

**HIGH IMPACT OF TECHNOLOGY ADOPTION TOWARDS SMEs OPERATION
PERFORMANCE**

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LETTER OF SUPERVISOR CONFIRMATION

I, hereby declare that have read this project paper. This project paper is submitted to Universiti Teknikal Malaysia Melaka as a requirement for completion and reward of Degree Bachelor of Technology Management (Technopreneurship).

Signature : _____

Name of Supervisor : _____

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PERFORMANCE**

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Submitted in partial fulfillment of the requirement for the Bachelor of Technopreneurship
(Honours)

FACULTY TECHNOLOGY MANAGEMENT AND TECHNOPRENEURSHIP

DECLARATION OF ORIGINAL WORK

“ I hereby declare that this project paper is result of my independent work except the summary and experts that have been specifically acknowledgement “

Signature :

Name :

Date :

DEDICATION

I would like to dedicate the appreciation for my beloved mother, Jamilah Binti Saad and beloved father Jaafar Bin Hashim who are strongly give moral support and motivation in order to complete this research study. Next, I would like to thank my supervisor Prof.

Dr. Salleh Yahya, for the valuable knowledge, and also to my best buddy Amira Ibrahim.

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I also want to give my appreciation to my best friends, for helping me and being supportive all the time. Last but not least, to anyone who had helped me in finishing this research, thank you.

ABSTRACT

The purpose of this study was to identify factors influencing the productivity level in operational by adoption of new technology 1) Conveyor, 2) Automate Storage and Retrieval Systems (AS/RS) and the use of programs and actions for operation enhancement. The study looked at existing theories 1) Lean management, 2) Total Quality Management, and Just in Time and strategies for productivity improvement that are applicable to SMEs. A survey methodology has been applied for this research to 100 SMEs by using questionnaires. This research is focusing on how SMEs enhance their operation performance in terms of material handling management.

Keywords; *Operation performance, technology adoption, material handling management, Just in Time, Total Quality management, Lean Management.*

ABSTRAK

Tujuan kajian ini adalah untuk mengenalpasti faktor-faktor yang mempengaruhi tahap produktiviti di dalam pengoperasian melalui pengadaptasian teknologi baru 1) Konveyer 2) Penyimpanan Automasi dan Sistem Retriv dan program yang digunakan serta tindakan untuk peningkatan dalam pengoperasian. Kajian ini melihat kepada teori yang sedia ada 1) *Lean Management* 2) *Total Quality Management* 3) *Just in Time* dan strategi – strategi yang boleh diguna pakai dalam IKS untuk meningkatkan produktiviti. Kaedah “survey” akan digunakan bai mengumpul data untuk 100 IKS melalui kajian soal selidik. Kajian ini menumpukan bagaimana IKS meningkatkan aktiviti operasi dalam konteks pengurusan kawalan barang.

Kata Kunci ; *Peningkatan pengoperasian, pengadaptasian teknologi, pengurusan kawalan barang, , Just in Time, Total Quality management, Lean Management.*

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CHAPTER 1

INTRODUCTION

1.1 Background Study

The purpose of this study is to find the best technology adoption that can be used among SMEs in order to go global. Nowadays, SMEs are not efficient in their operational activities that impact to the low productivity, low quality and low selling. According to Small and Medium Industries Development Corporation (SMIDEC), an enterprise is considered as an SME in each of the representative sectors based on the annual sales turnover or number of full time employees. SMEs are divided into two sectors; manufacturing, manufacturing related services and agriculture industries; and services (including ICT) and primary agriculture. It is apparent that small and medium enterprises (SMEs) play a vital role in the economic development of a country. The current trend of economic growth and the rapid industrial development has made Malaysia as one of the most open economies in the world.

In conjunction with the Ninth Malaysia Plan (2006-2010), the government is devoting and designing the SME development plan to assist the SMEs to meet the new business challenges in the competitive global business environment. According to the current trend of economic growth, many small and medium sized companies are concerned about the automation of their manufacturing operations, but they do not know where to begin, (B. Malakooti, 1985).

SMEs can upgrade and automate their existing operational facilities at a minimal and viable cost. Researcher was focus on three elements which are material

handling management, cost of quality management, and technology adoption in order to improve the operational performance.

1.2 Introduction of operational performance

According to Alberto and Javier. 2002, operational performance is the subject of measurement, evaluation and conceptualization in a company that is a recurrent theme in the different areas of the academic literature. Following a similar line, Kaplan and Norton (1992) believe that the traditional measurements of financial performance are no longer valid for today's business demands. Therefore, they consider that operational measurements of management are needed when dealing with customer satisfaction, internal processes and activities directed at improvement and innovation in the organisation, which lead to future financial returns.

Nowadays, SMEs are lack in terms of technology capabilities and skills. Researcher was focus in operational performance because researcher confident that operational enhancement activities are the main tools to increase SMEs productivity and quality in order to go global. Corbett and Van Wassenhove's model considers three dimensions of performance are cost or efficiency, quality and time. Efficiency refers to the best possible use of all available resources in order to maximizing output. This results in low cost products thanks to the reduction of waste and enables the factory to give value to customers. Traditionally quality has been defined in terms of conformance to specification and hence quality-based measures of performance have focused on issues such as the number of defects produced and the cost of quality.

1.3 The Four Keys of Operational Performance

1.3.1 Operation improvement

As we know, operations are the foundation of efficient distribution or manufacturing. That is because operation solid foundation is essential. Inefficient product flow and non-value added activities need to be eliminated in order to enhance the productivity and quality. Over-complication is very common in today's distribution centers due to systematization and mechanization. Over-complication is very common in today's distribution centers and is due to systematization and mechanization. Operating procedures must be easily understood by the associates, and all associates must be trained in the best methods to perform their tasks. In addition, it is important to collaborate with line managers and associates to identify "best practices" for SMEs operations.

1.3.2 Productivity tracking

Most SMEs track departmental or facility wide productivity and cost. However, this does not allow them to effectively manage labor or provide timely feedback to associates on their performance. Visibility of production and time recording at the individual level is imperative to effective labor management. Tracking productivity can be done in a variety of ways, but advances in technology have led to a new generation of automated productivity tracking software tools. These tools can be easily interfaced with a operation department to track productivity and calculate individual associate performance. When they know exactly who is, and more importantly, who is not performing up to standard, the manager can intervene to provide training or discipline as required. Another benefit of accurate productivity tracking is that the information can be used to plan and balance staffing by operational area, making best use of available labor assets – daily.

1.3.3 Engineering standards

Every SME has their own goal. Engineered standards developed through time and motion studies are an objective tool to measure individual performance. If the goals aren't considered realistic, associates become discouraged. Engineered standards are the best way to provide accurate and fair goals for associates as standards take multiple production variables (e.g., unit, carton, and pallet) into consideration. As product mix changes, the standard adjusts accordingly. Also, standards allow them to set one performance goal facility-wide – 100 percent performance in operational area.

1.3.4 Performance Incentive Programs

Rewards and Pay-for-Performance are the main tools in performance incentive programs. There are several ways to reward performance. Motivation is the key to high performance levels, since human nature is such that people tend to only put forth maximum effort. Incentive programs are a way to motivate associates by rewarding employees or skill workers for their effort and performance. Incentive programs range from non-monetary “rewards” to “pay-for performance” programs. Rewards may include recognition clubs, raffles, merchandise giveaways, and lunches. Pay-for-performance incentives reward associates with a hourly performance bonus for exceeding performance standards. As productivity increases, the company (lower labor cost) and the associates (increased earnings) share in the success – a “win-win” situation in order to grow their businesses to go global.

1.4 Automation technology

1.4.1 Automate Storage and Retrieval System (ASRS)

Many small and medium-sized companies are concerned about the automation of their manufacturing operations, but they do not know where to begin. Regarding to the issues, researcher are try to helping them through implementing the ASRS in their material handling system to be more efficient, save time and cost. Automated storage and retrieval systems have been widely used in distribution and production environments since their introduction in the 1950s. An automated storage and retrieval system (AS/RS) usually consists of racks served by cranes running through aisles between the racks. An AS/RS is capable of handling pallets without the interference of an operator, thus the system is fully automated. Both in production and distribution environments AS/RSs are used for putting products (e.g., raw materials or (semi-) finished products) in storage and for retrieving those products from storage to fulfill an order.

According to Travis et.al (2001), Automated Storage and Retrieval Systems have many benefits to different manufacturing systems. The benefits of Automated Storage and Retrieval Systems include better inventory control, larger inventory and storage capacities, and faster and more effective materials handling. Materials handling has always been a challenge in any manufacturing environment being a non-value added process and potentially unsafe in certain industries (ex. steel, chemical, aerospace). This also forced standard warehouses in SMEs to be faster, more efficient and hold more products. Trucks were bigger and stronger. Warehouses struggle to keep up with the demand. Automation was added to keep up with the orders.

Beside that, automation allows tighter and taller aisles. Every product is label with a Stock-Keeping-Unit (SKU). According to International Journal of Advanced Technology and Engineering Research, SKU can be defined as the unique combination of number and/or code which help to identify the item available for each item is given its own unique SKU, which allows a master computer to stock and

track each item. Incorporating a computer into a warehouse can greatly improve operational efficiency. A SKU combined with a computer can provide wonders for SMEs who run the warehouse. It can produce statistics to forecast future sales, it can also eliminate jobs by keeping and monitoring the inventory in real time. It can also automatically order new product to keep a constant inventory. Now automated systems are found in just about every warehouse that SMEs can afford it.

1.4.2 Conveyor technology

The improvement of the energy efficiency of conveyor systems can be achieved at equipment or operation levels towards SMEs performance. Switching control and variable speed control are proposed in literature to improve energy efficiency of belt conveyors. The current implementations mostly focus on lower level control loops or an individual belt conveyor without operational considerations at the system level. According to (Shirong & Xiaohua,2010), belt conveyors are widely used for handling bulk material over short to medium conveying distances because of their high efficiency of transportation as compared to other transport methods and energy cost forms a large part of the operational cost up to 40% according to of belt conveyor systems.

As a whole, the material handling is consuming a considerable proportion of the total power supply, for instance, 10% of the electricity supply is consumed by the material handling, (Shirong & Xiaohua, 2010). Hence, it is significant to improve energy efficiency of belt conveyors to reduce the energy consumption or the energy cost of material handling, which is one of the development focuses of the belt conveyor technology. A belt conveyor is a typical energy conversion system from electrical energy to mechanical energy. Its energy efficiency can be divided into four components: performance efficiency, operation efficiency, equipment efficiency, and technology efficiency.

The improvement of energy efficiency can easily put to the operation efficiency and equipment efficiency for most energy systems. It holds true for belt conveyors. It is also noted that equipment efficiency, and consequently operation efficiency, decides performance efficiency which is usually reflected by various external indicators, such as energy consumption, energy cost, or emission of greenhouse gas. On the other hand, a performance indicator can drive an operation in the optimal efficiency mode. As a conclusion, by applying the conveyor technology in operational level, it may reduce the operational cost and improve the cycle time in material handling.

1.5 Problem statement

ARKIB : 12/02/2011

Komuniti IKS perlu ubah pendekatan inovasi

KUALA LUMPUR 11 Feb. - Datuk Seri Najib Tun Razak hari ini menyeru komuniti Industri Kecil dan Sederhana (IKS) supaya menyertakan teknologi dan inovasi sebagai salah satu komponen penting dalam strategi perniagaan masing-masing.

Kata Perdana Menteri, ini kerana, komuniti IKS ketika ini tidak begitu memberi perhatian kepada elemen tersebut pada peringkat sepatutnya dalam perniagaan mereka.

"Sektor IKS perlu mengubah pendekatan berkaitan dengan inovasi dan jika perkara ini tidak diberi perhatian, kita berdepan dengan risiko untuk ketinggalan jauh di belakang," katanya pada majlis sambutan Tahun Baru Cina dan Taklimat Akta Agensi Inovasi Malaysia anjuran Persatuan IKS Malaysia di Sekolah Jenis Kebangsaan Cina Sungai Way di sini, hari ini.

Hadir sama, Menteri di Jabatan Perdana Menteri, Tan Sri Dr. Koh Tsu Koon; Menteri Kesihatan, Datuk Seri Liow Tiong Lai dan Menteri Pertanian dan Industri Asas Tani, Datuk Seri Noh Omar.

Turut hadir, Ketua Pegawai Eksekutif Unit Inovasi Khas (Unik), Datuk Kamal Jit Singh dan Presiden Kebangsaan Presiden IKS Malaysia, Chua Tiam Wee.

Najib menambah, kerajaan menyedari antara kekangan dalam menggalakkan penggunaan inovasi dan teknologi di kalangan IKS adalah kos penyelidikan yang tinggi.

Dalam masa sama katanya, IKS juga seolah-olah terikat dengan penggunaan teknologi dan inovasi dari luar negara sedangkan mereka sebenarnya mempunyai pilihan terhadap teknologi dan inovasi tempatan yang setanding.

Perkara itu kata beliau, turut menjadi perhatian kerajaan menerusi pembentukan unit khas yang dikenali sebagai Unit Inovasi Khas (Unik) di bawah Pejabat Perdana Menteri.

Appendix A

The quotes in newspaper cuttings above were picked from “Utusan Online” on the date February 12, 2011. Prime Minister was said that “SMEs Community Must Approach to Innovation and Technology”. Limited capital availability and lack of technology capabilities are the main factors affecting ineffective in operational activities for an SME. Regarding to the issues, researcher comes out with this research. As we know, since the initial years of business do not produce enough cash flows, the available cash is used up in operating activities, and there is shortage of funds for modernization and expansion. Because of that, SMEs have to pay a very high cost of capital for the funds they get from the market, which leads to a high degree of risk.

This further increases the cost of capital for them, making it a vicious circle. While it is easy for large and established players in the industry to raise funds, it is not the same case with SMEs quite a few large companies invest during the slowdown as they benefit on a few counts including availability of time, materials at competitive cost and also cheap labor.

However, the Small and Medium Enterprises (SMEs) do not have these luxuries though the challenge continues to be on enhancing quality, reducing cost and improving on-time delivery. In this scenario, can SMEs think of automation? Is this the way out for them to improve quality and delivery where cost is largely determined by their customers? Low cost automation not only simplifies the process but also reduces the manual content without changing the basic setup.

The major advantages of the process is that it involves low investment, increase in labor productivity, ability to handle smaller batch sizes, better utilization of material and process consistency leading to less rejections. Is technology adoption the solution to improve operation performance?. In today’s highly competitive environment, companies are continuously striving to increase their efficiency, quality, and value proposition. Automation will increasingly play a crucial role for productivity enhancement and operational excellence.