e-Research Collaboration
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Editors

e-Research Collaboration
Theory, Techniques and Challenges
Preface

Research in both academic and non-academic circles has remained virtually identical in its conduct and organization over the last few decades. Disparate groups of researchers have worked on their ideas, projects and inventions in isolated clusters, with little sharing of information and synergies from collaboration. The advent of social networks and Web technologies has led to the creation of new research networks that have dramatically reduced the barriers and obstacles to collaboration for researchers who are geographically and organizationally distant.

Web technologies use broadband connections, improved browsers, and “rich” multimedia in concert with a new generation of websites that encouraged users to contribute to content. Blogs, forums, wikis, and other forms of user-generated content are, in many cases, the major source of content for these websites.

The evolution of social networks began with the truly social networks of friends paving the way for business networks, which in turn led to the current research networks that connect academic and non-academic researchers across the world. Being much more robust than the original social networks and the business networks that followed, collaborative research networks have the potential to eventuate in technological advances, innovation, and economic contributions to both industry and nations.

Currently, tens of thousands of researchers are using research networks, ushering in a new paradigm for research. In this paradigm, collaboration is made much easier, and sharing of research knowledge is instant. Synergies from routine collaboration will yield huge advances in research productivity and innovation. The challenge for administrators in both industry and academia is to understand how research networks are changing the practice of research and to decide how best to embrace such technologies and use them to their best advantage.
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Part I

e-Research Collaboration: Theory
An Overview of e-Research Collaboration

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Abstract In this chapter, we examine the concept of collaborative research. We discuss the origins and elaborate on the factors that contributed to the emergence and subsequent exponential growth of collaborative efforts in research. In particular, we note that the emergence of internet technologies has the potential to provide a strong impetus to growth in collaborative research. It is much easier now to use newly developed internet tools to find researchers who have similar interests, to engage in synchronous conversation with a group of collaborators, to exchange data and to engage in meaningful intellectual discourse. We conclude this chapter by discussing the costs and benefits of collaboration and the obstacles that collaborators have to be aware of when pursuing research in its various collaborative manifestations.

You have added much several ways, if I have seen further it is by standing on ye shoulders of Giants.

From a letter written by Isaac Newton to Robert Hooke, 5 February 1676.

1 Introduction

Most researchers today are of the opinion that the increased complexity of the modern environment, and by extension, increased complexity of research problems, creates the need for multidisciplinary research. This is particularly accentuated by increased specialization across disciplines. Disciplines are gradually getting factionalized into specific areas of specialization. Increased specialization in turn causes a situation where the researcher, to complete a project, requires the services of other
For example, a researcher may have knowledge about earnings fraud in accounting and have the capability of understanding the intricacies of the problem and what data to collect. But such data may be proprietary and (s)he may have to engage someone in industry to obtain the necessary data. Further, he or she may not have the statistical expertise to know how to create models for actually detecting fraudulent behavior once the data has been collected. Thus, the researcher would also have to bring in an expert in statistical analysis into the team. Other reasons we attribute to increased collaboration in addition to the issue we outlined is the rising costs of technological apparatus and the need to bring in collaborators who have the necessary apparatus and or data. For the reasons mentioned above, collaboration has increased substantially. In today’s environment collaboration in electronic research has expanded exponentially due to the features of Web 2.0 which allows for rapid sharing and processing of data. In addition potential collaborators can now find partners with complementary skills using new web based tools such as mynetresearch.com.

In this chapter we discuss the concept of research collaboration, the relationship between social networks and research collaboration, and the emergence of e-research collaboration. We conclude the chapter with a discussion on the underlying challenges of collaboration.

We initially pose the question; “What is research collaboration?” The term collaborate originates from the Latin word *Collaborare* which means to work together. The concept appears simple enough. The Oxford English Dictionary defines collaboration as “work in combination especially in literary and artistic production”. In essence, it suggests the working together of individuals to achieve a common goal ostensibly for the purpose of producing or increasing the boundaries of knowledge. The Webster’s dictionary defines collaboration as “to work jointly with others or together especially in an intellectual endeavor”. Mattessich et al. (2001) define collaboration as a mutually beneficial and well defined relationship entered into by two or more organizations to achieve common goals. This relationship according to Mattessich et al. includes:

- A commitment to mutual relationships and goals
- A jointly developed structure and shared responsibility
- Mutual authority and accountability for success and
- Sharing of resources and rewards

In this chapter we define research collaboration based on a model by Hagstrom (1965) who developed a model to explain academic competition. He defined collaboration as a group of intellectual peers working together over a period of time to solve a research question.

However, this definition begs the question of who are these intellectual peers? And exactly how closely researchers have to work together in order to constitute a collaboration. Hagstrom (1965) notes that at one extreme it could be argued that the international research community is one big collaboration; hence basic research can be considered as a truly global activity, where, in a sense, all researchers work to advance scientific knowledge. We define a collaborator as anyone providing an
input to a particular piece of research. Leahy and Reikowsky (2008) note that at the extreme, one could make a case that only those scientists who contributed directly to every main research task over the duration of the project should be counted as collaborators. At the other extreme, any party who contributes in any way, such as only collecting the data or assisting the main researcher with respect to writing could be considered collaborators. Leahy and Reikowsky hence note that we are therefore left with the unsatisfactory conclusion that a research collaboration lies somewhere between these two extremes. Typically, collaborators could include the following:

- Those who work together on a research project throughout its duration or for a large part of it, or who make frequent or substantial contributions
- Those whose names or posts appear in the original research proposal
- Those responsible for one or more of the elements of the research (e.g., the experimental design, construction of research equipment, execution of the experiment, analysis and interpretation of data and writing up results in a paper)

In some cases, the list of collaborators may also include

- Those responsible for a key step (e.g., the original idea or hypothesis, the theoretical interpretation)
- The original project proposer and or fund raiser even if his or her main contribution subsequently is to the management of the research

So, in summary, research collaborations can take many forms. In his review of bibliometric studies of research collaboration, Subramanyam (1983) reported that collaboration was found to affect the visibility and productivity of scientists. He identified six types of research collaboration: teacher–pupil collaboration, collaboration among colleagues, supervisor–assistant collaboration, researcher–consultant collaboration, collaboration between organizations and international collaboration. In amore recent study, Bozeman and Corley (2004) conducted a survey of individuals engaged in collaborative research and concluded that individuals who initiate collaborations can be characterized as follows:

**The Taskmaster:** This is a researcher who searches for people who can stick to schedules and cooperate effectively.

**The Nationalist:** This relates to a researcher who seeks collaborators who are fluent in the researcher’s native language and are of the same nationality.

**The Mentor:** Those who are motivated to help junior colleagues and graduate students by collaborating with them.

**The Follower:** Those who are compelled to choose collaborators because someone in the administration requested that they work with the collaborator because of a characteristic of the potential collaborator (scientific background etc) that the administrator found appealing.

**The Buddy:** Those who choose collaborators based on the length of time they have known the person and the quality of previous collaborations with individuals.

**The Tactician:** Those who chose collaborators based on whether or not the collaborators have skills that complement their own.