

ESTIMATING THE BENEFITS OF GOVERNMENT-SPONSORED R&D

By

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To estimate and measure the benefits accrued to the government and to the economy and society from public-sponsored R&D one must employ a stage-process methodology. This method has been refined and tested in both industrial R&D and national laboratories. The method is based on a framework that includes four distinct stages of outputs and four distinct stages of transformation and transfer of these outputs. The stages of outputs are: immediate outputs, intermediate, pre-ultimate and ultimate. In this process approach we trace the flow of research through the stages of the innovation continuum. This is done retrospectively as well as prospectively by estimation. This framework or model of stages is superior to other methods in that it allows us to estimate not only the different outputs along the progression of R&D, but also the probabilities of transformation and transfer from one stage to another. In many instances the flow of R&D from research to development, to engineering, prototyping, and testing, may be held back at a given stage due to barriers that inhibit the transfer to the next stage. In addition, this method or model also allows for quantitative as well as qualitative measures (indicators) to be applied, and offers two valuable attributes. The first is the ability to have core and organization-specific indicators, thus accounting for individual differences among R&D performers and users of their outputs, such as differences in the missions of federal agencies. Secondly, it's the use of "transition indicators" in which we measure the indicators of R&D in transition between stages, hence we are able to identify points of reference and critical situations of problems.