



COMPUTER INTEGRATED MANUFACTURING CIM IMPLEMENTATION FOR DEVELOPED AND DEVELOPING COUNTRIES

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ABSTRACT

Searchable Implementing integrated advanced technologies is an effective approach towards solving most problems in today's competitive global market Computer Integrated Manufacturing (CIM) technologies are presented as a solution to manufacturing organizations which need to perform well

This research describes the major issues and problems facing developing countries that wish to implement CIM In this investigation, Libya is taken as an example of a developing country, while Ireland is used as a model of a more developed country, which has already implemented components of the CIM technology in some of its industrial companies This research demonstrates the effect of CIM technology on Irish industry by investigating the cost effectiveness of implementing CIM, reduction of the production time, reduction of the product cost and management efficiency

To carry out this study, in Indian manufacturing companies in order to help establish the status of CIM within manufacturing companies, to study the effect of CIM on industries were investigated to assess the CIM level in their companies and the possibility of implementing CIM technology The aim findings of this research are that successful implementation of CIM depends on sufficient initial and continued investment from within the country and outside Furthermore, in order to implement CIM successfully it is vital that there is sufficient expertise and trained workers.

Keywords: component: CIM Computer Integrated Manufacturing, CIT computer integrated technology

I. INTRODUCTION

Due to rapid developments both in new technologies and new production management techniques the industrial environment is changing and the pace of change is accelerating (1) Resources, markets, manufacturing processes and product strategies are also significantly changing Increasing international competition means that only the most productive and cost-effective industries will survive (2) Globalization has increased opportunities for across border trade, and higher standards of living in a world where technology has become the driving force behind the structure of domestic production

This vital power, however, resides in the productive enterprises, and is derived from their ability to introduce technological innovation continuously. Enterprises introduce technological innovation through acquisition (technology transfer) or self-generation (technology development) to enhance their market competitiveness. Thus, proper management of technological change, particularly at the productive enterprise level, has become the most important consideration for development. (3) Computer Integrated Manufacturing (CIM) is a management and manufacturing strategy which entails the integration of design, engineering, manufacturing, logistics, warehousing and distribution, customers and suppliers, sales and marketing activities, financial management and the overall control of the enterprise. (4) "CIM stands as innovative application for yesterdays proposals and the newer application required today and for the future" (5)

the application of computer integrated technology. They explain that implementing integrated advanced technologies provides opportunities to achieve competitive advantage, which is financially viable in an intermediate to long-term time frame, making it an effective approach towards solving the problems of decreased productivity relative to labor costs and consequent rise in unit costs, which are continually plaguing present day manufacturing managers. Indeed, any changes in the technology have an effect on products, employees and organizational structure and the relationships between them, as shown in Figure 1

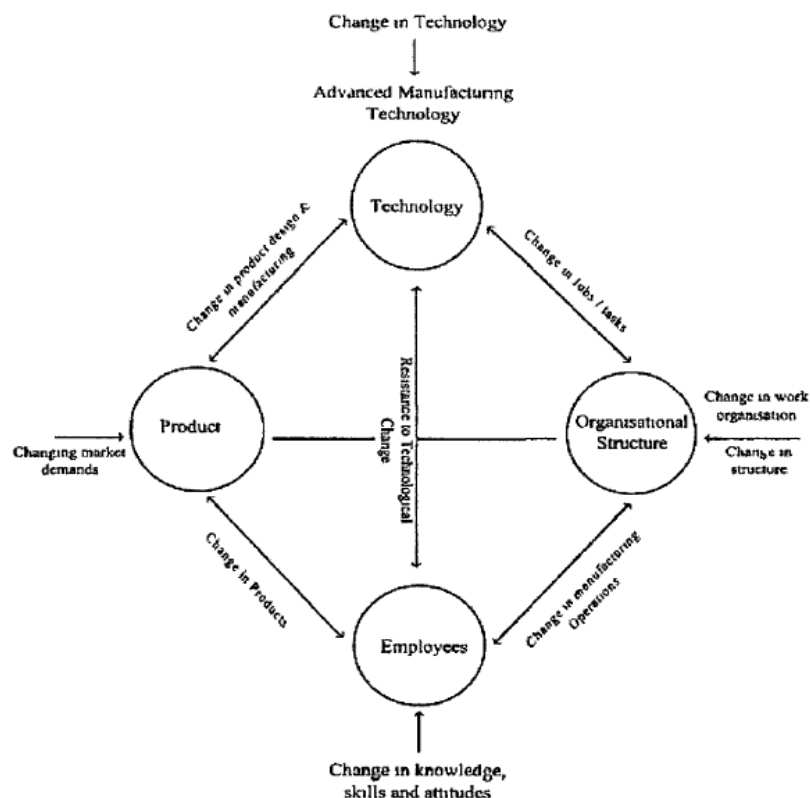


Figure 1 Conceptual Framework of Technological Change and Posited Relationship

II. AIM AND RESEARCH OBJECTIVES

The primary aim of this research is to estimate the benefits gained from the successful implementation of the components of Computer Integrated Manufacturing (CIM) system in some companies in Ireland and

demonstrate the importance of these benefits to overcome problems faced by industries today This research also aims to review the evidence of CIM effectiveness and efficiency in helping industry to survive in today's competitive global market

The research has been broken into three main objectives

- 1 To conduct a literature review on The CIM system and establish the rationale behind CIM, the components of a CIM system, it's benefits and a critique of the CIM system.
- 2 To distribute questionnaires to manufacturing companies to establish the status of CIM within manufacturing companies.
- 3 To conducting interviews with some manufacturing professionals in a sample of companies to explore why they do not currently use CIM and the possibility of implementing CIM in the future.

III. DISCUSSION OF IMPLEMENTATION AND NOT IMPLEMENTATION CIM

The primary aim of this research is to estimate the benefits gained from the successful implementation of components of a Computer Integrated Manufacturing (CIM) system in some companies and demonstrate the importance of these benefits to overcome today's industrial problems. This research also aimed to review the evidence of CIM effectiveness and efficiency in helping industry to survive in today's competitive global market. This research explores the possibility of encouraging developing countries' industries to start investing and implementing CIM. The purpose of this research was to critically analyses CIM technology in the Irish manufacturing economy and establish if CIM technology is cost effective, reduces production time, improves quality, reduces cost and if it is an efficient tool for management.

Manufacturing is fundamental to economies around the world Today's industry competes in a truly international marketplace. For any country to compete in this market, it must have companies that provide high-quality products to their customers in a timely manner. The global competition, which exists today, not only from developed industrial countries, but also from low labor cost countries such as China, forces manufacturing managers to consider and adopt innovative and advanced technologies (13). Implementation of CIM could help companies achieve their competitive goals to survive in the global market environment as long as the technologies chosen are appropriate to meet their objectives. Application of CIM has been proposed as a necessary step towards the future in manufacturing to face competitive challenges.

This research emphasizes the significant role of Computer Integrated Manufacturing (CIM) to a country's economy. Also, the results of the literature survey indicate that introducing a new technology in any enterprise can lead to reduced costs, and this is the main target of any manufacturing management in today's competitive global industry and market, such as decreased labor cost and consequent decrease in unit costs. Considering the costly, complicated and lengthy processes of CIM implementation, it is necessary to gain a comprehensive and reliable picture of CIM implementation in a country where CIM technology is already being implemented.

The current status of CIM implementations in Irish manufacturing companies.

- The main benefits gained from implementing CIM, in companies where it has been introduced.
- The reasons for not implementing CIM in companies where it has not been introduced.
- The possibilities of implementing CIM in developing countries,

where it was also necessary to conduct interviews with manufacturing managers and production engineers to analyses the level of awareness of the benefits of CIM technology.

By establishing the benefits of CIM technology in manufacturing companies

There are several issues arising from the literature review and the primary research conducted during the course of this dissertation. Based on the literature review it is evident that companies need to reduce Lead-time, Costs and Inventory. While, companies need to increase quality and responsiveness

to customers. Based on the literature review there is evidence to suggest that implementing CIM can produce an increase of productivity of some 40-70%. Both design costs and the in-shop time of a part can also be reduced by 15-30% and 30-69% respectively. Scrap can also be reduced by 20-50%, leading to better product quality (19).

Results from an empirical investigation into the use of Computer Integrated Manufacturing in German hardware manufacturing indicate a large number of reasons encouraging firms to invest in CIM. The most prominent of these reasons are a reduction in order processing time, an increase in scheduling effectiveness, and shorter delivery delay. These findings are supported in the results of the primary research conducted in this dissertation.

This research Paper showed that Irish companies using CIM have identified four

Clear benefits of using CIM:

- Improved product.
- Reduced production time.
- Reduced inventory.
- Cost reduction and cost effectiveness.

When considering whether or not to implement CIM, companies it should bear in mind these obvious benefits of CIM.

IV. CIM IMPLEMENTATION AND COST EFFECTIVE

“Although the cost of such a totally automated system is still unacceptably high, some companies have made considerable steps toward CIM with the goal of gaining a competitive advantage in the world marketplace” (16). The results showed that implementing CIM components is an expensive undertaking. Of those who use CIM, 54% chose quite expensive and 19% chose very expensive. 33% of those not using CIM who answered the question chose financial obstacles as a reason for not using CIM. So cost is one of the major obstacles toward implementing CIM. This is also true for companies in Libya. Most of the interviewees stated that the cost of CIM was a reason for not considering the introduction of CIM. Implementing CIM components requires a big budget or a large investment from a company. Many countries should consider investment from foreign sources as an effective way in helping to implement CIM in a country that cannot offer this kind of initial investment.

The results of the survey showed Ireland has huge foreign investment especially from developed industrial countries. For example 26% of the companies surveyed are USA owned. This supports the finding of Hashmi and Cuddy that the majority of the larger manufacturing industries in India who use new technological developments towards enhancing productivity and competitiveness are of overseas origin.



'U.S. investment has been particularly important to the growth and modernization of Irish industry over the past 25 years, providing new technology, export capabilities, and employment opportunities'. It is evident from the interview results that Libya's industry needs investment from inside and outside to achieve competitiveness in the market place. Despite the high income generated in Libya through the oil industry, there is a low level of inside investment in the broader industrial sector. In Libya, there is little foreign investment due to the political nature of the country to date. In recent times, Libya's industry has diversified from public sector to encouraging private investment and ownership. At present there are several foreign owned industries competing to invest in Libya and take advantage of the incentives offered .

Once investment is secured it is important for all managers to take into account the overall costs of implementing CIM including the cost of new equipment and skills training. These costs may result in some managers resisting the implementation of CIM technology. Small to Medium sized Enterprises (SMEs) need external assistance and technical recourses to implement CIM as they may lack some or most of these facilities themselves. When cross tabulation was used to analyse the numbers of small to medium sized companies using CIM compared to larger companies, it showed that a far greater percentage of larger companies were using some components of CIM (86%), in comparison to medium (60%) or smaller (50%) sized companies.

Considering the high cost of implementing CIM components, a sequential implementation strategy is an important approach. Investment in CIM can be, or perhaps even should be, started with one or only a few components at a time. Further elements can be added on a step-by-step basis, as production facilities require, or financial and human resources permit the investment. Most of the CIM components can be implemented individually, thus allowing CIM to be approached in a step-by-step manner (16). This makes CIM both attractive and feasible for smaller and medium sized companies. Due to this sequential implementation strategy option, the benefits of CIM are not restricted to large companies. It is important however, that companies continue to add to the components they use. It can be seen from the results of this research that some companies in Ireland are not using CIM to its full potential as they currently limit their use of CIM to only one or two components. They should continue to invest in the other CIM components to gain the full benefits of CIM. As Milling has confirmed, investment in isolated CIM components- CAD equipment, for example, that is used as a stand-alone tool will have limited effect on productivity. Only if it is connected to and shares its data with other equipment, can an over proportionate return on investment be expected.

Cost Effectiveness of CIM

As stated in the literature review, some of the previous studies have highlighted that one of the barriers to implementing CIM is the difficulty in justifying investment in CIM. This study confirmed that CIM is a cost effective system as 67% of the surveyed companies using CIM, stated that CIM is cost effective.

Other results from the questionnaire support this finding. For instance, 83% of respondents using CIM emphasized that using CIM has improved their product and 80% stated that it has reduced production time. Product improvement and reduced production time are important aims for most industries.

V. CONCLUSION

From this research the following points can be concluded,

1. Due to the fact that CIM would reduce costs and increase competitiveness, the successful implementation of CIM is essential in today's global market.
2. Although they may take some time to be seen, successful implementation of CIM has wide-reaching benefits for companies.
 - Operational - reduced costs, reduced cycle time, improved quality and productivity.
 - Managerial - Better resource management.
3. The successful implementation of CIM is dependent on adequate investment.
 - Implementing CIM is costly, but cost-effective.
 - Investment can be a combination of national and foreign investment.
 - Where funds are limited step-by-step investment and implementation can be a highly successful method.
4. Investment in CIM is quite expensive, so a long-term commitment to the investment must be made and management must consider the investment as essential to achieve the company's long-term goals. CIM funding should be part of the future planning because CIM is evolutionary.
5. The successful implementation of CIM is dependent on sufficient expertise and skilled workers.
 - Raising awareness of CIM is dependent on research and sufficient links between industry and relevant third level institutions.
 - Employees accept new technologies if they have access to sufficient training.
 - Adequate training depends on sufficient investment in this area.

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