	Realindex	0.29	Realindex	0.25	Real index	Real index	0.25	0.46	
Diff	24	16	24	4	24	1	24	4	24	3
Index	64	0.80	Diff	1	Diff	2	Diff	24	1	
Realindex	0.43	Realindex	0.35	Realindex	0.32	Real index	Real index	0.25	0.51	
CODE	STK	CODE	3-a	CODE	proj	CODE	3-a	CODE	1-a	
Diff	25	22	25	5	25	2	25	5	25	2
Index	58	0.73	Diff	0	Diff	1	Diff	25	2	
Realindex	0.34	Realindex	0.23	Realindex	0.31	Real index	Real index	0.5	0.47	

CODE	REAL INDEX
1	0.4035
2	0.4675
3	0.4303
4	0.3962
5	0.4025
6	0.4264
7	0.4531
8	0.6107
9	0.5006
10	0.4251
11	0.4316
12	0.4460
13	0.4384
14	0.3809
15	0.3483
16	0.3645
17	0.3858
18	0.2978
19	0.2900
20	0.2856
21	0.2718
22	0.2691
23	0.2979
24	0.3224
25	0.2677

RANK

RANK	CODE	REAL INDEX
1	25	0.2677
2	22	0.2691
3	21	0.2718
4	20	0.2856
5	19	0.2900
6	18	0.2978
7	23	0.2979
8	24	0.3224
9	15	0.3483
10	16	0.3645
11	14	0.3809
12	17	0.3858
13	4	0.3962
14	5	0.4025
15	1	0.4035
16	10	0.4251
17	6	0.4264
18	3	0.4303
19	11	0.4316
20	13	0.4384
21	12	0.4460
22	7	0.4531
23	2	0.4675
24	9	0.5006
25	8	0.6107

CODE	STK	ORDER	17-A	17-b	17-f	19-b	19-c	19-d	19-e	
	26	80.00	20.00	4	5	5	5	4	3	4
	4	85.00	15.00	5	5	5	3	3	4	4
Diff		5	5	1	0	0	2	1	1	0
Index		0.06	0.25	0.25	0.00	0.00	0.40	0.25	0.33	0.00
Real index		0.17								

	9	85.00	15.00	5	5	5	5	4	4	5
Diff		5.00	5.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00
Index		0.06	0.25	0.25	0.00	0.00	0.00	0.00	0.33	0.25
Real index		0.13								

	10	80.00	20.00	5	4	5	5	4	3	4
Diff		0.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
Index		0.00	0.00	0.25	0.20	0.00	0.00	0.00	0.00	0.00
Real index		0.05								

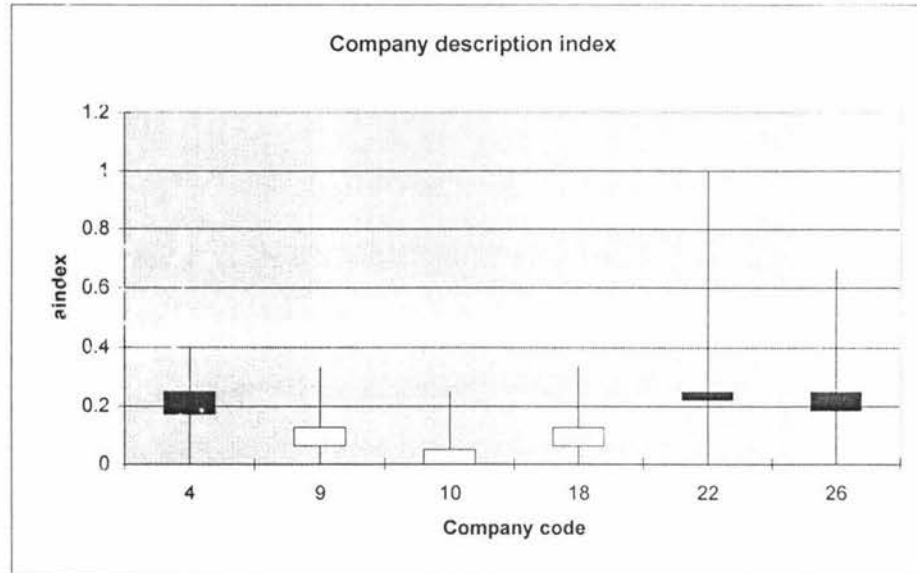
	18	75.00	25.00	5	5	5	5	4	4	5
Diff		5.00	5.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00
Index		0.06	0.25	0.25	0.00	0.00	0.00	0.00	0.33	0.25
Realindex:		0.13								

	22	100.00	0.00	5	5	5	5	3	3	5
Diff		20.00	20.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Index		0.25	1.00	0.25	0.00	0.00	0.00	0.25	0.00	0.25
Realindex		0.22								

	26	80.00	20.00	4	5	5	5	4	3	4
ideal #		100.00	20.00	5	5	5	5	5	5	5
Diff		20	0	1	0	0	0	1	2	1
Index		0.25	0.00	0.25	0.00	0.00	0.00	0.25	0.67	0.25
Real index		0.19								

	4	9	10
	Row1		
C. Code	4	9	10
Mean	0.171759	0.127315	0.05
Standard Error	0.052309	0.046642	0.033333
Median	0.25	0.0625	0
Mode	0.25	0	0
Standard Deviation	0.156926	0.139927	0.1
Sample Variance	0.024626	0.019579	0.01
Kurtosis	-1.80588	-2.09119	1.1875
Skewness	0.043221	0.337721	1.6875
Range	0.4	0.333333	0.25
Minimum	0	0	0
Maximum	0.4	0.333333	0.25
Sum	1.545833	1.145833	0.45
Count	9	9	9
Confidence Level(95,0%)	0.120624	0.107557	0.076867

	4	9	10
median	0.25	0.0625	0
max	0.4	0.333333	0.25
min	0	0	0
mean	0.171759	0.127315	0.05



10

18	22	26
0.127315	0.222222	0.185185
0.046642	0.105775	0.073201
0.0625	0.25	0.25
0	0.25	0.25
0.139927	0.317324	0.219603
0.019579	0.100694	0.048225
-2.09119	5.35383	2.168229
0.337721	2.146181	1.324904
0.333333	1	0.666667
0	0	0
0.333333	1	0.666667
1.145833	2	1.666667
9	9	9
0.107557	0.243917	0.168802

18	22	26
0.0625	0.25	0.25
0.333333	1	0.666667
0	0	0
0.127315	0.222222	0.185185

CODE	3-a	3-b	3-c	5-b	5-c	5-f	6-a	6-l	6-j	7-a	7-b	7-c	11-a	11-b	11-h	14-c	14-d	14-h
26	5	4	5	4	3	4	3	2	3	4	3	5	3	2	3	4	3	5
Diff	4	4	5	3	3	4	4	4	4	3	5	5	3	4	4	3	4	3
Diff	1	0	0	1	0	0	1	2	1	1	2	0	0	2	1	1	1	2
Index	0.20	0.00	0.00	0.25	0.00	0.00	0.33	1.00	0.33	0.25	0.67	0.00	0.00	1.00	0.33	0.25	0.33	0.40
Real index	0.30																	

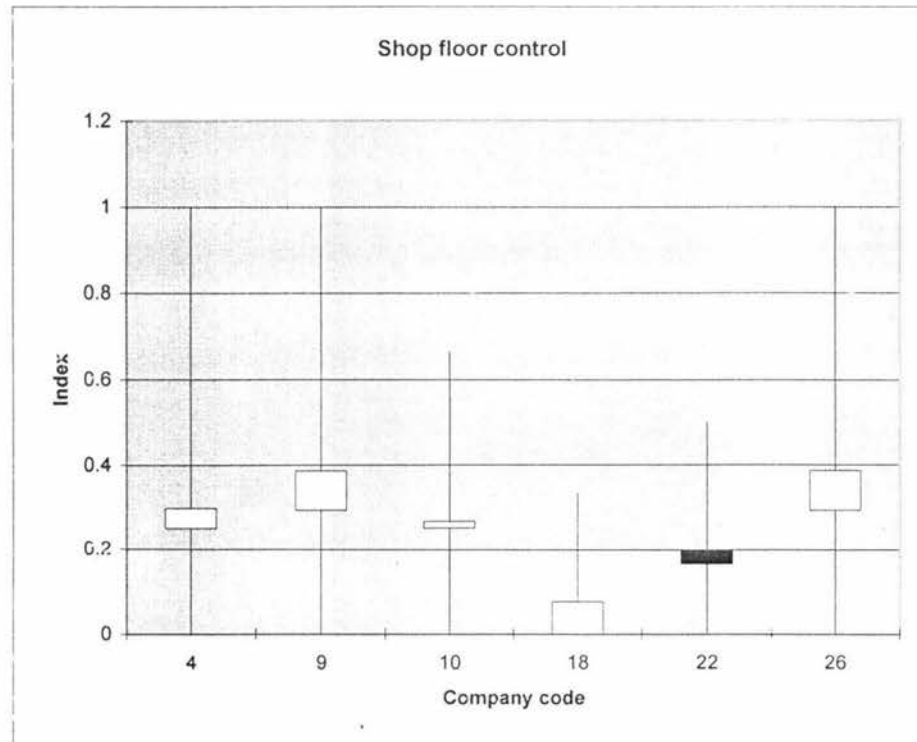
9	5	5	5	5	4	5	5	1	4	3	5	4	1	4	5	5	5	5
Diff	0	1	0	1	1	1	2	1	1	1	2	1	2	2	2	1	2	0
Index	0.00	0.25	0.00	0.25	0.33	0.25	0.67	0.50	0.33	0.25	0.67	0.20	0.67	1.00	0.67	0.25	0.67	0.00
Real index	0																	

10	5	5	5	4	4	5	5	2	2	5	5	5	2	3	4	4	5	4
Diff	0	1	0	0	1	1	2	0	1	1	2	0	1	1	1	0	2	1
Index	0.00	0.25	0.00	0.00	0.33	0.25	0.67	0.00	0.33	0.25	0.67	0.00	0.33	0.50	0.33	0.00	0.67	0.20
Real index	0.27																	

18	4	3	5	4	3	3	2	2	3	4	3	5	3	2	4	4	3	5
Diff	1	1	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0
Index	0.20	0.25	0.00	0.00	0.00	0.25	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.00	0.00	0.00
Real index	0.08																	

22	4	5	5	4	3	3	4	3	2	4	2	5	3	2	4	5	3	4
Diff	1	1	0	0	0	1	1	1	1	0	1	0	0	0	1	1	0	1
Index	0.20	0.25	0.00	0.00	0.00	0.25	0.33	0.50	0.33	0.00	0.33	0.00	0.00	0.00	0.33	0.25	0.00	0.20
Real index	0																	

26	5	4	5	4	3	4	3	2	3	4	3	5	3	2	3	4	3	5
Ideal #	5	5	5	5	4	5	5	1	4	3	5	4	1	4	5	5	5	5
Diff	0	1	0	1	1	1	2	1	1	1	2	1	2	2	2	1	2	0
Index	0.00	0.25	0.00	0.25	0.33	0.25	0.67	0.50	0.33	0.25	0.67	0.20	0.67	1.00	0.67	0.25	0.67	0.00
Real index	0.39																	



	Row1					
	4	9	10	18	22	26
Mean	0.297222	0.386111	0.265741	0.075926	0.165741	0.386111
Standard E	0.074234	0.066752	0.056711	0.030436	0.039086	0.066752
Median	0.25	0.291667	0.25	0	0.2	0.291667
Mode	0	0.25	0	0	0	0.25
Standard C	0.314946	0.283204	0.240606	0.129128	0.165829	0.283204
Sample Va	0.099191	0.080204	0.057891	0.016674	0.027499	0.080204
Kurtosis	1.103485	-0.44893	-0.8475	-0.20981	-1.1927	-0.44893
Skewness	1.243719	0.440533	0.449133	1.256499	0.313854	0.440533
Range	1	1	0.666667	0.333333	0.5	1
Minimum	0	0	0	0	0	0
Maximum	1	1	0.666667	0.333333	0.5	1
Sum	5.35	6.95	4.783333	1.366667	2.983333	6.95
Count	18	18	18	18	18	18
Confidenc	0.156619	0.140834	0.119651	0.064214	0.082465	0.140834

	4	9	10	18	22	26
median	0.25	0.291667	0.25	0	0.2	0.291667
max	1	1	0.666667	0.333333	0.5	1
min	0	0	0	0	0	0
mean	0.297222	0.386111	0.265741	0.075926	0.165741	0.386111