THE EFFECT ANALYSIS OF PRODUCTION MANAGEMENT FACTORS IN SUPPORTING STRATEGIC PLANNING BASED ON MODIFIED NESTED MODEL AND SWOT ANALYSIS

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ABSTRACT

In manufacturing industries, performance of production management is influenced by many factors such as production planning, machine and employee availabilities, raw material requirement planning, and the selling-price decision. The performance of production management is frequently determined by accurate decision considering those factors. In the real world, those factors have different level of importance. These factors have both direct and indirect effect on performance. The influence interaction of those effects will be shown in combined effect. The aim of this research is to find a dominant gap level of importance between the weight of direct effect and combined effect, which is assigned by the industry and is determined by analysing the correlation between related factors. The basic idea behind this research is the doubtfulness that the level of importance assigned by industry cannot describe the relative strength of the influence of one factor to another factor. This can mislead the decision-making. Using Value Chain, Nested Model and SWOT Analysis, this research analyses factor's influences to industry strategic planning, especially production management that has been implemented in 4 manufacturing companies.

Key words: Performance Management, Decision Modelling and Theory

1. INTRODUCTION

There are many production management decisions that must be made in manufacturing industries, such as production planning, machines and work forces preparation, demand scheduling, selling-price determination, and raw material purchasing. The innovative company displays several important characteristics. The creation of new value and new satisfaction for the customer is the objective (Cravens, 1991). `Every decision made will involve level of management with all the aspects behind (Simon, 2000). Each of those aspects (factors), has different degree of importance which influenced each other with certain correlation level. There are factors that have direct influence effect to final decision called direct effect factors and that have indirect influence through another factor called indirect effect.

In an organization, although each division has the authority to take their own decision, they still need to get value information from other relevant sources. Construction of production scheduling, for example, besides getting order data from marketing division, the team in charge is responsible for preparing the schedule needs to know the raw materials availability,

budgeting information, and so on. Therefore, decisions can be made by considering influence from many factors.

In fact, often in taking decision top management only give attention to one or two factors which considering has main influence direct effect, and have tendency to neglect the others factors that have less direct effect. On the other hand, perhaps the 'main' factor does not contain a lot of individual influence to production department performance. That impression comes precisely from the factors that considered only contain less affect, but actually turn out to be importance factors because its influence through another factors was bigger than its individual impression to final decision. The direct effect cannot describe how big its influence through others that can mislead the perception. This inaccurate decision will produce inapplicable results when implemented, and the performance of production management will not be optimal because of the misguided strategy.

This paper attempts to map the dominant factors in production management, and for pilot project this modified Nested Model has been implemented in 4 manufacturing companies, namely:

(1) PT. X – jewellery (gold) industry in Surabaya, East Java (Oey, 2003)
(2) PT. Indotirta Jaya Abadi – mineral water producer in Semarang, Middle Java (Anugraheny, 2002)
(3) PT. XYZ – genset industry in Surabaya (Lianto, 2002)
(4) PT. Filtrona Indonesia – cigarrette filter manufacturing in Surabaya (Sugiarto, 2002)

For those companies, the author wants to map the differencens and identicals of the dominant factors. Firstly, this research will analyse the value chain especially in production management context, then explain the steps on how Nested Model is constructed, followed by calculation of Combine Effect in the production management factors in four industries. Furthermore, the SWOT analysis based on dominant factors as of Nested Model output, and finally the action plan diagram to obtain competition strategic planning. The methodology uses PDCA (*Plan-Do-Check-Action)* cycle to illustrate continuous integrated system.

2. LITERATURE REVIEW

In this part the essentials of Nested Model construction, Value Chain Model will be described, along with a SWOT summary.

2.1. Nested Model (Prajugo, 2002)

There are a lot of factors that are considered in company performance measurement. Different weight of influence among those factors and for the relation issues can be divided into 2 effects, direct and indirect effects. The interaction of these factors will result in relative influence to final decision as the integration. Obviously, this research needs a model approcah to ascertain subjectives and preferences opinion from management perspectives to a quantitative value, therefore Nested Model adopts Analytic Hierarchy Process (AHP) method (Saaty, 1988) to estimate the weight factors through pairwise comparison between factors, and develop it with assessment of sub-factors's weight on different criteria in hierarchy that cannot calculated in AHP.

Direct effect is formulated in combination between inhenret effect (the weight of the factors itself) and direct effect (Suwignjo, 1999):

Direct Effect = Inherent Effect + Indirect Effect(in)

If the factor get influence from the other factors, then there will be a combine effect produced in that factor. The value of combine effect can be calculated from:

Combine Effect = Inherent Effect + Indirect Effect(out)

The Nested Model can be implied in the function of the influence weight from some factors to create a value model of a factor, while the weight influence factor itself is merged together from the function of its sub-factors. If a final decision influenced of n factors, and for the factor i influenced of n_i sub-factors for factors $i; F = \{i | i = 1,2,...,n\}$, therefore the weight value of *combine effect* from factor *i* is:

$$C_i = \alpha_i D_i + \sum_{\substack{j \in F \\ j \neq i}} \beta_j D_j \qquad (1)$$

The variables are:

C_i = the weight of *combine effect* at factor *i* to decision (in precentage; $0 \le C_i \le 100$)

D_i = the weight of *direct effect* at factor *i* to decision (in precentage; $0 \le D_i \le 100$)

α_i = the weight of *inherent effect* for factor *i* ($0 \le \alpha_i \le 1$)

β_j = the weight of *indirect effect-out* to factor *j* ($0 \le \beta_j \le 1$)

$\beta_j = \delta_{ij} \gamma_j$

δ_{ij} = the weight of *indirect effect-in* from factor *i* to factor *j* ($0 \le \delta_{ij} \le 1$)

$\delta_{ij} = 1$; if the factor *i* is the only another factor which influenced factor *j*

γ_j = the weight of *indirect effect-in* for factor *j* ($0 \le \gamma_j \le 1$)

The total weight of *direct effect* and *combine effect* from all of factor to decision is $\sum_{i=1}^{n} D_i = 100$ dan $\sum_{i=1}^{n} C_i = 100$.

With the same approach, the weight of combine effect from each factor and sub-factors can be calculated with fomula (1). This will determine the weight of global effect to final decision by:

$$G_{ik} = C_{ik} . C_i \qquad (2)$$

G_{ik} = the weight of *global effect* for sub-factor *k* from factor *i* (in percentage; $0 \le G_{ik} \le 100$)

C_{ik} = the weight of *combine effect* sub-factor *k* from factor *i* $(0 \le C_{ik} \le 1)$

The total weight of *combine effect* from all sub-factors in factor *i* is $\sum_{k=1}^{n_i} C_{ik} = 1; i = 1,2,...,n$ and the total weight of *global effect* from all sub-factors to final decision is $\sum_{i=1}^{n} \sum_{k=1}^{n_i} G_{ik} = 100$.

The application of Nested Model to resolve the weight factors sistematically is describe as follows:

1. Determine the weight of direct effect from each factor and sub-factors to another factors and sub-factors, in performance assessment.
2. Determine the comparison of inherent and indirect effect from each factor and sub-factors to obtain the influences from others factors and sub-factors.
3. Determine *indirect effect* from each factor to another factors, and sub-factors either.
4. Determine the influence direction from each factor and sub-factors to another factors and sub-factors due to pairwise comparison.

5. Calculate *index inconsistency ratio* (CR) from factors/sub-factors in step 4, and if CR>0.1 then re-evaluation is necessary until CR $\leq$ 0.1 which mean the preference comparison has been consistent already. (Saaty, 1988).
6. Calculate the weight from each factor to performance assessment and each of sub-factors to the factors influenced, using the Nested Model computation.
7. Determine the weight of *global effect* from each sub-factors to performance assessment.

2.2. Value Chain

Porter (1985) classified the value chain into nine interrelated primary and support activities. Primary activities are the fundamental activities performed by an organization in order to be operative. They relate to actions undertaken to satisfy external demands. Secondary activities are support activities, which are required to ensure the effective and efficient performance of primary activities. They relate to actions carried out to serve internal customers. Using this model the activities consumed by a business process or product can be identified more easily.

Porter's value chain model as depicted in Figure 2 (*Case study of PT.X*) is a useful mechanism for analyzing an organization to determine what activity it performs to convert inputs to outputs.

2.3. SWOT Analysis

Organisational environment can be divided into 2 parts, internal and external. Both of them have the same contribution to establish in competitive advantage. Management has to recognize its strenghs and weaknesses inside the organization and find out its opportunities and also on the other hand, the threats. Strategic decision planning always gets inputs from all those aspects to develop their mission, objectives and organization policy. In general SWOT analysis can identify all the significant factors and illustrate those in SWOT matrix (Rangkuti, 1999). The matrix aims to clearly describe the interaction factors deployed from the strengths, weaknesses, opportunities and threats, and for the outcome it found four alternatives strategy that can be configured at Figure 3 (*Case study PT. X*).

3. RESEARCH METHODOLOGY

This research undertaken is described with the structure indicated in Figure 1. Research methodology can be devided into four wide areas derived from PDCA cycle. Starting from *Planning* which constructing factors hierarchy and Value Chain model as observation production management activities primary and support. *Do* areas contain with Nested Model calculation to get the weight of effect factors. Gap analysis is in *Check* areas and SWOT analsys completed with the action plan suggestion enclose in *Action*. At the end result, the author tries mapping the equals and differences of dominant factors between four manufacturing industries.

4. DISCUSSION

Based on organisation vision and mission determined, the first step is to know internal management starting with the organisation structure and its job description (Haag,2004), then all of the activities connected with production operation showed in value chain's primary and support activities, procedures of information systems and ultimately the hierarchy building. Achievement the weight of Combine Effect used Nested Model calculation will indicate the importance factors, go on with gap analysis between Combine and Direct Effect, and after that SWOT analysis to accumulate alternatives of strategic followed by action plan matrix.

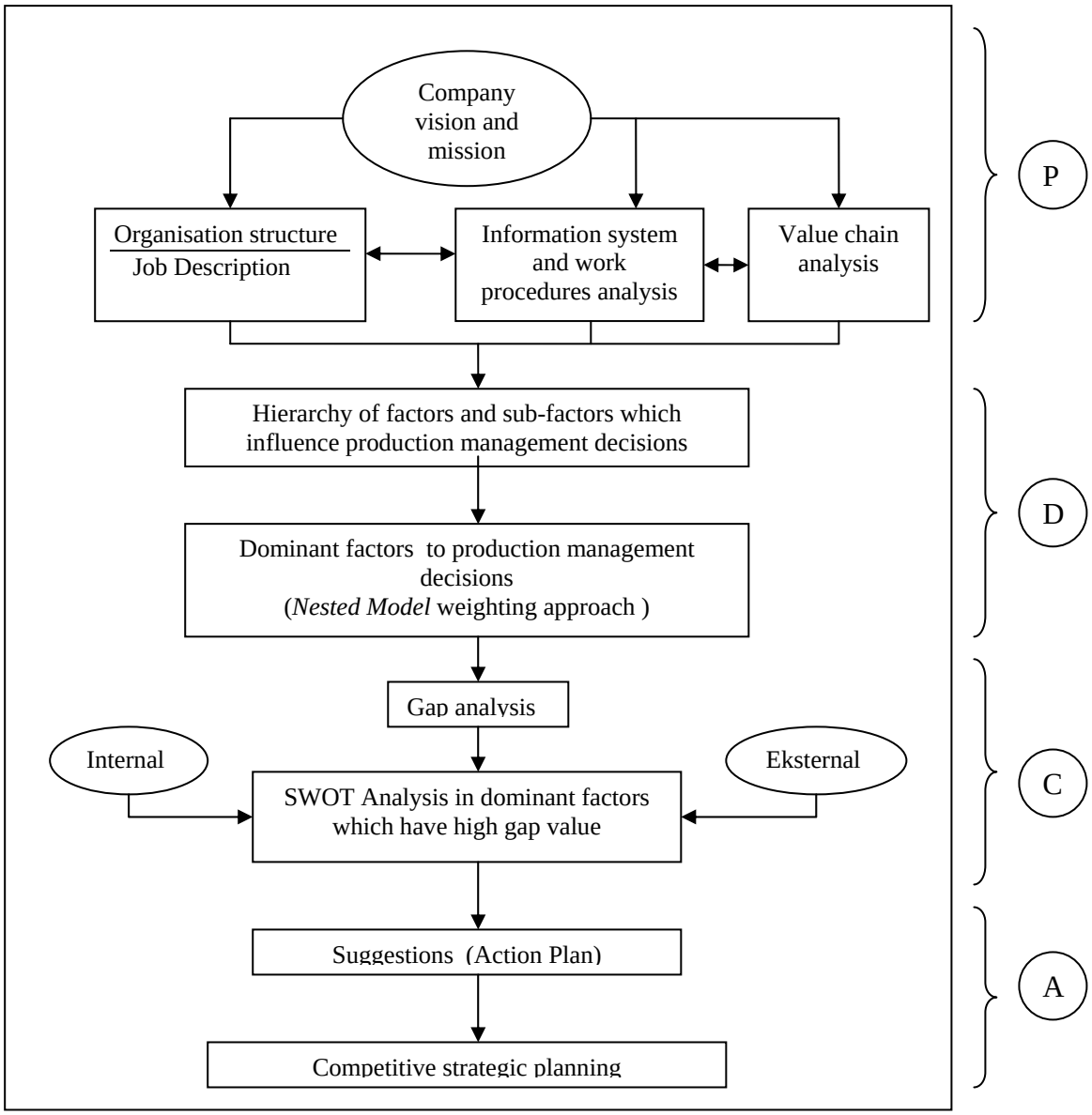

Figure 1. A framework for obtaining the influence of dominant factors to production management decision

4.1. Value Chain

Value chain of PT. X as depicted in figure 2 shows the primary and support activities periodically happened in this organization. These activities include all the systems and procedures that applicated information flow among the production management. In Table 3, it showed systems and procedures of 4 industries, included PT. X as the case study. The value chain analysis and the procedures, beside of the interview and discussion with the organisation's management, will be used to perform the critical success factors that give important influences to final decision; in hierarchy we called factors and subfactors.

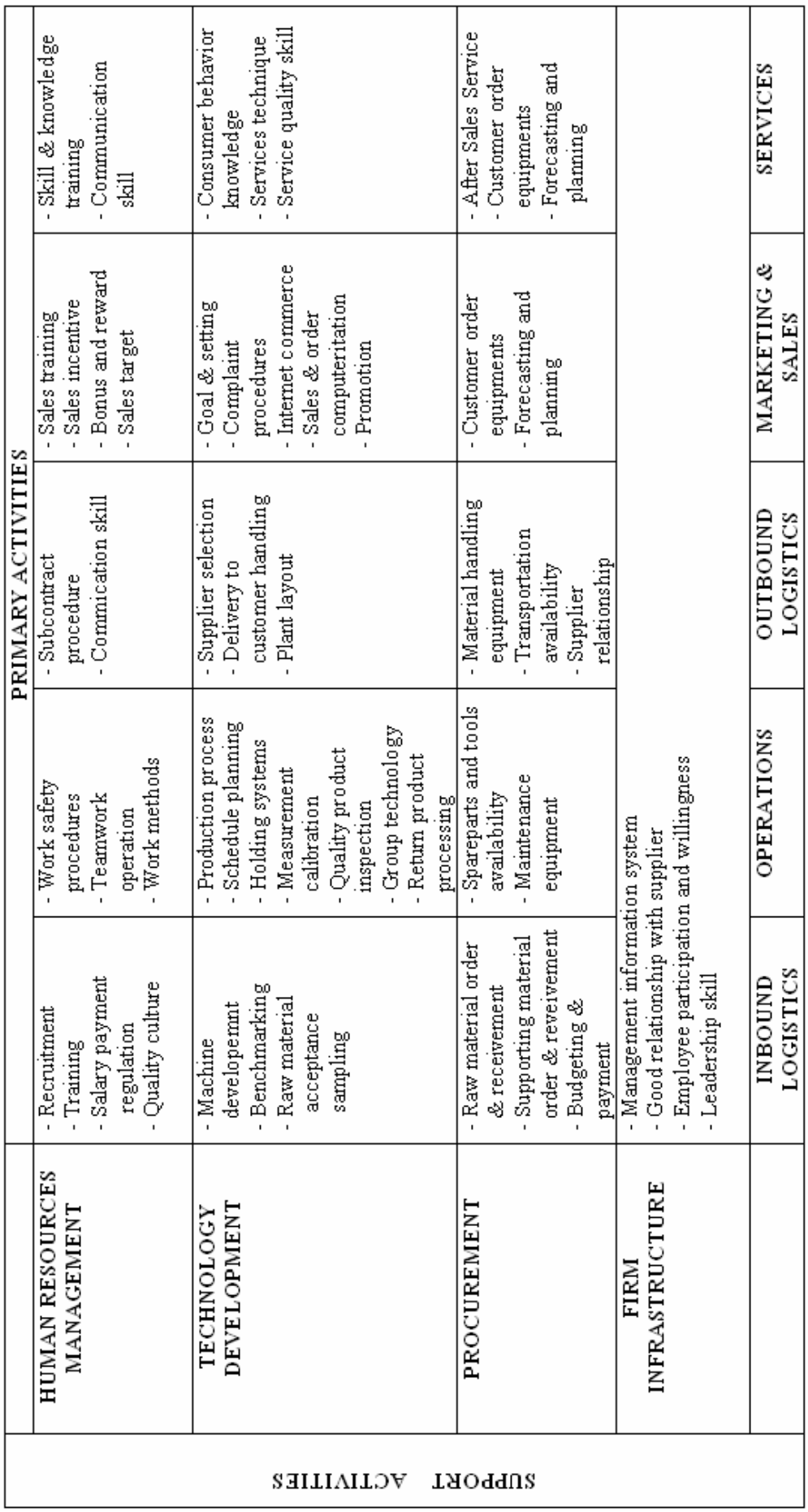

Figure 2. PT. X Value Chain Analysis

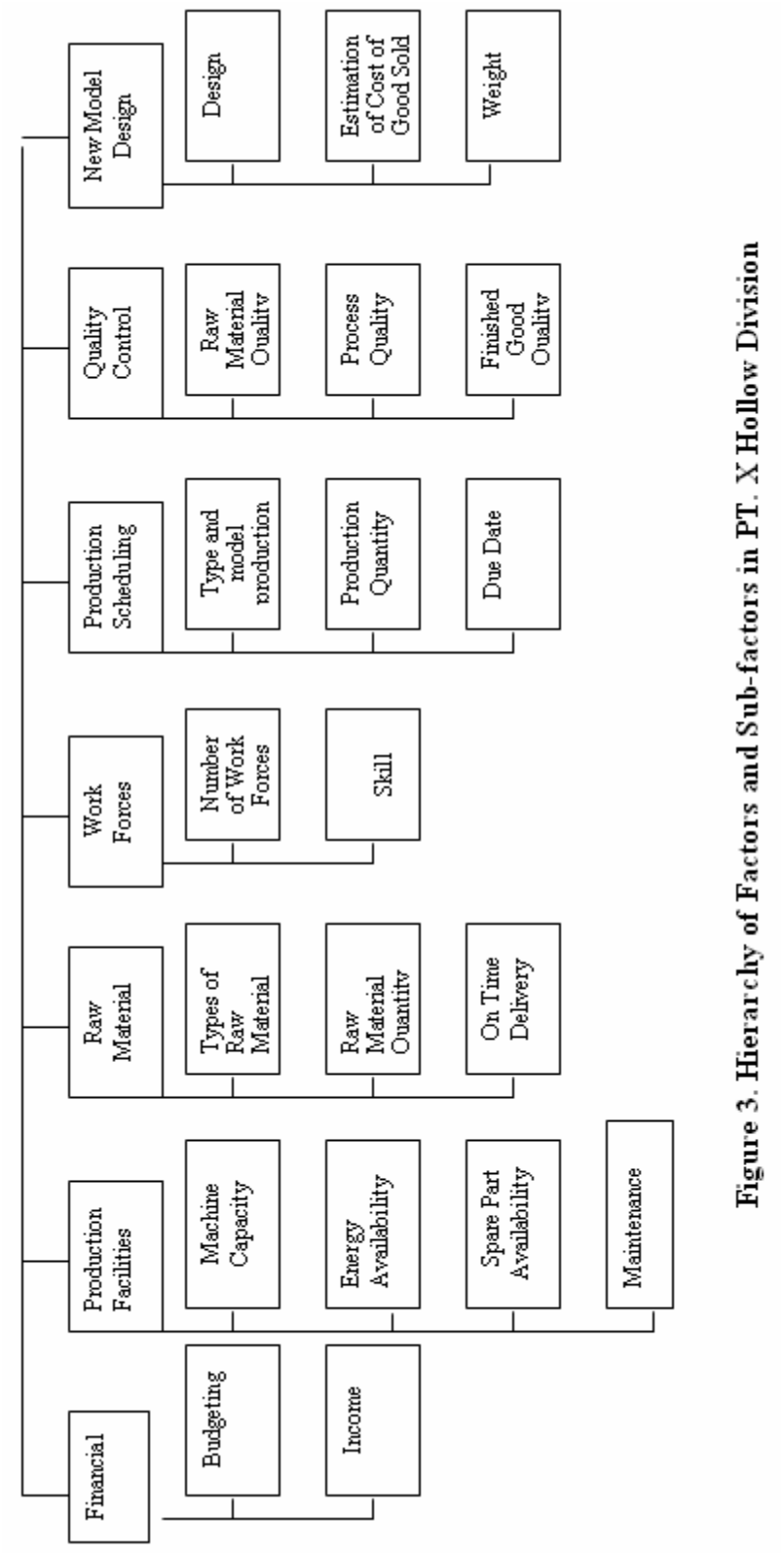

Figure 3. Hierarchy of Factors and Sub-factors in PT. X Hollow Division

4.2. Hierarchy Construction

For hierarchy construction example from 4 manufacturing industries, for shortens reason in this paper only one industry chosen that is PT. X as jewellery industry. However, this industry selected not because it have the best result, cause all of the industries done the same methods. Before the hierarchy made, many activities which have relation to production operations developed with value chain analysis. This analysis will be input the factors and sub-factors to be addressed, processing until the weight of combine effect is determined by Nested Model.

4.3. Nested Model

Following the hierarchy, from the observation and interview with management, it found the weight of indirect effect-in factors (influencing factors) and indirect effect-out factors (influences to other factors) which can be seen in Table 1. The weight of direct effect from every factors and sub-factors included inherent and indirect effect ratio indicated in Table 2.

Next, the weight was calculated the concistency degree of the factors weight using the AHP method. If the results were concistent, the Nested Model processing to find the weight of combine effect will carry on. However, the weight could not be used if inconcistency and evaluation about the predicaments have to be done.

The approximation of calculation is:

- For Financial factor:

$C_{Fin}= \alpha_{Fin}.D_{Fin}+ \delta_{FP}.\gamma_{FP}.D_{FP}+ \delta_{TK}.\gamma_{TK}.D_{TK}+ \delta_{JP}.\gamma_{JP}.D_{JP}+ \delta_{PMB}.\gamma_{PMB}.D_{PMB}$

$= 4/8\ (15)+ 2/6\ (0.75)(10)+ 2/6\ (1)(10)+ 4/8\ (0.091)(25)+ 2/6\ (0.429)(5)$

$= 15.1858$

- For Production Budgeting and Income sub-factors:

$C_{AP}=\alpha_{AP}.D_{AP}+\delta_{KapM}.\gamma_{KapM}.D_{kapM}+\delta_{JumTK}.\gamma_{JumTK}.D_{JumTK}+\delta_{STK}.\gamma_{STK}.D_{STK}+\delta_{DS}.\gamma_{DS}.D_{DS}+ \delta_{KE}.\gamma_{KE}.D_{KE} + \delta_{KSP}.\gamma_{KSP}.D_{KSP}$

$=2/6(40)+ 4/8\ (0.074)\ (40)+ 1/5\ (1)\ (40)+ 1/5\ (1)\ (60)+ 1/4\ (1)\ (45)+ (4/6)\ (0.25)\ (35)+ (2/6)\ (1)\ (10)$

$= 55.2299$

$C_{PDPT}= \alpha_{PDPT}.D_{PDPT}+\delta_{AP}.\gamma_{AP}.D_{AP}$

$= 2/6\ (60) + 4/6\ (0.598)\ (40)$

$= 35.9467$

Both of the sub-factors above are from financial sub-factors, therefore the total weight have to be 100%, and to find combine effect found throughout normalization is:

- $C_{AP}= 55.2299 / (55.2299 + 35.9467)$
  $= 60.5746$
- $C_{PDPT}= 35.9467 / (55.2299 + 35.9467)$
  $= 39.4254$

In the same way, the weight of combine effect factos and sub-factors are getting. The weights are listed in Table 2, that can be known the dominant factors, which will be organization priorities, and applied the SWOT analysis as the basic to Action Plan.

Table 1. Indirect Effect (in) and Indirect Effect (out) Factors

Factors	Indirect Effect (in)	Indirect Effect (out)
Financial	Production Facilities Work Forces Production Schedule Raw Material Quality Control New Model Design	Production Facilities Work Forces Production Schedule New Model Design
Production Facilities	Financial Production Schedule	Production Schedule Financial New Model Design
Raw Material	Production Schedule Quality Control	Production Schedule Financial Quality Control
Work Forces	Financial	Production Schedule Financial New Model Design
Production Schedule	Financial Production Facilities Work Forces Raw Material New Model Design	Raw Material Quality Control Financial Production Facilities
Quality control	Raw Material Production Schedule	Raw Material Financial
New Model Design	Production Facilities Work Forces Financial	Financial Production Schedule

4.4. Gap Analysis Between Direct Effect and Combine Effect

The calculation below illustrates the differences between the weight of combine effect and direct effect. The weights of direct effect directly given by decision maker, on the contrary the weight of combine effect obtained by consider influences from another factors/sub-factors. This gap can be analysised as follows:

1. If the weight of *direct effect* (D) smaller than the weight of combine effect (C) or ((C-D)/D>50%), it will indicate that the influence from that factor/sub-factor through its affect to another factor/sub-factor is more stronger than its own individual affect to final decision. So far it can said that if the factor/sub-factor gave its influence to many factor/sub-factor, then its attendance, as well the information availability also its value, give high dependency to others factor/sub-factors.
2. If the weight of *direct effect* (D) bigger than the weight of combine effect (C) or ((D-C)/D>50%), it will indicate that in fact the influence from that factor/sub-factor through its affect to another factor/sub-factor is smaller than its own individual affect to final decision. Therefore, it can be interpreted that decision maker assess the preference of that factor/sub-factor was too high, but in the real was less important to another factor/sub-factor.
3. If the weight of *direct effect* (D) as same as the weight of combine effect (C) or ((C-D)/D>50%), it will indicate that the weight of direct effect given was closely concistent and narrowly the real.

Table 2. Comparison of Inherent Effect and Indirect Effect (in), The Weight of Direct Effect and Combine Effect Factors and Subfactors with The Gap Value between Direct Effect and Combine Effect

Factors and subfactors	Inherent : Indirect Effect	The weight of Direct Effect (%)	The weight of Combine Effect (%)	(C-D)/D (%)
Financial	4 : 4	15	15.1858	1.2387
• Budget	2 : 4	40	60.5746	51.4365
• Income	2 : 4	60	39.4254	(34.2910)
Production Facilities	4 : 2	10	12.9692	29.6920
• Machine capacity	4 : 4	40	47.7046	19.2615
• Energy availability	2 : 4	35	20.4847	(41.4723)
• spare part availability	4 : 2	10	13.2136	32.1360
• Maintenance	2 : 1	15	18.5971	23.9807
Raw material	4 : 4	20	21.8373	9.1865
• Types of raw material	3 : 3	30	27.5948	(8.0173)
• Raw material quantity	3 : 3	30	26.4000	(12.000)
• On time delivery	4 : 2	40	46.0052	15.0130
Work forces	4 : 2	10	11.1800	11.800
• Number of work forces	4 : 1	40	41.0354	2.5885
• Skill	4 : 1	60	58.9646	(1.7257)
Production schedule	4 : 4	25	20.6883	(17.2468)
• Type and model production	3 : 3	35	28.8407	(17.5980)
• Production quantity	2 : 4	30	44.9660	49.8867
• Due date	4 : 2	35	26.1933	(25.1620)
Quality Control	3 : 3	15	12.9425	(13.7167)
• Raw material quality	-	45	67.2348	49.4107
• Process quality	3 : 3	40	24.6212	(38.4470)
• Finished good quality	1 : 4	15	8.1439	(45.7073)
New model design	4 : 2	5	5.2208	4.4160
• Design	3 : 1	45	63.6452	41.4338
• Cost of good sold estimation	1 : 3	20	10.0089	(49.9555)
• Weight	4 : 1	35	26.3460	(24.7257)

5. CASE STUDY

Appropriate with the research methodology, while organization vision and mission was being the direction of the goals and strategics statement, the next steps were doing formatly. PT. X that is jewellery (gold) industry was chosen to be the illustration in the steps above, but in the same way the others 3 industries will be shortly described in table 3 till table 5.

Table 3 shows some of similar systems and procedures run in all the industries, the recapitulation of the factors and sub-factors from each of the hierarchies are indicated in Table 4. Using the Nested Model computation the dominant factors achieved. Dominant means that the factors have high value of combine effect weight, and can be stated also that its influence to others factors/sub-factors was foremost to production performance. These dominant factors listed in Table 5 with the assumption that a dominant factor is the factors that have the weight of combine effect more than 10%. For the result, there were 2 dominant factors in all of the manufacturing industries, production facilities and raw material. Although the weights were not the same value, at any rate this outcome gives an idea about how important both of the factors to production processes.

Furthermore was SWOT analysis, derived from the dominant factors. This paper only figure out the analysis form PT. X in Figure 4 especially in production facilities factor. Following with the Action Plan from the alternatives strategy suggest indicated in Figure 5.

Table 3. Systems and Procedures Mapping in 4 Manufacturing Industries

Industry Names	Systems and Procedures Occur
PT. X	Receiving order by customers
	Work in process goods ordering to another division
	Complaint from other division (type/number of goods)
	Request materials to logistic and purchasing division
	Request spare parts to workshop division
	Delivery to customers
	Maintenance
PT. XYZ	Receiving order by customers
	Ordering and receiving raw material from supplier
	Structure and operation procedures (SOP)
	Finished goods delivery
	Payment to suppliers and principles
	Billing to customers
PT. Indotirta Jaya Abadi	Production Planning and Inventory Control (PPIC) procedures
	Purchasing of raw material, technical and general parts
	Receiving, holding and goods delivering
	Water treatment
	Planning and production preparation mineral water
	Production process in mineral water bottles and cups
	Packaging and delivery
	Raw material quality inpection and testing
	Production process inpection and testing
	Finished goods inpection and testing
	Machine maintenance and repair
PT. Filtrona Indonesia	Raw material purchasing and receiving
	Production procedures
	Finished goods delivery
	Routine and incidental maintenance
	Raw material and finished goods quality control

Table 4. Factors and Sub-factors on Production Department in Four Manufacturing Industries

PT. FILTRONA	PT. INDOTIRTA	PT. XYZ (Generator Industry)	PT. X (Jewellery Industry)
Financial	Financial	Financial	Financial
• Budgeting	• Budgeting	• Production budgeting	• Production budgeting
• Income	• Income	• Income	• Income
Production Facilities	Production Facilities	Production Facilities	Production Facilities
• Machines	• Employee availabities	• Machine and infrastructure availability	• Machine capacity
• Work Forces	• Production room setting	• Work Forces	• Energy availability
• Warehouse Capacity	• Machine set up	• Location and work areas preparation	• Spare part availability
• Infrastructure (water,power,etc)	➢ type		• Maintenance
	➢ spare part		
	➢ Length of maintenance		
	• Energy availability		
	• Material handling		
Raw material	Primary raw material (mineral water)	Raw material	Raw material

Table 4. Factors and Sub-factors on Production Department in Four Manufacturing Industries (continued)

• Type	• Water supplies	• Type	• Type
• Inventory	• Transportation set up	• Number of stocks	• Inventory
	• Water resources exploration	• Raw material planning	• On time delivery
	• Water resources maintenance	• Supplier on time delivery	
	• Water treatment process		
Production Schedule	Production estimation and material requirement	Production Schedule	Production Schedule
• Order types	• Order types	• Order types	• Order types and models
• Order quantity	• Order quantity	• Order quantity	• Order quantity
• Due date	• Inventory in finished good warehouse	• Due date	• Due date
• Production capacities	• Inventory in transite warehouse	• Production capacities	
• On hand inventory	• Inventory in raw material warehouse		
• Maintenance	• Number of subcontracts		
	• Machine capacity		
Quality Control	Quality Control	Quality Control	Quality Control
• Raw material	• Water resources	• Raw material	• Raw material
• Process	• Mineral water	• Process	• Process
• Finished goods	• Water treatment	• Finished goods	• Finished goods
	• Production process		
	• Finished goods		
Supplier	Supporting material	Planning	Work Forces
• Supplier category	• Production	• Product design	• Number of employee
• Number of suppliers	• Sanitation	• Cost of goods sold estimation	• skill
• Lead time	• Water treatment	• Production lead time estimation	
• Purchase cost	• Supplier on time delivery		
Customer	Ekspedition		New model design
• Category	• External		• Design
• Number of customers	• Internal		• Cost of goods sold estimation
• Selling price	➢ Tranportation availability		• Weight
	➢ Maintenance		
	Warehouse capacity		
	• Finished goods warehouse		
	• Transite warehouse		
	• Raw material warehouse		

Table 5. Dominant Factors Based on The Weight of Combine Effect >10%

Industry Names	Factors	The Weight of Combine Effect (%)
PT. X	Raw Material	21.8373
	Production Schedule	20.6883
	Financial	15.1858
	Production Facilities	12.9692
	Quality Control	12.9425
PT. Indotirta Jaya Abadi	Production Facilities	21.7420
	Financial	20.9905
	Primary Raw Material	18.6840
	Supporting Material	15.8135
PT. XYZ	Production Schedule	26.282
	Raw Material	20.5967
	Production Facilities	18.9867
	Quality Control	16.312
	Planning	13.2907
PT. Filtrona Indonesia	Financial	26.199
	Production Facilities	19.223
	Raw Material	16.191
	Quality Control	11.071

	***Strengths*:** 1. Using high technology 2. Skill to product many jewellery types 3. Long economic lyfe 4. Enough energy availability 5. Each process computerized	***Weaknesses*:** 1. Production plant layout is not well-optimaized 2. Unstructured maintenance machine schedule 3. imprecisely information system
***Opportunities*:** 1. Rapid technology development 2. Workshop facilities availability to support maintenance process	**Maxi-maxi Strategy (S/O)** • (S1 S2 S3 O1): Increase parts and machine technology used	**Mini-maxi Strategies (W/O)** • (W2 O2): Scheduling and intensify parts and machine maintenance • (W3 O1) Enhance management information system • (W1 O1) Production plant layout renovation
***Threats*:** 1. Competitor technology movement 2. Electrical, fuel cost increase and the others expenses	**Maxi-mini Strategies (S/T):** • (S2 S3 T1): Benchmarking to developed company • (S1 S2 S3 S4 S5 T2): Developing effective and effeicient production process	**Mini-mini Strategy (W/T):** • (W2 T2): Doing effective and efficient machine maintenance

Figure 4. SWOT Matrix on PT. X Production Facilities

No.	Suggestion Strategies	Action Plans	Person in Charge
1.	Improve product quality and decrease defect rate	- Strengthen the acceptance raw material sampling - Increase employee skill - Increase employee awareness on quality, with 5S program implementation for example - Increase in employee intensity to operate the duties based on organization regulation and keep continuous process inspection	- Production (Hollow) Manager - Human Resource Manager
2.	Increase production schedule effectivity	- Coordination with marketing division about order receivement - Accurate raw material planning throuhg coordination with production, purchasing and logixstic division - Minimize production schedule adjustment - Clearly work arrangement and allocation - *Improvement process* in many operation, improve work method to accelerate leadtime production, for example	- Production (Hollow) Manager - PPIC Manager - Production Supervisor
3.	Enhance management information system	- Re-evaluation and designing the processes, procedures and data needed to support operational activities - Re-design information database adjusting with the requirement and adopt with implemented computerization systems - Deploy and communicate the new information system mechanism to all of the employees	- Production (Hollow) Manager - Financial Manager - Accounting Manager - Auditor and Head of EDP
4.	Increase parts and machine technology used	- Active in information gathering especially in rapid machine tecnology development - Benchmarking to developed company	- Workshop Manager - Technician
5.	Scheduling and intensify parts and machine maintenance	- Make list of machine types, breakdown time, breakdown caused and how to handle it - Compose parts and machine schedule maintenance, and told the operators to hang it so can be easy to remember - Operator gets dicipline in writing down the maintenance book after the activity done. The book then had signature from technician to recheck - Take care of *spare part* inventories	- Technician

Figure 5. The Action Plan of Strategic Planning Suggestion on PT. X Production Facilities

6. CONCLUSION

This research discussed has the main objective to contribute the management in decision making situation to reconsider the combined effect factors before applying strategic policy. Management usually only thinking about the factors which have large weight of direct effect and abandon the possibility that for some condition, the direct effect factors does not describes the real influence to the final decision. Rational perspectives and clearly observations will give the objective value so that the mistaken strategic planning can be minimized.

In performing the weight of combine effect, Nested Model has the advantage to obtain the gap between combine and direct effect at any factors and sub-factors interaction However, despite of this brainstorming it would be opened opportunity to develop this model through further research and case studies.

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