
Publication

Barman, H., & Bhattacharjee, D. (2014). Understanding Enterprise Productivity – An Information Technology Perspective. *DAVCC's Advance Management Research: An International Journal (DAVCC's AMRIJ)*. 2:3, 11–20.

DAVCC's Advance Management Research: An International Journal (DAVCC's AMRIJ)

Bi-Annual Publication of
DAV Centenary College, Faridabad

Vol.2, Issue-3, October 2014, Page No.1-99

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Understanding Enterprise Productivity An Information Technology Perspective

Himadri Barman¹
Dibyoyoti Bhattacharjee²

ABSTRACT

Organizations spend much time and money in increasing productivity at the workplace to increase margins and stay ahead of competition. This paper discusses in general terms the importance of Enterprise Productivity (EP) and the necessity of binding it into a definition. It carries forward the discussion with respect to the influence of Information Technology (IT) on EP. The paper concludes with the uses of IT in EP and sums up with a definition of EP in the context of the use of IT.

Keywords: *Productivity factors, Productivity determinants, Productivity strategies.*

INTRODUCTION

The economic progress of nations and the standard of living of its citizens are today determined by their Gross Domestic Product (GDP) and the GDP growth rate. A key factor of higher GDP growth rate is productivity. At a macro level, it is the productivity of the enterprises which drives the fortunes of the nation and its citizens. Hence, studying the driving forces behind enterprise productivity carries substantial weight and ought to be rigorously pursued.

A review of literature on productivity, performance and growth dynamics in organizations does refer to the term 'enterprise productivity' regularly. Similar terms like 'organizational productivity', 'enterprise performance', 'firm performance', etc. are also found. But, a proper and precise definition of the term Enterprise Productivity (EP) is not found. The Telstra Productivity Indicator published in February 2009 which is a report on business attitudes towards improving productivity in Australia states that 54% of organizations

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agreed on a definition of EP that revolved around efficiency and working smarter. The world renowned consulting firm Deloitte LLP has conceptualized EP as *lasting value which is only created when increased earnings are balanced with efficient use of assets*.

The least controversial definition of productivity is that it is a quantitative relationship between output and input. This definition suggests what productivity is thought of to be in the context of an enterprise, an industry or an economy as a whole. Thus, we may say that $EP = \text{Enterprise Output} / \text{Enterprise Input}$, i.e., EP may be defined as the ratio of the sum total of all outputs and sum total of all inputs for the enterprise. Unfortunately again, definition of either output or input or both may sometimes pose more difficulty to the understanding of what productivity is. The problem becomes more acute if sufficient data is not available to quantify input, output or both.

The European Productivity Agency came up with an interesting definition more than five decades back. It said that, "Productivity is an attitude of mind. It is mentality of progress, of the constant improvement of that which exists. It is the certainty of being able to do better today than yesterday, and less well than tomorrow. It is the will to improve on the present situation, no matter how good it may seem, no matter how good it may really be. It is the constant adaptation of economic and social life to changing conditions, it is the continual effort to apply new techniques and new methods; it is the faith in human progress."¹

To look at EP from the perspective of IT, it is imperative that an attempt be made to come up with a definition of 'Enterprise Productivity' that is applicable across sectors and industries, and which doesn't depend on quantitative data. This is the main objective of this paper.

THE FOCUS ON ENTERPRISE PRODUCTIVITY

A focus on Enterprise Productivity is desirable so as to make enterprises competitive and sustainable. With an increasingly competitive global economy, the ability of companies to enhance the productivity of their resources is critical for remaining competitive in this environment.

The factors affecting EP have been categorized into two types (Prokopenko, 1987): External Factors and Internal Factors. The external factors (not

¹ The European Productivity Agency's Rome Conference, "The Concept of Productivity and Aims of the National Centres" in 1958

controllable) are Structural Adjustments (Economic, Demographic and Social), Natural Resources (Manpower, Land, Energy, Raw Materials), and Government & Infrastructure (Institutional Mechanism, Policies and Strategy, Infrastructure, Public Enterprise). The internal factors (controllable) are Hard Factors (Product, Plant and Equipment, Technology, Materials and Energy) and Soft Factors (People, Organization and Systems, Work Methods, Management Styles). A focus on increasing EP will naturally gravitate towards the internal factors.

Various ways can be traceable in order to increase productivity in an enterprise (Yildirim and Şahin, 2007):

- Getting use of scientific and technologic developments. According to this, the enterprises that are able to reconstruct their organization structures and always keep them firm, will gain productivity increase and by increasing their income they will strengthen their competition capacity.
- Applying some changes within the scope of production process. For instance, if an establishment buys semi finished products and starts processing it, since the units that are having high costs and risks will be switched off, the productivity will increase.
- Together with the developments in the organization and the administration, productivity can be increased. The enterprises that can be successful in putting forward targets and defining the means that are to be used in order to attain them, transporting the materials, planning the production, managing the active and passive assets, and finally managing people.
- Using the capital capacity of the machineries and counters that cannot be changed much in a short time period and are being used in production in full capacity as well as man power and preventing the long term inactivity of these in particular, are one of the ways of increasing productivity.
- Enhancing the quality of the inputs and most important of all enhancing the quality of man power will enable the enterprises increase their productivity for sure.

Enterprise productivity rests on a range of critical determinants, some integral to the enterprise itself and others within the broader economic environment in which the enterprises are operating. The *Framework for Economic Development in Scotland* has identified the following determinants of enterprise productivity:

- The generation through R&D of knowledge that can drive productivity
- The rate of innovation and technical advances in productive processes
- Capital investment, especially where it provides a vehicle for technical progress
- Investment that enhances the equality of human capital - the education and skills
- The quantity and quality of the physical and electronic capital infrastructure
- The effectiveness and efficiency of resource use in production and distribution
- The environment in which enterprises are seeking to flourish.

STRATEGIES FOR IMPROVING ENTERPRISE PRODUCTIVITY

Enterprise Productivity is a long term goal and is therefore a strategic activity. Deloitte Consulting has mentioned five basic strategies for improving ET. According to them, companies that follow these strategies can put themselves in a better position to respond to future economic and consumer shifts. They have concentrated on the following:

- **Strengthen business fundamentals:** The business has to be understood very well in the context of both competitors and the general business environment. A simple SWOT analysis will help identify where the company stands and build up from there. Every business process must be given a thorough look and any scope for improvement should be quickly latched onto. Cash flow has to be improved.
- **Reduce asset intensity:** Ways must be devised to reduce fixed asset costs without sacrificing product quality and service quality. It has been observed that outsourcing and contract manufacturing wherever appropriate helps to cut down on these costs. Improving inventory management can have a significant bearing on working capital requirements.
- **Bolster planning and analysis capabilities:** Enterprise productivity is maximized when investment is made in areas that deliver the highest overall return. However, many companies lack the analytical prowess to know where to focus. Upgrading analytical capabilities to turn data into

useful insight should be given due attention. Developing and communicating performance metrics that motivate the workforce and improve decision-making needs to be prioritized. Aligning operating plans and management rewards with long-term strategies is a key requirement.

- **Adopt value-based management principles:** Measuring is critical to getting things done. Individual performance goals and incentives with shareholder values have to be aligned and should directly contribute to achievement of organizational goals. Productivity metrics to improve operating margins and asset efficiency must be developed which will reflect incentives and rewards due to the employees. Training and skill development of employees which enable them to think about new ways to improve shareholder value should be a regular feature.
- **Improve cost efficiency and customer responsiveness across the value chain:** This is the most complex strategy to implement, but also offers the greatest potential returns when done right. Listening to customers and creating products and services that add value across the enterprise will not only retain customers but add new ones. Improving supply chain responsiveness will increase sales and improve margins. Using demand synchronization to help understand and optimize product profitability while driving consumer behavior will create a strong value chain.

INFORMATION TECHNOLOGY AND ENTERPRISE PRODUCTIVITY

IT has led to radical changes in how enterprises operate and have enabled the creation of innumerable opportunities. Many economists have credited the adoption of IT as a key driver the productivity growth in the enterprises. It is beyond doubt that technology especially information technology is playing and will continue to play a leading role in increasing enterprise productivity. IT has a central role in raising productivity because it is a source of leverage for information, communications, collaboration and management. In other words, IT resources are available and for the most part are not consumed or used up in the execution of business activities. What is being said is that we can readily flow more activity over the same resource base and therefore drive more productivity.

In 2001, the McKinsey Global Institute's (MGI's) US Productivity Growth Report found that the productivity acceleration of the mid to late 1990s, the so

called "new economy", was concentrated in only six sectors and that the role of IT was only one of several factors at work in the productivity jump. These results were sometimes interpreted by outside observers as "McKinsey says IT doesn't matter." On the contrary, MGI's Productivity Growth Report highlighted IT's enabling role as a key component of the managerial innovation that allows firms to compete in the modern economy.

The Telstra Productivity Indicator as mentioned earlier has reported that 44% of organizations which were early adopters of technology had increased productivity a lot or to a great deal. Significantly again, 61% of organizations had reported that use of Information and Communication Technology (ICT) had resulted in their productivity increasing a lot or to a great deal. IT increases the productivity of the enterprises in three ways (Yildirim and Şahin, 2007):

- As a result of the increase in information technologies, the capital per employee increases and this increases the productivity of the employees of the enterprise.
- As a result of technological developments for the production of information technologies and services, there is also an increase of productivity in the information industry and this reflects to other enterprises as external benefit.
- As the usage of information technologies in a country spreads to all sectors, in general the country economy and specifically the enterprises in the country have a total increase in productivity.

IT-enabled platforms can play an important role in mediating knowledge flows that can increase productivity. Knowledge inflows, called spillovers, from other participants of an online community of practice on enterprise software are associated with a significant increase in firm productivity (Huang et. al, 2013). Here are some of the ways in which enterprises can use IT resources and capabilities to improve enterprise productivity (McDonald, 2010):

- IT can automate business processes and activities; shifting those activities from resource constrained employees to high capacity automated systems. This will not only improve efficiency of the business processes but also streamline them.

- IT can shift a good deal of work from employees to customers, suppliers and other interested parties. Such a move raises productivity particularly when they have the information and motivation to perform those works better than employees.
- IT can accelerate cycle time for internal processes by improving coordination and workflow among teams. Shorter cycle time means that more work units can flow across the teams.
- IT can raise the quality and availability of external products and services as well as internal operations. Here information combined with preventative maintenance and continuous improvement locks in gains.
- IT can expand trading/operational hours and access without requiring additional resources.
- IT can raise the value of products and services with minimal increase in the cost of providing those products and services.
- IT can play a big role in providing personalized or differentiated products and services.
- IT reduces external coordination costs, internal coordination costs and operational costs increasing productivity

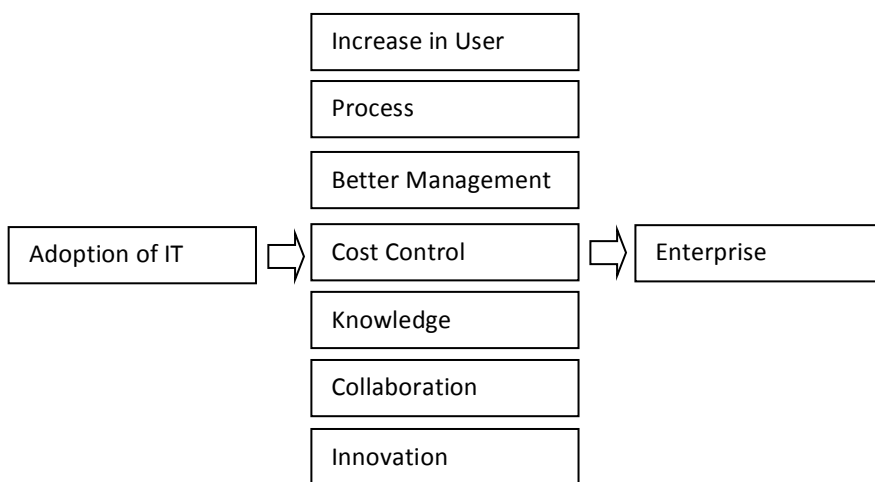
In order to create the most value, companies need to view enterprise IT in a fundamentally different way from how they did in the past. Hitherto, its main effect has been to standardise business processes, and wherever possible, automate activities to remove people from those processes. The primary focus of IT innovation is now about connecting people, and helping them improve performance more rapidly through working together. And more and more, it's about connecting people across institutional boundaries (Taylor, 2008). IT is understood to offer substantial information efficiencies and synergies to an organization. It does not just allow access to prior knowledge, as might result from a knowledge codification, but in fact enables the employees to search for and absorb new knowledge that is relevant to a problem at hand (Gupta et. al, 2007).

CONCLUSION

The exponential growth and advancement in IT is a significant factor that influences today's business environment and thus business organizations.

Organizations are typically composed of different dispersed units that require integration. Therefore, managers can focus on IT to integrate information and communication across units of an organization (Qutaishat et. al, 2012). On average IT does appear to be statistically significantly associated with higher firm level productivity. The magnitude of the association between IT and company productivity is also substantial (Reenen and Sadun, 2005). Productivity per information technology dollar varies widely, and may differ with clusters of technology, strategy and organizational practice (Bulkley and Alstyne, 2004).

The preceding sections attempt to provide an insight into the nuances of EP in the context of IT. As set out in the introduction of this paper, we define Enterprise Productivity in the context of Information Technology as “the increase in user satisfaction, process improvement, better management, cost control, knowledge enhancement, collaboration and innovation brought about by adoption of information Technology in the enterprise”.



The definition is not specific to any industry or sector and may be applied across industries or sectors which has adopted IT with the aim of increasing the productivity of the enterprise. It is capable of not only helping us determine the relationship between ET and It but also the nature of the relationship. The definition as presented here has been conceptualized in such a way that it is not expected to change either with advancement in IT

and evolution of new management paradigms in the context of increasing EP through the use of IT.

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- **Permission from Digboi Refinery**
- **Permission from Guwahati Refinery**
- **Permission from Numaligarh Refinery**



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जिला : चिरांग (असम)
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Bongaigaon Refinery
P.O. : Dhaligaon - 783 385
Distt. : Chirang (Assam)

रिफाइनरीज प्रभाग
Refineries Division

Ref: HR: 12.01.22

Date: January 9, 2013

Sri Himadri Barman
Assistant Professor (System & Management)
Centre for Management Studies
Dibrugarh University

Sub: Permission for conducting research work at Bongaigaon Refinery

Dear Sir,

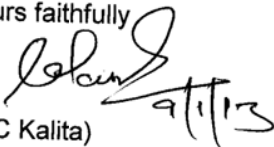
With reference to your letter HB/2012/PER/12-01 dated 20.12.2012, we are pleased to convey in principle the permission to carry out your research work on "ERP Implementation on Enterprise Productivity -- A study on the Refineries of Assam" pertaining to your PhD work.

However, details of data required, mode of collecting information (for example: through questionnaire with sample) from respondent may be conveyed in advance for consideration at our end.

Please note that the permission has been granted for the above study only and accordingly, the data collected should not be used for any publication or any purpose without permission of the corporation. Further this permission is accorded for a period of one year from the date of receipt of this letter and the corporation shall not be able to support for accommodation etc during the period of study at BGR.

Thanking you

Yours faithfully


(G C Kalita)
Senior Manager (T&D)

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Dated: 30.11.2012

To
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Assistant Professor (System Management)
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Assam

Dear Sir,

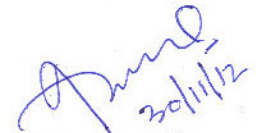
Sub: Permission for Conducting Research work at Digboi Refinery

With reference to your letter dated 05.11.2012, we are pleased to convey (in principle) permission to carry out your research work with "ERP implementation on Enterprise Productivity – A study on the Refineries of Assam" in connection with your PhD work.

However, details of data required, mode of collection eg. through questionnaire (with sample) from respondent may be conveyed for consideration at our end

Please note that the permission has been granted for the above study only and accordingly, the data collected should not be used for any publication or any purpose without permission of the Corporation.

Yours faithfully,
Indian Oil Corporation Limited
(Assam Oil Division)



(A.K. Tamuli)
Senior HRD Manager
For Executive Director

इंडियन ऑयल कॉर्पोरेशन लिमिटेड

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NO: P/GR/13

Date : 22.01.2013

To

Shri Himadri Barman
Assistant Professor (Systems Management)
Centre for Management Studies
Dibrugarh University
PIN – 786004 , Assam

Sub : Permission to carry out research work at Guwahati Refinery

Dear Sir,

This has reference to your e-mail dated 09.01.2013, seeking permission to carry out research work at Information Systems Department of Guwahati Refinery, IOCL.

In this regard, you are hereby permitted to carry out your research work on the subject "ERP implementation on Enterprise Productivity – A study on the Refineries of Assam".

Please note that the permission has been granted for the above study for academic purpose only, the information collected should not be used for any publication or any other purpose without permission of the Corporation.

For & on behalf of

Indian Oil Corporation Limited


Subrata Kamal Gogoi

Chief Human Resources Manager

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भारत सरकार का उपक्रम
A GOVERNMENT OF INDIA ENTERPRISE



8th July'2013

Ref.,NRL/NG/PERS/004

To
Shri Himadri Barman,
Assistant Professor (System Management),
Centre for Management Studies,
Dibrugarh University,
PIN:- 786004 (Assam)

Subject: - Permission for Conducting Research work
at Numaligarh Refinery Limited.

Dear Sir,

With reference to your mail dtd. 8th July'2013, we are pleased to convey (in principle) permission to carry out your research work with "ERP Implementation on Enterprise Productivity - A Study on the Refineries of Assam" in connection with your PhD work.

However, details of data required, mode of collection e.g., questionnaire (with sample) from respondent may be conveyed for consideration at our end.

Please note that the permission has been granted for the above study only and accordingly, the data collected should not be used for any publication or any purpose without permission of the Corporation.

Thanking you,

Yours faithfully,

K. Saikia
Chief Manager (HR)

Please reply to Refinery Office :

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