TECHNOLOGY MANAGEMENT REVIEW AT AEROWISATA CATERING SERVICE, JAKARTA

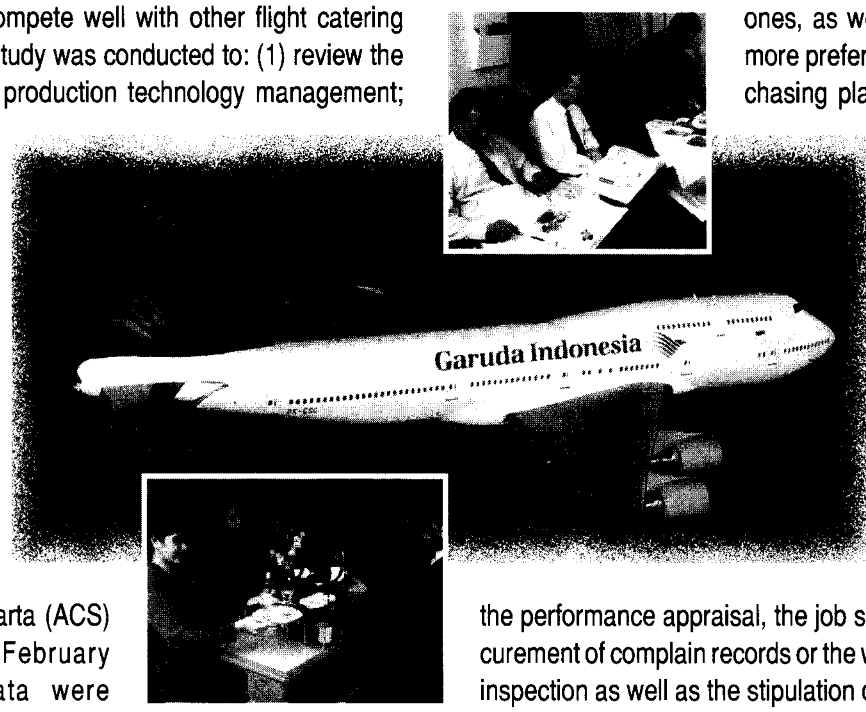
Dr. Ir. E. Gumbira-Sa'id, MA Dev[1], Ir. Rachmayanti, MM[2] and Ir. Abdul Basith Achmad, MS[1]

A.B.S.T.R.A.C.T

In the future global era, the region of Asia-Pacific will become a second market of flight services after the Europe, Middle-East and Africa regions. One of the inflight services that must be concerned is the flight catering service. The business of flight catering service is very strategic and supports a flight company for increasing its competitiveness in the inflight services. The flight catering cannot be separated from the health problem and food safety. The development of flight catering industry needs the mature planning and preparations.

Therefore, the flight catering must have the knowledge of menu planning, food selection, technology equipment, serving of sanitary food, well organization and cost control. In brief, flight catering industry needs technology management to compete well with other flight catering companies. This study was conducted to: (1) review the implementation of production technology management; (2) identify factors that influence the success of the implemented technology management; (3) provide alternatives for technology development. This case study was performed at the Aerowisata Catering Service Jakarta (ACS) during January-February 1998. The data were analysed using the Science of Technological Management Information System method toward indicator of technology transformation and technology capability. Then the data were processed using the Minitab program while the testing of data used Mann-Whitney and Chi-Square methods. The results show that apparently the ACS company has already retained and control appropriately the technoware.

However, it is not furnished with the humanware, infoware and the orgaware. The implementation of the technology management at the ACS Jakarta is successful due to some factors. These factors are: (1) the optimal usage of technoware; (2) the possession of human resources who have technical capability and a high level of management; (3) the use of optimal information along with the support of the integrated information system; (4) the complete organization structure, which can take on good management functions. Some policy alternatives for technology management development are: (1) The utilization of the present technoware. It can be done by recovering damaged equipment, replacing old equipment with new and more efficient ones, as well as undertaking a more preferred and precise purchasing planning of the equipment in the future. (2) The performing of the education and training, as well as, the development of human-ware in both technical and management skills must be concerned. Besides, the improvements of the performance appraisal, the job specification, the procurement of complain records or the working performance inspection as well as the stipulation of the job description should be done. (3) The optimization of the information management and utilization could be done by improving the present information system, the use of the integrated computer system, and the use of the Internet facilities. (4) The establishment of more complete organization structure, the building of a new kitchen, and the separation of meals uplift production are also important to do.



(KEY WORDS: TECHNOLOGY MANAGEMENT, FLIGHT CATERING, TECHNOLOGY COMPONENTS)

[1] Lecturer at MMA - IPB
[2] Graduate of MMA - IPB

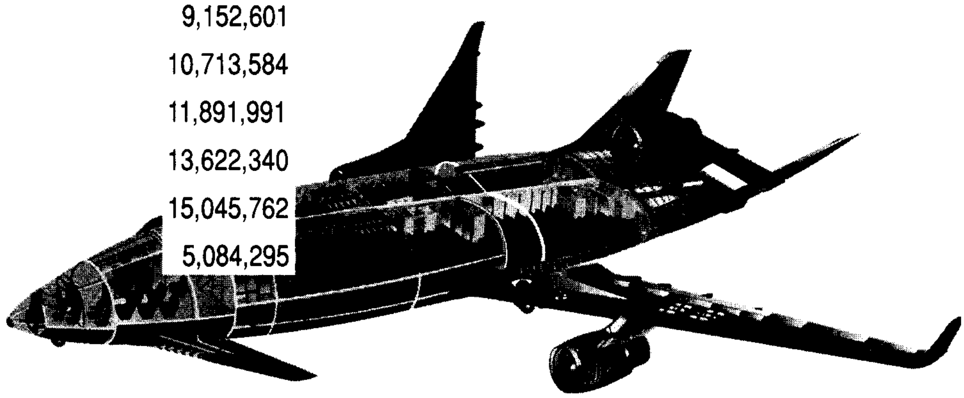
I.N.T.R.O.D.U.C.T.I.O.N

Aerowisata Catering Service (ACS) is a prominent and the oldest flight catering company in Indonesia. As a Garuda airline based flight catering company, the ACS is a catering company that prepares food supplies for a flight, apart from serving all Garuda supplies needs. Every day, the ACS serves flight companies both domestic and international. The amount of the catering uplift produced by the ACS Jakarta experiences an increase year by year (Table 1). By the continuous increase of the foods to produce, the company has always to make a more effective technology management to produce foods with better quality viewed from nutritional, taste and safety aspects.

Table 1. The amount of meals uplift produced by the ACS

Year	Jakarta	Total
1991	5,705,662	9,152,601
1992	6,641,463	10,713,584
1993	7,109,282	11,891,991
1994	8,203,900	13,622,340
1995	9,332,946	15,045,762
1996 (up to April)	3,186,094	5,084,295

Source: ACS, 1998



One of the most important topics in the present global era is the health and the food safety problems. This is very important since the processed foods undertake a long food chain. The foods produced by the ACS also go through long process stages. They started with the raw material (imported and local), production processes, packaging, storing, and food preparation, up to the carriage of the foods aboard the plane. These long processes occur for about 8-12 hours. During these hours it is possible for the foods to be contaminated with micro-organism, which can damage people's health.

Besides, the costs disbursed by the ACS toward the meals uplift production experience an increase of 43% from sales, eventhough the amounts of the yearly produced meals uplift experience an increase. Though, the production costs can be reduced up to 30% if the technological management during production is efficient.

Such case cannot be ignored constantly, especially for a company that faces strong competition in this global era. The implementation of the precise technology and the ability to manage technology components will determine the preferment of the quality and quantity produced meals uplift. Ultimately, consumers can be satisfied.

In regard with such problems; the study in the ACS Jakarta was aimed to: (1) review the implementation of production technology management; (2) identify factors that influence the success of the implemented technological management; (3) provide alternatives for technology development.

C.O.N.C.E.P.T.U.A.L F.R.A.M.E.W.O.R.K

The company's missions and objectives can be achieved by undertaking business strategies both in the short term and the long term. These business strategies can be made as references to run the technology management in the company. In facing the above problems, further review must be taken on the technology components, which includes the review on the indicators of the technology capability and the transformation technology. The outcomes of the review on the technology components show the possibility of the technology development.

Technology development is adjusted with the internal and external conditions, as well as the company's business strategies in maximizing the satisfaction of the flight service consumers.

Selection of the technology is adjusted with the capability and the needs of the company. Selection of technology and its implementation are transferred to the management of company. This framework is shown on Figure 1.

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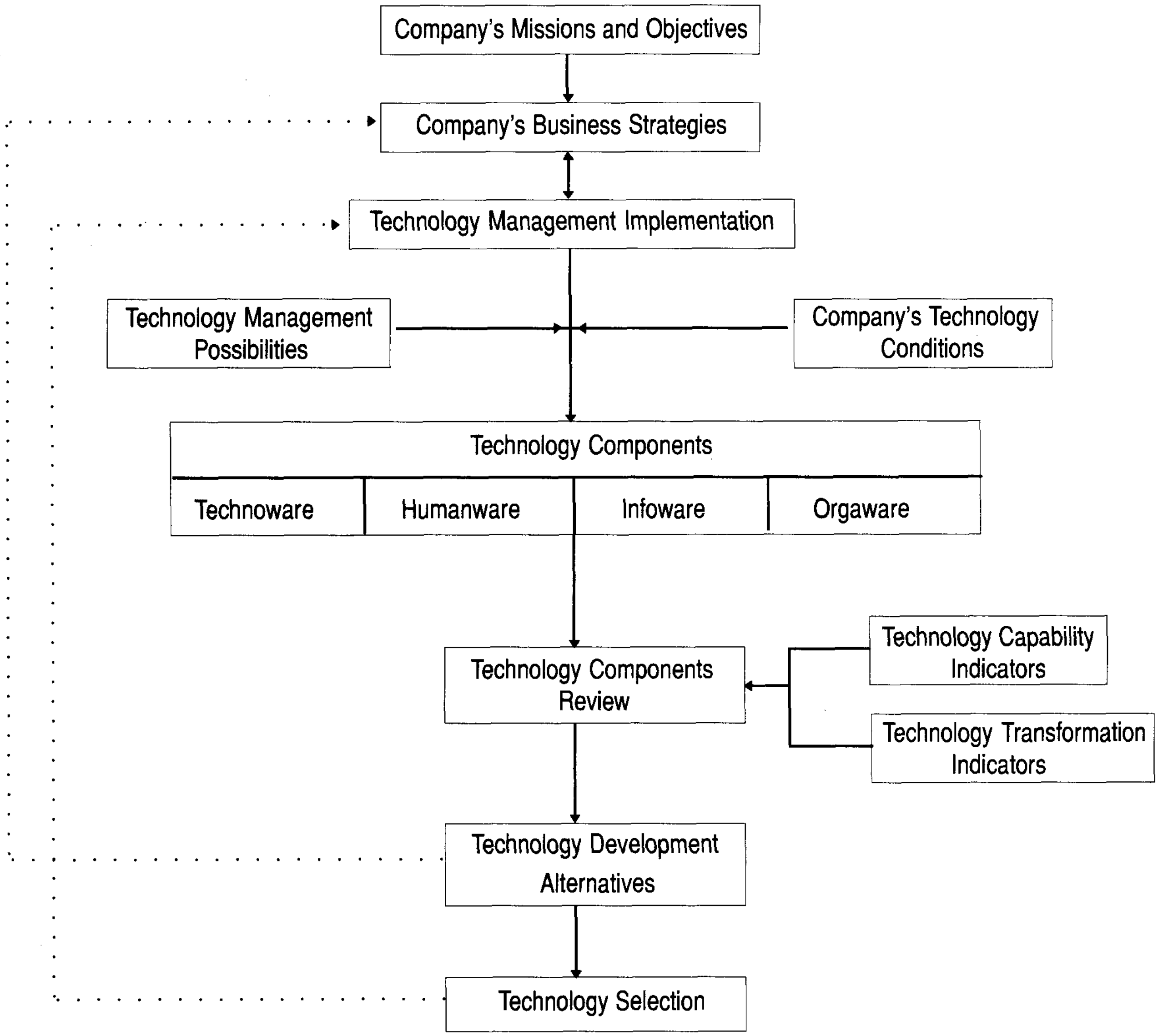

Figure 1. Diagram of the conceptual framework of the study

M.E.T.H.O.D.O.L.O.G.Y

This case study was conducted at the Aerowisata Catering Service Jakarta, precisely located at the end part of the Soekarno-Hatta International Airport terminal, during January-February 1998. The types of data collected comprised of the primary data (interview, observation, and questionnaire) and the secondary data (various sources and literature).

The collected data were analysed by using the **STMIS (*Science and Technological Management Information System*) Method** (Ramanathan, 1993). The analysis was focused on indicators of technology capability (operative, acquisitive, supportive, and innovative capabilities), and technology transformation (technoware, humanware, infoware and orgaware).

Assessment of the four technology components was done by giving the classified score from 1 until 9. These classified scores are shown on Table 2, Table 3, Table 4 and Table 5 (Harjanto, 1996). Besides, the technology capability indicators was done by rating the following score procedure: (1) Rating 0 = no capability; (2) Rating 1 = best in Indonesia in the flight catering industry; (3) Rating 2 = similar to the competitor companies in the ASEAN countries; (4) Rating 3 = best in the ASEAN countries in flight catering industry; (5) Rating 4 = similar to the competitor companies in the world; (6) Rating 5 = best in the world in flight catering industry.

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Table 2. The score of technoware assessment

Type of technoware	Score for the degree of sophistication		
Manual	1	2	3
Manual facilities	2	3	4
Powered facilities	3	4	5
Special facilities	4	5	6
Automatic facilities	5	6	7
Computerized facilities	6	7	8
Integrated facilities	7	8	9

Table 3. The score of humanware assessment

Classified of humanware	Score for the degree of sophistication		
Operating abilities	1	2	3
Setting abilities	2	3	4
Repairing abilities	3	4	5
Reproducing abilities	4	5	6
Adapting abilities	5	6	7
Improving abilities	6	7	8
Innovating abilities	7	8	9

Table 4. The score of infoware assessment

Classified of infoware	Score for the degree of sophistication		
Familiarizing facts	1	2	3
Describing facts	2	3	4
Specifying facts	3	4	5
Utilizing facts	4	5	6
Comprehending facts	5	6	7
Generalizing facts	6	7	8
Assessing facts	7	8	9

Table 5. The score of orgaware assessment

Classified of orgaware	Score for the degree of sophistication		
Striving framework	1	2	3
Tipe-up framework	2	3	4
Venturing framework	3	4	5
Protecting framework	4	5	6
Stabilizing framework	5	6	7
Prospecting framework	6	7	8
Leading framework	7	8	9

Qualitative and quantitative data were processed through tabulation, descriptive statistic, and nonparametric statistics (*Mann-Whitney Method* and *Chi-Square Statistic*), to test the relationships significances among the received variables using the Minitab program (Zuhriati, 1997).

RESULTS AND DISCUSSION

A. REVIEW ON THE TECHNO -LOGY TRANSFORMATION INDICATORS

1. Assessment of Technoware

The assessment of technoware was based on the sophistication of the hardware or machineries, which have direct connections with the meals uplift production stages. The results of the observation show that the company's production technoware had the median of 4, which means that the technoware can be grouped between the manual facilities and the special-purpose facilities. The status of the production technology expected by the company was that of a more modern machineries, that is, between the powered facilities and the automatic facilities (median 4.5).

When assessed more, it is so proper if the technoware is grouped between the manual facilities and the special-purpose facilities. This is important since ACS is a basically a food industry which is based on skills and experience to produce full meals (appetiser, main course and dessert). Nonetheless, the development of the flight catering industry that Utilizes the cook-chill catering system intensely necessary certain high technology especially in case of storage processed foods. Based on such condition the management of the company expects so much to classify their production technology to be between the powered facilities and the automatic facilities.

The test shows that the probability value at the significant level of 0.05 was 0.3134. It can be concluded that the H_0 can be accepted. Therefore, the present condition of the company's technoware was not significantly different with the accepted condition. The technology status in this ACS company has actually grouped into the automatic facilities. However, the company still has to expand its technoware sophistication. Especially in case of freezer, dishwashing machine as well as its supporting facilities, AC in the loading and off loading dock, and the packing machine in the cold kitchen.

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2. Assessment of Humanware

The assessment of humanware was aimed to examine the involvement of human resources with the technology sophistication level, and its capabilities in the production activities and the handling of the meals uplift in the ACS. The observation undertaken shows that the company's humanware had a median of 5. This means that the humanware capabilities laid in one of the repairing, reproducing, or adapting capabilities. Meanwhile, the capabilities expected by the company was that to the extent of improving and undertaking innovation (median of 8).

The test shows that the probability value in the significant level of 0.05 was 0.0322. Therefore, it can be concluded that H_0 cannot be accepted since the humanware capability level in the ACS Jakarta was different significantly with the capabilities by the company.

The observation undertaken shows that employees who work in the production section or others related to production have possessed quite fair capabilities in the technical production section. In average, they have worked for quite a long time (more than 5 years) and comprehend each stage of the production processes. Besides, most of them are that of the productive age, that is, among 30-39 years old (51.5%). Therefore, the company continues to make training so that the skills of the employees can be increased and can support the company's performance.

The company has also made fixed criteria about its employee's quality in each department and level. However, the ACS company has not yet owned a clear and detailed job description and performance appraisal. The company has not also possessed a certain division that can review correctly and seriously the feasibility of the employees' composition in each section; so that it can face the present challenges and working loads.

3. Assessment of Infoware

The assessment of infoware was aimed at analyzing the attempt of the company to utilize present information in order to familiarising, describing, and assessing facts for the sake of the company's interest. These assessments were done to the operating, purchasing, improving, and planning of the information.

The observation conducted shows that the median is 4. This means that the capability of the company in utilising information has just only arrived in the stages of describing, specifying, and collecting facts. Meanwhile, the company expected to be in the stage of comprehending, concluding, and assessing facts (median 7). Tested data show that the probability value at the significant level of 0.05 was 0.0256. Therefore, H_0 cannot be accepted. This means that the infoware capability possessed in the present time was not sufficient with what expected by the company. The questionnaire shows that the present infoware cannot yet fulfil company's needs, especially to the extent of controls against the quality of the production activities, as well as meals uplift handling.

The information of processing for production plan was still unsatisfactory and slow. Besides, not all the gained information was used for the long term planning. However, the company has planned to buy a more applicable infoware. In the mean time, an effort is done to use an integrated computer system for the sections of kitchen, sales, meal costing, and planning and product control (PPC).

4. Assessment of Orgaware

The assessment of orgaware was aimed at analyzing the capability of the company in managing present resources and framework in order to achieve company's missions and objectives. The assessment was done toward the orgaware capability level, beginning with striving framework, tipe-up framework, until leading framework.

The orgaware assessment shows that the median was 3.5. This means that the framework possessed by the company still laid on the stages of tipe-up framework, venturing framework, and protecting framework. Meanwhile, the framework expected by the company was that on the stage of stabilising framework, and leading framework (median 6.5). The test shows that the probability value at the significant level of 0.05 was 0.0041. Therefore H_0 can be accepted. This means that the condition of the company's orgaware was different significantly with what expected by the company.

The Organization structure of the company has not yet satisfied company's needs. The ACS company has not yet been supported by a Research and Development Department (R&D). This department is very crucial in the assessment of the working system and procedure to be a superior working system and procedure. Moreover, the R & D department is expected to develop the meals uplift technical production with a high competition level.

The company should build a new kitchen. The old kitchen can be used for Garuda flight meals uplift, while new kitchen is dedicated to flights order than Garuda. This management separation is necessary in order to make a more professional performance. Then the Garuda meals uplift management does not take big profit but prefers more to the service quality, while the meals uplift management other than Garuda tends to take big profit.

The sudden increase in the production cost percentages against selling amounted to 43% indicates the presence of inefficiently in the production management. In this case, the company should increase the efficiency in managing its technology components just if the company is willing to compete with other flight catering companies.

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B. REVIEW ON THE TECHNOLOGY CAPABILITY INDICATORS

The ACS company has no competitors in Indonesia so that it runs almost a monopoly business. Therefore, competitor comes from overseas or international business. The most powerful competitor for the ACS is the SATS Catering Pte. Ltd. (Singapore), Malaysia Airline System (Malaysia), Royal Brunei Catering SDN BHD (Brunei Darussalam), Thai Airways Int'l Ltd. (Thailand), China Pacific Catering Service (Hongkong), Qantas Flight Catering Ltd. (Australia), KLM Royal Dutch Airline Catering Service (Netherlands) and Saudi Arabian Airlines Catering (Saudi Arabia). These competitors' companies are airline based flight catering.

1. Assessment of Operative Capability

The ACS company has utilized and control technoware in the meals uplift production activities. According to the previous undertaken meal test activity, the planning of the production operation has been running well. Besides, the company has already received the ISO 9002 certificate in 1994 that furnished the company with a higher competition level.

The capability to provide information support and networking for operation has been used well. Despite constraints in the implementation of information integrity, anticipation has been made by procuring an integrated computer system among each related section.

The capability of company in maintaining and doing trouble shooting has been running well. However, there were also damaged equipment or machines, which have not fully repaired. Fortunately, this equipment has reserves so that the delay made by such improvement result in no production process disturbances.

The above explanations reveal that the company's capability laid in level 2 (similar to the competitor companies in ASEAN countries). Meanwhile, the operative capability expected by company was level 3 (the best in the ASEAN countries).

2. Assessment of Acquisitive Capability

The ACS company has no Research and Development Department yet. This will limit the performance of the company, especially to the extent of the assessment on the superior system and framework. However, the technical production of the company has been running well as well as the creations of the produced meals uplift.

Individually, the identification of technology sources is perceived to be outnumbered. The company still depends on foreign equipment distributors so that to know the developing production technology the company has to attend exhibitions or EXPO of the newest products for food services.

The acquisitive capability of the company was assessed to lay on level 1 (the best in Indonesia), while the condition expected by the company was level 2 (similar to the competitor companies in the ASEAN countries).

3. Assessment of Supportive Capability

The company is perceived to possess the capability in undertaking project execution. The development of branches of the company has spread to other areas in Indonesia (based frequency of certain airports). Besides, the company is also able to provide different meal's uplift desired by any airlines both domestic and overseas. In addition, the company is also entrusted to provide foods for the pilgrimage to Mecca.

The Human Resources Department has the task to carry out education and development of employees of the company according to their job requirements in anticipating the smoothness of the company's operations.

The marketing done by the marketing division was less active. This was possibly caused by the fixed market of consumers, that is, airlines that visited Indonesia. Besides, the ACS company is a subsidiary of Garuda so that its marketing is related closely with Garuda's. Therefore, the ACS company should be more proactive in marketing its products, especially in replacing the coming free trade era in Asia-Pacific.

The above explanations underline that the supportive capability of the company laid on level 2 (similar to the competitor companies in the ASEAN countries). Meanwhile, the supportive capability expected by the company was level 3 (the best in the ASEAN countries).

4. Assessment of Innovative Capability

The capability of the company in adapting imported technology has been running well. This can be learned from the capability of the production and engineering employees in the well operation of the technological equipment. Besides, when simple damages occur the technician of the company can fix the damaged equipment reasonably soon.

The ACS company has not yet owned the capability in duplicating acquired technology. This possibly is so since the company focused more on the technical production. To the extent of duplicating the technical production, the ACS company has been running well.

The innovative capability of the company was assessed to be in level 2 (similar to the competitor companies in ASEAN countries), while the innovative capability expected by the company was level 3 (the best in the ASEAN countries).

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The assessment of technology capability of the company shows the median of 2. This means that the technology capability of the company laid on level 2 (similar to the competitor companies in the ASEAN countries), while capability expected by the company was level 3 (the best in the ASEAN countries). The test of data shows that the probability value at the significant level of 0.05 was 0.0578; this means that the H_0 was accepted. The acceptance of H_0 means that the technology capability of the company has satisfied the expectation of the company, that is, at level 3 (the best in the ASEAN countries). This indicates that the company is quite able to develop its catering business by usage of higher technology; the technology capability quite supports operationally, acquisitively, supportively, and in innovative matters.

5. Test On The Relationship Between The Technology Transformation Indicators And The Technology Capability Indicators

The test on both indicators was done using Chi-Square Statistic method. The result of the calculation shows that the chi-square value was 1.081. This value was compared with the chi-square value in the table with df = 9 (amounted to 16.919); it results in the acceptance of H_0. This acceptance means that the relationship between the technology transformation indicators and the technology capability indicators is free or has no influences.

According to that test, certain technology components that should be fixed can be acknowledged so that company's objective can be attained. Relating to this, there are policy alternatives that can be undertaken by the company: (a) use the current techno-ware as optimal as company can; (b) undertake the education, training and development of the current humanware, improve the performance appraisal system as well as the job specification, and stipulation of the job description; (c) optimize information processes and utilizing, especially to the extent of the meals uplift production planning, marketing planning, and even the meals uplift production process itself; (d) improve immediately the orgaware of the company, especially to the extents of the making of more communicative organization structure, the making of the Research and Development Department, the building of new kitchen, and the separation of meals uplift productions.

CONCLUSIONS AND RECOMMENDATION

The ACS company has possessed and controlled excellently the technoware. However, this success is not supported with the human-ware, infoware, and orga ware. The review on the technology transformation against in the technology components resulted:

(1) The technoware of the ACS company can be grouped into the manual up to the special-purpose facilities. This condition has satisfied the company's expected technology status, that is, between the powered up to automatic facilities.

(2) The humanware of the ACS company has possessed the capabilities to repair, reproduce, and adapt. The capabilities to improve and to undertake innovations have not satisfied the expectation of the company.

(3) The utilizing of the infoware of the company laid on the stages of describing, specifying, and utilizing facts. This condition has not satisfied the expectation of the company, that is, on the stages of comprehending, concluding, and assessing facts.

(4) The orgaware of the company laid on the stages of striving, tipe-up, and protecting the framework. This condition has not satisfied the expectation of the company, that is, on the stages of stabilizing, prospecting, and leading the framework.

The review on technology capability indicators of the company against its external environment indicates median 2 (similar to the competitor companies in the ASEAN countries). This means that the company has a quite fair capability to compete in the flight catering industry. This condition has satisfied the expectation of the company that at least the company put itself at the best position in the ASEAN countries (median 3). Then, the usage of the chi-square statistics concludes that the technological transformation indicator has nothing to do with the technology capability indicator.

Some policy alternatives for optimizing the implementation of its technology management are:

(1) Utilizing current technoware as optimal as the company can by means of improving damaged equipment, replacing old equipment with new or more efficient ones, and carrying out a more preferred and precise technoware purchasing planning for future transactions.

(2) Undertake education, training and development of the presence humanware both in the technical and management aspects. Besides, the company should improve performance appraisal system, the job specification, the complain record or the working performance inspection, as well as the stipulation of the job description.

(3) Optimize the information processing and utilization by improving the present information system, the usage of the integrated computer system and the usage of the Internet facilities.

(4) Improve the orgaware of the company. It can be done by making a more communicative organization structure, forming a Research and Development Department in short term and long term planning, possibly building new kitchens and separating the meals uplift productions.

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