Research Joint Ventures in the United States: A Descriptive Analysis

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ABSTRACT. This paper describes trends and characteristics of the membership of RJVs in the United States.

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1. Introduction and background public policy

The purpose of this paper is to describe the current state of descriptive information about industrial research and development (R&D) that is undertaken cooperatively in the United States through research joint ventures (RJVs).[1,2] Hopefully, researchers will respond to the paucity of empirical research, especially empirical research of a policy nature, and fill the many voids, a point emphasized by Combs and Link (2003).

The National Cooperative Research Act (NCRA) of 1984, Public Law 98-462, was legislated, as stated in the Preamble to the Act:

> to promote research and development, encourage innovation, stimulate trade, and make necessary and appropriate modifications in the operation of the antitrust laws.

While the Act sets forth these objectives, it does not place them in an historical perspective. In the early 1980s there was growing concern that the U.S. industrial sector was loosing its competitive advantage in global markets. This was explicitly noted in the Research and Development Joint Venture Act of 1983, HR 4043. In the Joint Research and Development Act of 1984, HR 5041, the supposed benefits of joint research and development were first articulated from a policy perspective:

> Joint research and development, as our foreign competitors have learned, can be procompetitive. It can reduce duplication, promote the efficient use of scarce technical personnel, and help to achieve desirable economies of scale [in R&D].

After revisions, the NCRA of 1984 was passed.

The NCRA of 1984 created a registration process, later expanded by the National Cooperative Research and Production Act (NCRPA) of 1993 and recently by the Standards Development Organization Advancement Act of 2004 (SDOAA), under which RJVs can voluntarily disclose their research intentions to the U.S. Department of Justice; all disclosures are made public in the *Federal Register*.[3]

RJVs gains two significant benefits from filing with the Department of Justice, and these benefits are what could be referred to as a "safer harbor" for participants in the venture. One, if the venture is subjected to criminal or civil action, the charges would be evaluated under a rule of reason that analyzes whether the venture improves social welfare. And two, if the venture is found to fail a rule-of-reason analysis, it is subject to actual damages rather than treble damages.

There is a vast theoretical literature, recently summarized by Hagedoorn *et al.* (2000) and Combs and Link (2003), that concludes that, among other things, collaborative research increases the efficiency of the R&D conducted by the collaborating members. Link and Rees (1990) provided early empirical evidence of this proposition, but to date related empirical research has been sparse owing to the paucity of public domain data related to research collaborations.

However, there has been conspicuously absent from the policy landscape rich public domain information about cooperative research activity. The Cooperative Research (CORE) database was constructed under the sponsorship of the

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National Science Foundation, and is maintained under their support by Link, for the purpose of chronicling what public information there is. Its resource base is information in the RJV filings with the Department of Justice as disclosed publicly in the *Federal Register*. The unit of observation in the CORE database is the RJV. In the following section, public domain information about disclosed RJVs is summarized.

2. An example of a research joint venture

There have been very few case studies of RJVs; this is surprising because even in the absence of rich public domain datasets on these activities, case-based information is accessible. In fact, reflecting on the Mansfield research tradition, much of his early work was case based, and from these case studies more complete datasets began to be created and analyzed systematically.

As discussed in the following section, there have been 913 RJVs filed with the Department of Justice and disclosed publicly in the *Federal Register* through 2003. One joint venture is described herein for purposes of illustration.[4]

During the late 1980s, software developers were increasingly unwilling to incur the cost of maintaining ports to the numerous and different UNIX operating systems, many of which were not identical.[5] In addition, many hardware companies were addressing specific market niches, and any given niche was generally too small to offer a critical market size to software developers to make their products successful. Thus, to maintain profitability, developers limited their software support to only a few hardware platforms.

Most of the computer industry's leading companies relied on, at that time, technology licensed from MIPS Technologies, Inc., in particular its reduced instruction-set computing (RISC) processor for use in UNIX operating systems. Since 1991, a number of the companies committed to the MIPS RISC architecture began to work together on a standardized interface to facilitate software portability in an open UNIX environment. The group's objectives were:

- to improve software availability and selection for end users
- to lower the cost of business and quicken product development for platform vendors
- to provide customers with compatible solutions, and
- to preserve customers' investments in hardware, software, and training.

Toward these objectives, a RJV was formed in 1996 and disclosed publicly in the *Federal Register* on February 20, 1996. As stated therein:

> The nature and objectives of this joint venture are developing, adopting, establishing, maintaining, publishing, promoting and endorsing UNIX SVR4 ABI [Application Binary Interface] standards (i.e., conformance specifications) for MIPS processor-based systems and to provide under appropriate transfer means (e.g., license, lease or sale), ABI specifications and other intellectual property to industry participants, including labs, universities and consultants.

The original members of the joint venture and their home country were Concurrent Computer Corporation (U.S.); Control Data Systems, Inc. (U.S.); Dansk Data Electronic A/S (Denmark); NEC Corporation (Japan); Siemens AG (Germany); Silicon Graphics, Inc. (U.S.); Sony Corporation (Japan); and Tandem Computers, Inc. (U.S.). In 1997, Concurrent Computer merged with Harris, and, due to financial difficulties, it left the joint venture. Also, in 1997, Control Data Systems dropped out of the computer business and left the venture. On March 1, 1999, the MIPS ABI Group, Inc. ceased operations because all needed standards were developed.

While operative, the MIPS ABI Group companies worked together to develop a single, binary-compatible port which was sold and supported across multiple platforms, thus making each member's own platform compatible, and thus facilitating development and support of software by key vendors.

3. General characteristics of research joint ventures

Through calendar year 2003, 913 RJVs have been registered with the Department of Justice and