Chapter 10
Neuro-Model for Improving the University-Industry Collaboration and Intellectual Property

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ABSTRACT

Some universities in the United States are leading technology transfer by their many close partnerships with government and industry. This has benefited them financially and by enhancing their research reputation. Patent-based intellectual property is a determinant factor, so an adequate cost-aware model must be derived to understand the process completely. This chapter presents the design and results of an artificial neural network (ANN) which relates the patent cost and the primary inputs of the process to model performance. Such inputs are invention disclosure, new patents issued, U. S. patents issued, licenses and optional executed, and other major agreements. A prediction of patent's cost could help a technology transfer office decide over the research to be patented but also to evaluate cost benefits. In addition, an integral solution is proposed where the positions of doctoral students and postdocs are defined. Overall, generating high quality invention disclosures is improved based on a more effective relationship between universities and industries.

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INTELLECTUAL PROPERTY AND PATENT COST

University–industry collaborations in science and technology-based industrial sectors have long been recognized as an important source of economic growth (Cohen et al., 2002; Mansfield, 1995; Rosenberg & Nelson, 1994). Especially in engineering, these collaborations act as fundamental element to transforming academic discoveries into commercially successful innovations (George et al., 2002; Kenney, 1986; Murray, 2002; Rothaermel & Deeds, 2006). Hence, it is expected that the number of R&D collaborations with universities has a positive influence on a firm's patent performance. A knowledge management perspective of interfirm alliances suggests that the intention of accessing and assimilating external knowledge and know-how is the key driver of alliance formation (Grant a& Baden-Fuller, 2004). Existing studies have attributed the success of knowledge-based alliances to partners' relative absorptive capacity and relational investments (Dyer & Singh, 1998; Kale & Singh, 2007; Lane & Lubatkin, 1998). University–industry collaborations are, however, different from strategic alliances between industrial firms in an important way. Academic research is situated in the realm of open science, creating an environment that encourages freedom to explore novel ideas and exchange of scientific knowledge (Dasgupta & David, 1994).

As such, the scope of research associated with university collaborations is generally less well defined and more distant from the commercial goals. In translating academic research into commercial applications, firms must possess the ability to access and apply knowledge that is novel, often interdisciplinary-based and complex, comprising both explicit and tacit components (Arora & Gambardella, 1994; Hicks, 1995). Such abilities are closely tied to a firm's R&D focus in scientific research and in technological recombination. In-house scientific research not only broadens the knowledge base of the firm but also enables the firm to access and exploit public science (Gambardella, 1992:391). In furthering the applications of scientific discoveries, the firm can integrate knowledge elements in a novel way or reuse existing technological combinations (Carnabuci & Operti, 2013; Gruber et al., 2013).

Therefore, a firm's R&D activities may determine the extent to which the firm captures the benefits from collaborating with universities in commercialization of science. The privatization of university intellectual property developed using federal research funding is an attractive idea for both universities and industry because the results of technology transfer, which may include the creation of new start-up companies and the growth of existing businesses, contribute to both the national and local economy (Etzkowitz 2002). Government initially framed the fundamental mechanisms set up to facilitate university technology transfer to support universities in diffusing the results of their research activities for the public good. Academic institutions, however, viewed the attempt to develop efficient technology transfer systems as a way to gain substantial benefits, such as better services for faculty, new sources of research funds in the form of industrial research support, and as a marketing tool to attract new students, faculty and industrial sponsors (Carlsson & Fridh 2002).

Since 1980, university research has placed a greater emphasis on applied science (Agrawal 2001) as part of the higher education sector's effort to adapt to new and harsher socioeconomic environments. Most universities traditionally assigned a low value to patenting and licensing because both required high fixed costs comparing to the benefits they conferred (Carlsson & Fridh 2002), and universities inventions were rarely used as important sources of technology innovation in industry (Mowery, 2004). However, because of government supports and incentives during the 1980s and 1990s, the usability of university innovations by industry has gradually increased: in 2005, 3,6% of the US-owned patents belonged to US universities, compared to only 1,1% in 1991 (US Patent and Trademark Office 2007). While the