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**Fenton, H. Edward**

**COMPANY PRODUCTIVITY MEASUREMENT AND USAGE IN THEORY AND  
PRACTICE**

*Pace University*

D.P.S. 1985

**University  
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**Company Productivity**  
**Measurement and Usage**  
**in**  
**Theory and Practice**

H. Edward Fenton

1984

A dissertation submitted to the faculty of the  
Graduate School of Business, Pace University,  
in partial fulfillment of the requirements for  
the degree of Doctor of Professional Studies.

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ABSTRACT  
OF DISSERTATION ENTITLED  
COMPANY PRODUCTIVITY MEASUREMENT AND USAGE  
IN THEORY AND PRACTICE

The productivity growth rate has declined significantly in the last decade. This decline has jeopardized our standard of living and contributed to many of the countries economic ills. It has damaged U.S. industries competitive position in the world and domestic markets. It isn't the 'United States' which is experiencing comparatively low rates of productivity growth; rather it is the individual firms which in aggregation make up the economy. These firms are the source of productivity growth; their success or failure is reflected not only in the national statistics but in their real profit margins. Since productivity growth is vital to the health of all firms, a growing number of them are engaged in efforts to improve their productivity. An important element in this effort is to explicitly measure their productivity as a management tool to promote further productivity and profitability gains.

The purpose of this study was to analyze those companies which are measuring their productivity to determine how they are coping with the concepts of productivity and its measurement problems. Further the study sought to determine how productivity measurements are influencing the actions of these companies.

A survey instrument was developed based upon a review of the literature relating to productivity and its measurement and by attending an American Productivity Center seminar. The questionnaire was designed to determine how companies use their productivity measures, what factors are considered and how these elements are adjusted in calculating productivity levels and trends.



The questionnaire was mailed to the productivity vice-president, the chief financial officer or equivalent officers of the Fortune 500 companies. One hundred and thirty-four survey forms were returned. Eighty-five of the companies returning the questionnaire measure their productivity. These returns formed the basis for the study's analysis.

Fourteen percent of the firms who measure their productivity were from the service sector of the economy while eighty-six percent were from the diverse companies which comprise industrial America.

These companies use their productivity measures for a multiplicity of purposes. Some of the many uses reported included increasing awareness among employees, assisting in long and short range planning and for operational purposes. To meet their diverse needs the firms have developed many measures of productivity. Nearly all use several different measures of labor productivity. Material, energy and capital productivity are measured by less than half the reporting firms. About thirty-five percent combine the various factors into a total productivity measure. In computing their measures of productivity the firms exhibited great diversity in determining both the outputs and inputs. For example, nearly two-thirds use sales to represent output, while over three-quarters use some other value to represent output. It is evident that many firms use more than one value for output.

When developing inputs the companies seemed to be in general agreement on one dominant aspect of the input, but showed little agreement on additional elements which could or should be included. All firms measuring labor productivity included hourly

employees, however a decreasing number included salary, supervisory, management, engineering or R & D personnel. Among the firms measuring capital productivity all included equipment and machinery among their capital inputs, nearly all included land and building but the firms including inventories, account receivables, leased fixed assets or cash declined steadily.

The survey revealed a number of aspects of productivity measurement where many companies have departed from the theoretical concepts of productivity. Perhaps the most significant departure is that many firms fail to adjust the outputs and inputs for the affects of inflation and are obtaining spurious results. Most of the firms are not adjusting sales to reflect production in the time period under study. In many cases it appears that firms are using values which are readily available from accounting or production without attempting to refine the numbers.

It must be concluded from the survey that a majority of companies are not measuring their productivity as well as they could or should.

It is hoped that the survey will provide executives and others with insights in evaluating productivity measurement programs already underway or in planning new programs.

## ACKNOWLEDGEMENTS

The seeds for this dissertation were planted in Dr. William Freund's Economic and Financial Planning (DPS720) seminar. It was there that the writer was made aware of the relation of productivity to inflation and profitability.

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Fortunately good health, excellent instruction and assistance, and the constant support and encouragement of my wife Jean Edwards Fenton have enabled the writer to complete his doctoral studies.

## CHAPTER I

### Introduction

Productivity in the United States has declined significantly in the last decade contributing to many of the economic ills of the country.

"Productivity improvement may be our most pressing domestic economic problem - and our most difficult to solve,"<sup>1</sup> warns Bradley T. Gales, president of the Strategic Planning Institute. In August of 1980, the Congress was considering a tax bill which contained what Senator Long referred to as "productivity tax cuts".<sup>2</sup> Earlier Robert Straus, at the time, President Carter's inflation czar, announced that they, the government, would make a "full-scale review of all federal programs that affect productivity."<sup>3</sup>

In March 1979 all 20 members of the Joint Economic Committee of Congress endorsed the committee's annual report which said, "declining productivity was among the nation's most pressing economic problems."<sup>4</sup> In 1980, the committee reiterated this position.

Productivity is a, "measure of the efficiency," writes Solomon Fabricant, "with which resources are converted into the commodities and services men want."<sup>5</sup> It is essential that the efficiency with which we use our resources continuously improves. "The economic significance of productivity is focused

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<sup>1</sup> Bradley T. Gales, "Can More Capital Buy Higher Productivity," Harvard Business Review, July-August 1980, p. 75.

<sup>2</sup> R.W. Merry, "Sharp Political Maneuvering Faces Bill To Cut Taxes \$39 Billion; Fate Unknown", Wall Street Journal, August 25, 1980, p. 4.

<sup>3</sup> Editorial, "Lagging Productivity", Business Week, October 23, 1978, p. 159.

<sup>4</sup> New York Times, August 17, 1980, p. F11.

<sup>5</sup> Solomon Fabricant, Basic Facts on Productivity Change, Occasional Paper No. 63, (New York: National Bureau of Economic Research, 1959), p. 1.

primarily upon its improvement over time. As productivity increases unit costs are reduced, unit profits can rise; unit prices can be reduced; unit wages and returns to investors can go up; and all participants benefit."<sup>6</sup>

The government's primary measure of productivity growth is the output produced per employee hour.

Output per employee hour in the private business economy declined in absolute terms in 1979, and 1980. In 1981 an increase of 1.9% resulted in the sector exceeding the 1977 level by only 0.7%. C. Jackson Grayson says, "The United States now faces a national economic crisis which I am convinced is more serious than any we have experienced since the Great Depression. Our very survival as a first rate power is at stake as well as the standard of living of our future generations. There are policy options available to us: but time is very short. A well organized and determined nation-wide effort for the reversal of recent trends in productivity is essential."<sup>7</sup>

Prior to World War I Great Britain was the world leader not only in world trade but in industrial productivity. After the war the U.S. took over the lead. Between 1918 and the onset of the Great Depression, a period of eleven years, output (Real Goods Domestic Product) per unit of labor input increased by more than one-third. At the end of World War II U.S. productivity level (output per employee hour) was double that of Great Britain and Germany. Japan's productivity level was only 13% of the United States.<sup>8</sup> The high

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<sup>6</sup> Elliot S. Grossman, Measurement of "Total Factor" Productivity Index, (Houston: American Productivity Center), p. 1.

<sup>7</sup> C. Jackson Grayson Jr., Productivity, National Economic Growth and the U.S. Status in an Increasingly Competitive World: Realities and Policy Options, Occasional paper, (Dallas: The Center For International Business, 1980), p. 8.

<sup>8</sup> Productivity Perspectives (1981 Edition), (Houston: American Productivity Center, 1981), p. 3.

productivity growth rate was an important factor among several responsible for the U.S. having the highest standard of living in the world.

Not only our standard of living is jeopardized by the fall in the productivity growth rate, productivity has an effect upon all aspects of our economic life. The inflation we've been experiencing has been linked to productivity by a number of experts. In a study prepared for the Joint Economic Committee of Congress, it is stated that "a slowdown in the productivity growth rate during one period will ignite an inflation speedup not only in that period but in succeeding periods - even after the decline in productivity growth is halted."<sup>9</sup> It is only through productivity gains that we as a society can increase our income per worker, or living standards.

For many years, few were concerned about the declining efficiency of our industrial base. The effect was masked by the weakness of our foreign competitors. That weakness no longer exists; most have built or are building modern industrial economies using the best available technologies.

As our productivity growth rate declined after 1965 and our wage rates climbed to among the world's highest, U.S. industry lost much of its competitive advantage in world and domestic markets. This has resulted in a decline in market share, which can be self perpetuating unless the decline in productivity rates and unit labor cost is reversed.

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<sup>9</sup> Productivity and Inflation, A study prepared for the use of the Joint Economic Committee, 92nd Congress of the United States, prepared by William Freund and Paul B. Manchester, 1980, p. 3.

In 1981 Japan produced more cars and trucks than the U.S. While U.S. manufacturing productivity growth between 1960 and 1980 averaged 2.7%, Japan's growth rate was 9.4%.<sup>10</sup> Nearly four times the U.S. pace!

A report issued in 1980 showed the average U.S. plant was over 20 years old, 8 years older than the equivalent German plant and more than 10 years older than the equivalent Japanese plant.<sup>11</sup>

The relative changes in productivity between countries when coupled with the changes in real compensation are reflected directly in the change in unit labor cost, which in turn produces a comparable change in prices. In 1980, unit labor costs in the U.S. increased by 11.0% while in Japan the increase was only 0.8%. When measured in U.S. dollars (with changes in exchange rates taken into account) unit labor costs declined 2.5% in Japan and increased 11.0% in the U.S.<sup>12</sup>

When the relative price of automobiles and other major products such as agricultural and construction machinery in the U.S. rise, vis-a-vis Japan or Germany or France or Italy, it leads to an increase in imports and a weakening of our domestic industry.

Japan's share of the U.S. auto market has jumped from 3.7% to 19.5% in the last ten years, dramatically illustrating the relationship of international competition and productivity. More recently U.S. agricultural and construction machinery manufacturers are facing major plant shut downs and possible

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<sup>10</sup> Patricia Capdevielle and Donato Alvarez, "International Comparison of Trends in Productivity and Labor Costs," Monthly Labor Review, December 1981, p. 17.

<sup>11</sup> Defense Industrial Base Issues, (Committee on Armed Services, U.S. House of Representatives, November 13, 1980), cited by Manufacturing Productivity Frontiers, February 1981, p. Feb/81/1.

<sup>12</sup> *Ibid*, p. 19.

bankruptcy due to non-competitive unit costs. Productivity is one of the major factors governing the rise and fall of industries.

While the subject of productivity is of great interest to business people, unions, economists and government, each group seems to use the term differently. Some unions think it's a dirty word - "that it is how the boss justifies speeding up the production line". Technological advances in the past which resulted in significant productivity gains, have also inevitably eliminated jobs. The unions are understandably wary of productivity growth, but some leaders aware that change cannot be halted are working with management to ease the introduction of automation and to minimize technological unemployment.

A PIMSLETTER issued in 1977 reflects how many business people think about productivity. "Everyone knows that modern technology requires elaborate machinery, and thus heavy investments, that high labor productivity depends on extensive automation and thus on heavy investments and that consumer goods must be readily available to customers to sell successfully, and thus require large inventory investments. Since modern technology, high labor productivity and readily available consumer products are judged to be "good" things, they are expected to improve profitability rather than to hurt it."<sup>13</sup> The PIMSLETTER goes on to say that rather than all the productivity gain being reflected in profits they must be shared with the customer in lower prices, with the employees in higher wages and with the investor in their dividends.

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<sup>13</sup> "The Unprofitability of Modern Technology and What To Do About It", The PIMSLETTER on Business Strategy - Number 2, The Strategic Planning Institute, 1977, p. 2.