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Chapter XV

The Impact of Computer Processor Speed on End-User Productivity

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ABSTRACT

With each new improvement, the power, speed and capabilities of the computer have increased, as has the demand for computing power. Some managers have questioned the necessity of continuously upgrading computing technology when its efficient use is dictated more by the speed of the user than by the speed of the processor. These observations have led to the questioning of the value that continued processor speed upgrades add to end user productivity. This chapter identifies the impact that upgrades in processing speeds of personal computers have on end user productivity. A controlled lab experiment was conducted to measure the impact that processor speed had on student output. Based on the results of the experiment, it was observed that end user productivity (as measured by an increase in the amount of work completed) improved.

INTRODUCTION

There is no doubt that information technology (IT) has dramatically impacted many if not all aspects of the business environment. However, the ability to capture, measure and analyze the effects of IT has been elusive. At the aggregate level it has only been in recent times that the net positive effects of IT have been

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acknowledged (McGee, 2000). Yet the identification and measure of these effects are still under debate.

As of 1999, statistics from the B.E.A. state that over $390 billion was spent on IT, including both hardware and software (B.E.A., 1999). The continued investment in IT is testament to the high expectations that businesses place on the ability of IT to improve the productivity of its workers, as well as its organizations, even if it cannot be isolated and measured. As IT becomes more and more enmeshed with the business organization, the ability to evaluate its contribution becomes more complex and more difficult. This complexity-intensifying infusion of IT into the business processes restricts substantive observation windows to two levels: corporate aggregates and individual users. Intermediate evaluation of the effects of IT on subdivisions or work groups are almost impossible given the integration of IT into the fabric of business processes.

Corporate aggregate productivity has been a research focus for some time. It has only been recently that a consensus has begun to form that measurable business productivity improvement can be attributed to IT investment (Brynjolfson, 1993; Whelan, 2000; Oliner & Sichel, 2000).

The second level has received much less attention. The ability to measure improvement of end user productivity, while easier to isolate and measure, severely lacks the generalities necessary for widespread utilization or business decision impact. It is further complicated by the increasing rate of technology improvement and innovations that increasingly expand the breadth of utilization in the workplace. This is characterized by the expanding number of workers who utilize a computer in their place of employment. In 1984, 24.6% of the workforce used a computer (C.P.S., 1984). In 1997, that percentage had increased to 49.8% (C.P.S., 1997)

Productivity measurement has never been an easy task and is even more difficult given the unique characteristics of IT and its effects in and on business processes. This chapter presents a framework for classifying information technology productivity improvement at the user level. By identifying specific productivity categories, IT effects may be uniquely identified and more easily measured.

Using this classification scheme a study is presented that isolates and measures the productivity improvement for a specific classification of end user productivity.

PRODUCTIVITY AND INFORMATION TECHNOLOGY

The introduction, in 1975, of the Altair computer initiated the age of personal computing. The first Apple machine arrived in 1976, with the IBM PC following in 1981. These early machines provided the ability to put processing power on an individual's work desk, decreasing the need for expensive time-share connections, increasing end user capabilities, and improving end user effectiveness and efficiency. Businesses began investing increasing amounts of time and money in computing