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**CRITICAL SUCCESS FACTORS FOR IMPLEMENTING INTEGRATED MANAGEMENT SYSTEM (IMS): SURVEY AND CASE STUDIES RESULTS**Musli Mohammad<sup>1</sup>, M.R. Osman<sup>2</sup>, Rosnah M.Y.<sup>2</sup> and N. Ismail<sup>2</sup><sup>1</sup>Department of Manufacturing and Industrial Engineering, Faculty of Mechanical and Manufacturing Engineering, Universiti Tun Hussein Onn Malaysia, Johor, Malaysia<sup>2</sup>Department of Mechanical and Manufacturing Engineering, Faculty of Engineering, Universiti Putra Malaysia, Selangor, Malaysia  
Email: mmusli@uthm.edu.my**ABSTRACT**

*Business trend nowadays demands for the integration of several business related management systems such as Quality Management System (QMS), Environmental Management System (EMS) and Occupational Health and Safety Management System (OHSMS). The integration of management systems will reduce paperwork, minimise costs, eliminate redundancies and eventually improve system efficiency and effectiveness. This paper explains the Critical Success Factors (CSFs) for implementing Integrated Management System (IMS) based on survey and case studies results. Questionnaires were distributed to 87 companies that are certified with both ISO9000 and ISO14000, which resulted in a response rate of 36.8%. Meanwhile, three case studies were conducted at the manufacturing companies that have implemented IMS. The analysis found that five most Critical Success Factors (CSFs) for IMS implementation are: management commitment and leadership, education and training, continual improvement, performance measurement, and systems and processes.*

**Keywords:** *Critical Success Factors, Integrated Management System, Malaysian manufacturing companies.*

**INTRODUCTION**

There are various factors that are currently being perceived to be critical for successful Integrated Management System (IMS) implementation. Even though there are different views given by various authors, the factors are actually centred on seven main elements which are management commitment and leadership, resources management, focus on stakeholders, education and training, performance measurement, systems and processes, and continual improvement (Mohammad et al., 2005). According to Rockart (1979), Critical Success Factors (CSFs) are the limited number of areas in which results, if they are satisfactory, will insure successful competitive performance for the organisation. The ultimate value of the CSFs is its ability to focus management attention on tasks and activities that need to be done well to achieve success (Bullen, 1995). For this case, the CSFs are the few key areas/activities that 'must go right' for IMS to flourish and successful.

**METHODOLOGY**

Survey and case study were conducted for collecting quantitative and qualitative data. A five step approach was used for the survey in order to ensure successful survey implementation. It started with designing the survey and followed by designing the questionnaire, instrument validation and pilot study, conducting survey and finally analysing data. For case studies, three steps were involved. Firstly, case study instrument was developed. It is followed by conducting the case studies and analysing the data.

**Survey**

Self-administered questionnaire was selected to be the survey instrument. The questionnaires were distributed to all the Malaysian manufacturing companies that have certified with both ISO9000 and ISO14000 based on FMM Directory 2004 (FMM, 2004) and SIRIM QAS International Directory of Certified Products and Companies 2004 (SIRIM, 2004). The total number of these companies is eighty seven. Fifty two companies were obtained from FMM Directory 2004 (FMM, 2004), 10 companies were from SIRIM QAS International Directory of Certified Products and Companies 2004 (SIRIM, 2004) and, the balance of 25 companies were from both of the directories. The reasons for choosing this sample are as follows:

- There was no database or directory that provided listings of the manufacturing companies that have implemented IMS
- Companies that implement IMS must at least have two management systems in place in order for them to integrate (e.g. QMS and EMS/ QMS and OHSMS / EMS and OHSMS). Since the standards for QMS and EMS are widely used by the Malaysian manufacturing companies, therefore companies that certified with ISO9000 and ISO14000 have been selected as the sample for this study
- FMM member companies certified to ISO9000 and ISO14000 were identified from the FMM Directory 2004 (FMM, 2004). However, for non-FMM members, the companies were identified from the SIRIM QAS International Directory of Certified Products and Companies 2004 (SIRIM, 2004). Based on these two directories, the majority of the Malaysian manufacturing companies certified with ISO9000 and ISO14000 could be included in this study.
- Other researchers, such as Douglas and Glen (2000) also used those companies that have certified with ISO9000 and ISO14000 as the sample for their study on IMS implementation.

Based on a comprehensive review on literature and several existing questionnaires, a questionnaire with a total of five sections was developed. The first section attempts to obtain general information about the respondent's company. Concurrently, this section also segregates the respondents according to the status of their IMS implementation, which are those that (1) currently implementing IMS, (2) not implementing IMS but have plan to implement it in the next three years; and (3) company that is not implementing IMS and do not plan to implement it. Second section is designated to the companies that have implemented IMS since this section attempts to investigate the strategies that have been used and the level of IMS practice at the respondent's company. Section 3 of the questionnaire asks the opinions on what should be the strategies for integrating the management systems. Question pertaining five most critical factors for successful IMS implementation is included in this section. Responses were collected from the respondents that 'have implemented IMS' and, those that 'have not implemented IMS but have planned to implement it in the next three years'. It is believed that these respondents have the ideas on what should be the strategies for integrating the management systems since they have implemented it or have planned to implement it in the near future. In Section Four of the questionnaire, respondents that 'have not implemented IMS and do not plan to implement it' were asked about their reasons for not implementing IMS. Finally, Section Five asks the respondent's opinions or experiences on the barriers towards implementing IMS at their company.

The questionnaire used for this research was validated to ensure that it is valid for data collection. Two types of validity have been conducted which were face validity and content validity. Face validity was conducted by showing the questionnaire to a few untrained individuals to check whether they think it is acceptable for the study or not. Meanwhile, content validity was conducted by distributing the questionnaire to several reviewers involving academicians and practitioners who have knowledge on the subject matter. The reviewers assessed the contents of the questionnaire to ensure that it includes everything it should have and does not include anything it should not have. Subsequently, a pilot study was conducted with a small sample population. Five companies were involved in this pilot study embracing those that have implemented IMS and those that have not implemented IMS. Based on the feedbacks from validation and pilot study, the questionnaire was revised. For reliability analysis, Cronbach's alpha model that measures internal consistency was performed using Statistical Package for Social Science (SPSS) software version 12.

Subsequently, 87 sets of questionnaire were mailed out together with the cover letter, recommendation letter and self-addressed stamped envelope to the sample companies all over the country. Respondents of the survey were quality or environmental management representative since they are directly involved in the management systems implementation. The respondents were given four weeks to answer and return back the questionnaire using the enclosed self-addressed stamped envelope or fax it to the research supervisor.

### **Case Study**

Case study method was used to collect qualitative data for this project. Research questions for case study mainly focus on "how" and "why" (Yin, 1994). This method has been employed by many researchers when conducting IMS research such as Bamber et al. (2000), Beckmerhagen et al. (2003), Chan et al. (1998), Holdsworth (2003), Labodova (2004), and Zutshi and Sohal (2005).

Case study instrument was developed to facilitate data collection. All pertinent questions to be asked when conducting a case study have been included in it (Yin, 1994). The case study instrument is an important tool for increasing the reliability of case study research and has been used as a guide when conducting the study (Yusof and Aspinwall, 2001). It consists of three main sections. The first section attempts to investigate the background

information of the case company. The second section requests information on how the strategies for IMS have been implemented at the case company. Meanwhile, Section 3 asks about how the Critical Success Factors for IMS have been implemented. Prior to data collection, the case study instrument was validated by the lecturer that well-versed with this area in order to ensure that the questions were suitable and properly phrased.

In an attempt to identify the companies that are willing to be involved in the case study, a question was added in the questionnaire asking the respondents willingness to participate in the case study. Based on the returned questionnaires, nine companies had indicated their willingness to be involved in the case study. Five of these companies were contacted based on several factors which are as follows: (1) status of IMS implementation, (2) type of industry, (3) size of the company, and (4) location. Eventually, three companies did agree to cooperate and provide information. It was involved companies from non-metallic mineral products (Company A), electrical and electronics (Company B) and chemical industry (Company C).

The main element of the case study was conducting an interview with the personnel who is responsible for IMS implementation in each case company. The interview took one to three hours to complete. For further clarification and confirmation about the content of the case study, site visit and/or document review were also carried out. All the data were collected based on the case study instrument that has been prepared earlier before conducting the case study. Data collected for case study was analysed through cross-case examination between all the case companies to look for differences and similarities.

## RESULTS AND DISCUSSIONS

This section presents the overall results of this study. It begins with explanation on the profiles of the survey and case study. Then, it is followed with discussion on the Critical Success Factors (CSFs) for IMS implementation

### Profiles of Survey

The responses of the survey were analysed using the Statistical Package for Social Science (SPSS) software version 12. Based on the total of 87 questionnaires distributed, 32 questionnaires were returned which represent 36.8% response rate. According to Yusof and Aspinwall (2000), a response rate of 20 to 25% is normal for mailed questionnaires. Therefore, the response rate of this study could be considered reasonable for data analysis. Comparing the response rate of 36.8% with other IMS studies conducted in United Kingdom, it is higher than Stamou (2003) (11.9%) and Tang (2003) (22%), but lower than Douglas and Glen (2000) (56%).

The breakdown of the respondents according to the size of the companies is presented in Table 1. Twenty six of the respondents (81.2%) are large enterprises and only six of the respondents (18.8%) are small and medium sized enterprises.

Table 1: Breakdown of the respondents according to the size of companies

| No           | Size of the company  | No. of respondent | Percent (%) |
|--------------|--|-------------------|-------------|
| 1            | Large enterprise (more than 150 full time employees*)                      | 26                | 81.2        |
| 2            | Small and medium sized enterprise (not exceeding 150 full time employees*) | 6                 | 18.8        |
| <b>Total</b> |  | <b>32</b>         | <b>100</b>  |

\* based on definition from Small and Medium Industries Development Corporation (SMIDEC) (2002)

Table 2 shows the distribution of the respondents according to the type of industry that the companies are involved in. Most of the respondents are from electrical and electronics industry which represented 53.1% of the total percentage. It is followed by the chemicals (9.4%) and food (9.4%) industries.

In terms of management systems standards, all the respondents are certified with both ISO14000 (EMS) and ISO9000 (QMS). For companies that are supplying parts or products to the automotive industry, they are also certified with other QMS standards such as ISO/TS16949: 2002 (18.8% or 6 companies) and/or QS9000 (21.9% or 7 companies). In addition, 40.6% of the respondents (or 13 companies) are certified with OHSAS18001:1999 (OHSMS).

Table 2: Distribution of the respondents according to the type of industry

| No           | Type of industry                | No. of companies | Percentage (%) |
|--------------|---------------------------------|------------------|----------------|
| 1            | Electrical and electronics      | 17               | 53.1           |
| 2            | Chemicals (including petroleum) | 3                | 9.4            |
| 3            | Food (including beverage)       | 3                | 9.4            |
| 4            | Automotive                      | 2                | 6.3            |
| 5            | Fabricated and basic metal      | 2                | 6.3            |
| 6            | Non-metallic mineral products   | 2                | 6.3            |
| 7            | Others                          | 3                | 9.4            |
| <b>Total</b> |                                 | <b>32</b>        | <b>100</b>     |

As can be seen in Table 3, only 15 respondents (or 46.9%) have implemented IMS and the other 17 respondents (or 53.1%) have not implemented IMS. However, 9 out of the 17 companies that have not implemented IMS (or 52.9%) are actually planning to implement it in the next three years.

Table 3: Breakdown of the respondents according to the status of IMS implementation

| No           | Status  | No. of companies | Percentage (%) |
|--------------|---|------------------|----------------|
| 1            | Has implemented IMS   | 15               | 46.9           |
| 2            | Not implemented IMS, but has plan to implement it in next 3 years | 9                | 28.1           |
| 3            | Not implemented IMS, and do not plan to implement it              | 8                | 25.0           |
| <b>Total</b> |   | <b>32</b>        | <b>100</b>     |

### Profiles of Case Study

Case studies were conducted at the Malaysian manufacturing companies as summarised in Table 4. The first case company is a small and medium sized enterprise (SME) that produces premix and aggregate for road construction. It has implemented Quality Management System (QMS) first (certified with ISO9000 in 1998), and then continued by integrating the Environmental Management System (EMS) with their existing QMS. Subsequently, the company obtained certification of ISO14000 in the year 2001. It has also informally implemented Occupational Health and Safety Management System (OHSMS) in-house. Coordinator for IMS implementation is the Assistant Quality Manager.

Table 4: Background of the case companies

| Items                                    | Company A                               | Company B   | Company C   |
|--|---|---|---|
| Sector                                   | Non-metallic mineral products           | Electronics   | Chemical  |
| Category                                 | Small and Medium Sized Enterprise (SME) | Large enterprise  | Large enterprise  |
| QMS implemented (year of implementation) | ISO9001:2000 (1998)                     | ISO9001:2000 (1995)   | ISO9001:2000 (1993)                                       |
| EMS implemented                          | ISO14001 (2001)                         | ISO14001 (1997)   | ISO14001 (2000)   |
| OHSMS implemented                        | Informal/in-house                       | OHSAS18001 (2002)   | OHSAS18001 (2005)   |
| IMS started                              | 2000                                    | 2003  | 2002  |
| Element of integration                   | QMS and EMS                             | QMS, EMS and OHSMS  | QMS, EMS and OHSMS  |
| Coordinator / Management Representative  | Assistant Quality Manager               | ISO Quality, Environment, Safety and Health (ISO QESH) Department | Environment, Safety, Health and Quality (ESHQ) Department |

Company B has around 5,000 employees. The company manufactures colour television, key components of colour television, colour projection television, Video Cassette Recorders (VHS), DVD Player, home audio and portable audio. The company has implemented QMS first and certified with ISO9000 in 1995. It is followed by EMS (certified with ISO14000 in 1997) and OHSMS (certified with OHSAS18000 in 2002). The EMS and OHSMS procedures have been integrated since this company implemented OSHMS. Then, in year 2003, the company has integrated all the three existing management systems which are QMS (ISO9000), EMS (ISO14000) and OHSMS (OHSAS18000). The management systems integration has been coordinated by ISO QESH (Quality, Environment, Safety and Health) Department.

Company C manufactures titanium dioxide pigments for the usage in producing paint, metal decorative, automotive finishes, coal coatings, powder coatings, plastics and other related products. It has implemented

QMS (certified with ISO9000 in year 1993), EMS (conducted Group Global Responsible Care Management System and certified with ISO14000 in year 2000) and OHSMS (conducted Group Global Responsible Care Management System). The Group Global Responsible Care Management System consists of employee health and safety code, pollution prevention code, process safety code, community awareness and emergency response, distribution code and product stewardship code. Subsequently, the company has integrated all three management systems (QMS, EMS and OHSMS) simultaneously in year 2002. This company has also certified with OHSAS18000 in year 2005. Their IMS implementation has been coordinated by ESHQ (Environment, Safety, Health and Quality) Department.

### Critical Success Factors (CSFs) for IMS implementation

The respondents of the survey were asked to select five most critical factors for successful IMS implementation. As shown in Figure 1, five most critical success factors are; management commitment and leadership (95.8%), education and training (91.7%), continual improvement (91.7%), performance measurement (79.2%) and finally, systems and processes (70.8%).

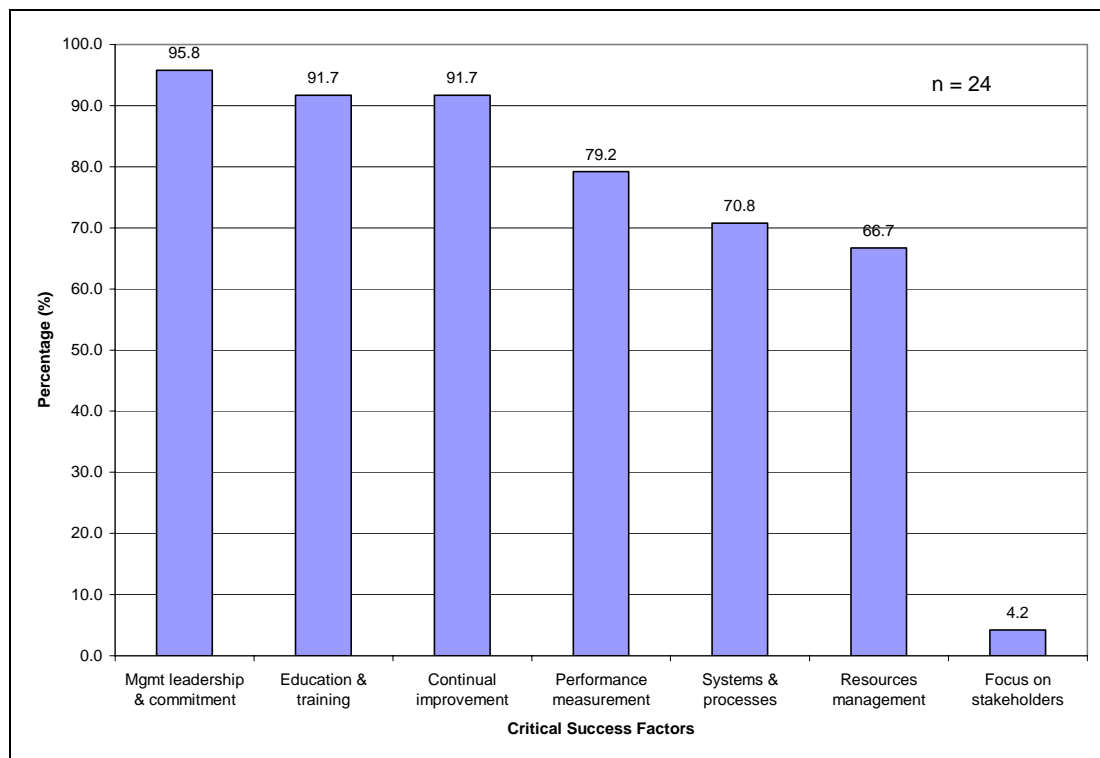


Figure 1: Critical success factors for IMS implementation

This result is similar to the five most critical success factors selected by company A. The other two companies have selected four factors that are similar to this survey result which are: (1) Management commitment and leadership, (2) Education and training, (3) Continual improvement, and (4) Performance measurement. For the fifth most critical factor, company B and C have selected ‘resources management’ which is the sixth most critical success factor for IMS implementation according to the survey result.

The major lessons learnt from the implementation of the five most CSFs by the case companies are described as follows:

(i) Management commitment and leadership

Before starting to implement IMS, the companies need to obtain top management commitment (Zutshi and Sohal, 2005). Due to this reason, the management commitment has been emphasised by all the case companies and is one of the main factor for their success in implementing IMS. In addition, the management leadership is also vital to lead the case companies in implementing IMS. The main roles that have been implemented by the management level of the case companies are listed below:

- Developing IMS policy and objectives based on the vision and mission of the company.

- Disseminating the IMS policy and objectives through effective communication channel (e.g. intranet, notice board, and poster) and conducting briefing. Company A and B also distributed a pocket sized IMS policy to all employees.
  - Conducting management review regularly to discuss about the progress of IMS implementation.
  - Providing sufficient resources to the employees in order for them to do their work effectively.
  - Appointing the Management Representative (MR) or 'champion' for IMS implementation. This person has been given full support, adequate resources and authority from top management in order to ensure that IMS can be implemented successfully. For the large companies such as Company B and C, they have established a department to coordinate and administer the IMS implementation at the company level. Other departments in these companies also have an IMS representative to assist the IMS implementation at the department level.
  - Involving in the IMS activities such as IMS campaign and plant tour.
  - Demonstrating leadership capabilities and always motivates the employees at all levels.
- Several literature such as Beechner and Koch (1997), Zutshi and Sohal (2005), and Zutshi and Sohal (2004) have also highlighted the roles of the management level as practiced by the case companies.

(ii) Education and training

Education and training are the effective ways to reduce resistance from the employees in implementing IMS. The main aims of education and training are to: provide awareness for the needs and benefits of IMS implementation; explain how the IMS would be implemented, utilised and maintained; and gain employees involvement (Zutshi and Sohal, 2005). The main types of training that have been provided by the case companies are as follows:

- Internal or in-house training, such as basic awareness and understanding of IMS, environmental knowledge and awareness, safety and health awareness, and the usage of Personal Protection Equipment (PPE);
- External training, to enhance the employees' capabilities (e.g. management system training, lead auditor training, legal requirements training and, safety and health training).

In addition, all the case companies have their own training requirements. For example, company C requires all the employees to be trained on IMS related knowledge and skills for average of eight hours. The status of the training and its effectiveness are also reviewed regularly. All these issues have also been highlighted by several researchers such as Beechner and Koch (1997), Zutshi and Sohal (2005), and Dubinski et. al (2003).

(iii) Continual improvement

In order for continual improvement activities to be successful, it requires culture change and total involvement from all the employees (Zutshi and Sohal, 2005; Imai, 1986; Wilkinson and Dale, 1999). The employees should be innovative and open-minded about the changes that are taking place in integrating the management systems (Zutshi and Sohal, 2005). All these issues are emphasised and implemented by the case companies. The main approach that has been used by the case companies is Total Quality Management (TQM). However, company B also uses six-sigma approach for its continual improvement initiatives. The continual improvement initiatives are implemented within the same department and across departments. Most of the process improvements at the case companies are carried-out through small group activities (e.g. Quality Control Circle or QCC). Every department/unit has to submit several projects for continual improvement. During conducting the project, each group utilises the improvement tools and techniques such as Seven Quality Control (QC) tools, brainstorming and PDCA cycle. The projects are monitored regularly, whereby the best projects are presented and awarded accordingly.

(iv) Performance measurement

Performance measurement is one of the most important activities that have been implemented by the case companies in order to check their performance and identify the potential improvement areas. Several researchers have highlighted the importance of performance measurement such as Scipioni et al. (2001) and, Zutshi and Sohal (2005). In relation to this, Key Performance Indicators (KPIs) are established by the case companies at all relevant functional levels. Some examples of the KPIs that have been established in company A are: quality, environment, safety, health, production improvement and productivity. The KPIs are monitored regularly. Each department/division has its own targets, which are developed based on the company's targets. For example, the targets for each department in company B are set based on quality, delivery, cost, environment, safety and health. Internal and external audits are carried-out at least once a year by the case companies. For large companies like company B and C, they are also conducting: group audit, by other group companies; and supplier audit, by their suppliers. Furthermore, the performances of the case companies are benchmarked with the companies in the same scope of business. All these activities have also been mentioned by Mackau (2003), McDonald et al. (2003), Dubinski et al. (2003), Abarca (1998) and Zutshi and Sohal (2005).

(v) Systems and processes

Prior to the development of IMS documentation, all the processes in the company, product characteristics, and regulatory requirements especially that affect quality, environment, safety and health performance, were identified and analysed by the case companies. The requirements of the related management systems that wanted to be integrated were also reviewed. Once the gaps between the existing systems documentation and the requirements for new IMS documentation were identified, then only the IMS documentation had been developed. The IMS documentation was reviewed, analysed and modified until it had been finalised. Once it was finalised and approved by the IMS committee, then IMS have been implemented in the case companies. During the implementation of IMS, the IMS documentation are reviewed periodically for relevancy and disposed when it become obsolete. Furthermore, corrective and preventive actions are identified and implemented by the case companies in order to comply with the requirements of the system. All the activities that have been carried-out by the case companies are quite similar to what have mentioned by Holdsworth (2003) and Beechner and Koch (1997).

## CONCLUSIONS

Based on results of the survey, five most critical success factors for IMS implementation are; (1) management commitment and leadership, (2) education and training, (3) continual improvement, (4) performance measurement, and (5) systems and processes. These results are similar to the five most critical success factors selected by company A. The other two case companies have selected top four factors that are similar to this survey results. However, these companies have selected 'resources management' as its fifth most critical factor, which is also the sixth most critical success factor for IMS implementation according to the survey results.

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