f) **Economies:** the economics and business literature refer to economies of scale, scope and learning.[24] Research on Canadian technical alliances in the electronics industry has revealed that, in fact, economies of scope may be more important than economies of scale, although the latter are important for smaller firms.[25]

g) **Reduced Market Failure:** collaboration encourages members to undertake a level of research that they would not otherwise consider economical due to the limited appropriability of research results.[26]

h) **Signalling Effect:** Finally, government support for R&D consortia can signal support for the development of particular technologies of "strategic" importance to the economy, and can act as a source of "patient" capital for important technologies which take a long time to commercialize, as in the case of certain biotechnologies.

The Cons

The negative aspects of R&D cooperation include[27];

a) **Anticompetitive Dynamics:** collaboration in research can undoubtedly provide an impetus to collusive behaviour in product markets, particularly if the adoption of new technologies is staggered among firms to promote rapid diffusion. However, the potential also exists for such collusion to restrict the diffusion of a technology in the early stages of its development or to prevent the adoption of a variety of approaches to application within a technology.

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[24] Economies of scale are cost savings associated with large scale production; per unit costs are reduced by spreading fixed costs such as buildings, equipment, etc. over a larger number of units produced. Economies of scope are defined as those resulting from the use of processes within a single operating unit to produce and distribute more than one product. Economies of learning, also termed "first mover advantages", are the benefits (cost savings) derived from being the first to achieve efficiencies in production from a new manufacturing process.

[25] J. Niosi and M. Bergeron, "Technical Alliances in the Canadian Electronics Industry: An Empirical Analysis", Technovation, 12:5 (1992), p.316.

[26] This point is more technical and is a benefit to both society and individual firms. It has long been recognized that innovation is a public good. In fact, empirical studies have confirmed that the social benefit from R&D may be greater than the benefit derived by the innovator. In some cases, social rates of return exceeded private rates of return by an amount ranging from two to ten times, depending on the industry. *Bernstein and Nadiri, cited in M.L. Katz and Janusz A. Ordover, "R&D Cooperation and Competition", Brookings Papers: Microeconomics, (1990), p.137.* The point is that co-operation can serve to internalize the external benefits created by technological spillovers, thus increasing the incentive to invest in R&D.

[27] All of the following disadvantages are derived from Mowery and Rosenberg, pp. 239-241.