

**Technological Progressiveness
as a Precursor to the Concept of High-technology:
A Note**

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In 2004, Godin suggested that the indicator on high-technology originally came from official (governmental) organizations.¹ Academics who worked on the indicator did so mainly as consultants for national and international organizations, or as users of the indicator and improvers. This historical picture is valid. However, a precursor to the concept of high-technology exists in the academic literature itself. In this note, I want to add some very brief thoughts on this precursor, the authors responsible for it, and the characteristics it shared with that of high-technology.

The precursor is the concept of technical or technological progressiveness. The concept comes from the economist W.R. Maclaurin. Maclaurin was an early analyst of innovation in the United States in the 1940s and 1950s and he wrote regularly on this topic.² In 1954, he published a study looking at the role of large firms in what he called technological progress.³ Here, Maclaurin used a three-scale nomenclature of **technological progressiveness** to classify industries and their performances in introducing important new or improved products or processes: high, medium, low. The classification was based on an analysis of the most important new products and processes introduced during the period 1925 to 1950, as discussed with experts in thirteen

¹ B. Godin (2004), The Obsession for Competitiveness and its Impact on Statistics: the Construction of High-Technology Indicators, *Research Policy*, 33 (8), pp. 1217-1252.

² A.A. Bright and W.R. Maclaurin (1943), Economic Factors Influencing the Development and Introduction of the Fluorescent Lamp, *Journal of Political Economy*, October, pp. ~~XXX-XXX~~; W.R. Maclaurin (1949), *Invention and Innovation in the Radio Industry*, New York: Macmillan; W.R. Maclaurin (1950), Patents and Technical Progress: a Study of Television, *Journal of Political Economy*, April, pp. 145-153; W.R. Maclaurin (1950), The Process of Technological Innovation: the Launching of a New Scientific Industry, *American Economic Review*, 40, March, pp. 90-112; W.R. Maclaurin (1953), The Sequence from Invention to Innovation and its Relation to Economic Growth, *Quarterly Journal of Economics*, 67 (1), pp. 97-111; W.P. Maclaurin (1954), Technological Progress in Some American Industries, *American Economic Review*, 44 (2), pp. 178-200; W.R. Maclaurin (1955), Innovation and Capital Formation in Some American Industries, in NBER, *Capital Formation and Economic Growth*, Princeton: Princeton University Press, pp. 551-578.

³ W.P. Maclaurin (1954), Technological Progress in Some American Industries, *op. cit.*

industries. Because of this methodology, Maclaurin admitted that the final rating was subjective. Nevertheless, he produced the following ranking of industries according to technological progressiveness:

- Highest rate of progress
 - Chemical
 - Photographic
 - Airplane
 - Oil
- High Progress
 - Radio and television
 - Electric light
- Medium Progress
 - Automobile
 - Paper
 - Steel
- Lower progress
 - Food processing
 - Cotton textile
 - Coal mining
 - House assembling in tracts

A few years later, C.F. Carter and B.R. Williams, respectively from Belfast and Keele universities, carried out series of studies on innovation for the Science and Industry Committee of the British Association for the Advancement of Science.⁴ One of these studies looked at the characteristics of firms that make them **technically progressive**, defined as using science and technology and capable of producing or adopting new products and processes.⁵ The suggested classification of over 150 firms in their population was: progressive, moderately progressive, non-progressive. The authors admitted that the concept of technical progress lacks precision. In fact, no precise criteria were proposed but the following rationale suggested (p. 178):

⁴ C. F. Carter and B. R. Williams (1957), *Industry and Technical Progress: Factors Governing the Speed of Application of Science*, London: Oxford University Press; C.F. Carter and B.R. Williams (1958), *Investment in Innovation*, London: Oxford University Press; C.F. Carter and B.R. Williams (1959), *Science in Industry: Policy for Progress*, London: Oxford University Press.

⁵ C.F. Carter and B.R. Williams (1957), *Industry and Technical Progress*, *op. cit.*, pp. 108-111, 177-188; C.F. Carter and B.R. Williams (1959), The Characteristics of Technically Progressive Firms, *Journal of Industrial Economics*, 7 (2), pp. 87-104.

We think that there is no difficulty in recognizing a firm which is in the forefront of discovery in applied science and technology, and which is quick to master new ideas and to perceive the relevance of work in neighbouring fields. Similarly, there is no difficulty in recognizing a firm which is quite uninterested in science and technology, and is perfectly content to continue with its traditional methods without even examining the alternatives. What we have done is to examine the group of highly progressive firms, and to draw up a long list of the characteristics which seem to be common to all or most of them. We have then tested the less progressive firms by these characteristics. Firms of a moderate level of progressiveness give widely spread results.

The concept of technical or technological progressiveness had few followers.⁶ In fact, high-technology would soon take its place. Nevertheless, the concept shares with that of high-technology two important characteristics that make it a precursor. First, like high-technology, the concept carries a normative label with a modern overtone or rhetoric: high in the case of high-technology, progressiveness in the case of technological progressiveness. Second, like high-technology again, the concept carries a classification scheme in three dimensions.

What distinguishes high-technology from technological progressiveness, however, is statistics. Technological progressiveness was defined on purely subjective grounds, as admitted by their promoters, whereas high-technology came to be defined with the aid of statistics, above all expenditures on research and development (R&D). Certainly, subjective elements remains, but the construction of the indicator ultimately rests on numbers.

⁶ R. Rothwell (1977), The Characteristics of Successful Innovators and Technically Progressive Firms (with Some Comments on Innovation Research), *R&D Management*, 7 (3), pp. 191-206; S.F. Cohn (1980), Characteristics of Technically Progressive Firms, *OMEGA*, 8 (4), pp. 441-450.