



## University trustees as channels between academe and industry: Toward an understanding of the executive science network

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### ABSTRACT

Policy makers in the United States (US) and the European Union (EU) see “autonomous” research universities as increasingly central to “world class” status, technology development and economic innovation. Trustees or regents (US) and external board members (EU) are seen as a marker of university autonomy. Examining university trustees may shed some light on the role of trustees/external board members play in research strategy, innovation and economic development. Given that a number of trustees of US research universities sit on the boards of directors of large corporations with research interests, we hypothesized that trustees may be an important channel connecting universities to innovation and economic development. To date, university trustees have not been studied as a channel between academe and industry that enables scientific discovery, technology development and economic innovation.

The analysis concentrates on the trustees of the twenty-six private US Association of American Universities (AAU). This organization includes some of the oldest research universities, where trustees have long played an important part. The ties between university trustees and the corporate boards of which they are directors were examined in 1997 and 2005 to see if trustees served as channels between academe and industry. The findings indicate that while the number of trustees stayed the same, there was a drop of roughly one-third of the number of trustees connected to corporations. However the percentage of trustees connected to science-based corporations remained the same. There was an increased convergence between the research fields of a university and the science fields of the corporations to which trustees are connected. Finally, there is evidence that the number of university trustees connected to science-based corporations positively influences the amount of R&D funding a university receives. Given the results, we conclude by theorizing the rise of an executive science network that plays an instrumental role in relations among universities and industry.

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### 1. Introduction

Policy makers see “autonomous” research universities as increasingly central to “world class” status, technology development and economic innovation (Altbach, 2007; European Commission, 2010; Orszag and Holdren, 2009). World class status, technology development and economic innovation are related in that indicators for rankings depend on publications (Dehon et al., 2011), which, in the Science, Technology, Engineering and Math (STEM) fields, are assumed to underpin technology development and economic innovation (National Economic Council, Council of Economic Advisors, and Office of Science and Technology Policy, 2011; European Commission, 2010; World Bank Institute, 2007). Academic patents are generally seen as complementing

publications, and as playing a strong part in technology development resulting in economic innovation (Stephan, 2012). Although losing ground, United States (US) research universities still lead the world in academic patents (National Science Board, 2010, 2012). In the 2012 Shanghai rankings, 19 of the top 25 were US research universities, four were in Great Britain (GB), and two were located elsewhere (Academic Rankings of World Universities, 2012). The majority of the universities in the US top ten academic patent rankings were in the Shanghai top 25 (D’Amato et al., 2010). Both the US (whether private or public) and GB have a tradition of autonomous universities, in that they are not directly managed by the state, rather, they have external boards of trustees that hold fiduciary, moral and legal responsibility. In this paper, we explore the part that trustees play in contributing to research, technology development and economic innovation at the highly ranked world-class universities.

There is not a great deal of empirical research on why autonomous universities are the vehicles for cutting edge research with economic development potential. Rankings are based on

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rather limited indicators and do not speak to what management processes contribute to the success of these universities (Saisana et al., 2011). Managerially, the defining characteristic of private US research universities is self-perpetuating boards of trustees that have legal, moral and fiduciary responsibility for these institutions. US public research universities also have trustees with similar authority, although they are usually appointed by state governors. There has been little examination of the part trustees play with respect to shaping how research strategies of these universities intersect with technology development and innovation. This is despite the fact that many of the trustees of leading private US research universities are heads of Fortune 500 and/or research intensive companies and often sit on the Board of Directors of other Fortune 500 and/or research intensive corporations (Pusser et al., 2006).

The study of US university trustees may shed some light on the role of trustees/external board members in research strategy, innovation and economic development. Given that a number of trustees of US research universities sit on the boards of directors of large corporations with research interests, we hypothesized that trustees may be an important channel connecting universities to innovation and economic development. To see if this were the case, we constructed a data set composed of the trustees of 26 private US Association of American Universities (AAU) universities at two points in time, 1997 and 2005, and the corporations that they directed as well as the corporations on which they sat as members of boards of directors. For reasons that will become clear below, we did not include public universities in the analysis. The North American Industry Classification System (NAICS) code was used to categorize each corporation, and a crosswalk was developed between those codes and National Science Foundation (NSF) categorization of the broad fields of science at research universities, allowing us to identify the corporations' academic science fields. Using the same NSF categories, universities top research fields were identified by total R&D dollars expended. We then developed a set of models to explore the relationship between trustees' corporations' science fields, universities' top research fields and R&D funding over time. Given our results, we conclude by theorizing the rise of an executive science network that plays an instrumental role in relations among universities and industry.

## 2. Background

There is not a great deal of research on US university boards of trustees. Both public and private US universities have boards of trustees, so there are more than 3000 such boards representing colleges and universities ranging from community colleges and small private colleges to elite research universities. The bulk of the trustee literature is descriptive and proscriptive, aimed at teaching trustees the rules of good stewardship. Although these boards are charged with broad governance of universities and have legal, fiduciary and moral responsibility, most scholars assume that presidents run universities, and that the function of the board is to act as a buffer between the university and the state (Association of Governing Boards, 2007; Chait et al., 1991; Hill et al., 2001; Kerr and Gade, 1989; Madsen, 1997; for exceptions treating public university trustees see Nicholson-Crotty and Meier, 2003; Pusser, 2004).

With regard to research universities, the literature shows that the governors' of the states where they are located generally appoint public research university trustees. Although the trustees are supposed to be above politics, managing universities in the public rather than the private interest, traditionally, trusteeships are given to persons who contribute heavily to the governor's campaign funds and are members of the governor's political party. Therefore public university trustees are often selected for their contributions

**Table 1**  
Association of American Universities US Members 2005.

Brandeis	Purdue	U Iowa
Brown	Rice	U Kansas
Cal Tech	Rutgers	U Maryland
Carnegie Mellon	Stanford	U Michigan
Case Western	SUNY Buffalo	U Minnesota
Columbia	SUNY Stonybrook	U Missouri
Cornell	Syracuse	U Nebraska
Duke	Texas A&M	U North Carolina
Emory	Tulane	U Oregon
Harvard	U Arizona	U Penn
Indiana	UC Berkeley	U Pittsburgh
Iowa State	UC Davis	U Rochester
Johns Hopkins	UC Irvine	U Southern Cal
MIT	UC Los Angeles	U Texas
Michigan State	UC San Diego	U Virginia
New York U	UC Santa Barbara	U Washington
Northwestern	U Chicago	U Wisconsin
Ohio State U	U Colorado	Vanderbilt
Penn State	U Florida	Washington U
Princeton	U Illinois	Yale

and loyalty to the governor and his or her political party rather than for their business acumen. In contrast, private research universities trustees are thought to be selected because they are loyal alumni likely to donate to the endowment (Pusser, 2004).

However, trustees of private AAU universities may be different than most other university trustees. The AAU is the oldest and arguably the most elite association of research universities in North America and having membership has shown to be a decidedly positive predictor of an institutions' research capacity (Cantwell and Mathies, 2012). It develops national policy positions on issues related to academic research and graduate and professional education and provides a forum for discussing a broad range of other institutional issues. The AAU was founded in 1900 by the original fourteen universities that offered the Ph.D. Degree, and is a "principals only" organization in that only the presidents are at the table for meetings; substitutes are not acceptable. AAU membership is highly sought after, but granted by invitation only. There were 60 US AAU universities when data were gathered (see Table 1). The AAU institutions consistently score among the highest on all indicators of research: grant and contract funds, citations in research literature, patents, citations in patent literature, revenue generated by licensing, start-up companies, and quality ratings by peers in specialized fields (National Science Board, 2012).

Historically, and presently, the trustees of AAU universities are drawn from the boards of directors of large corporations (Veblen, 1918; Sinclair, 1923; Beck, 1947). Our data revealed that within AAU, there was a marked difference between public and private universities. Private universities trustees were closely interlocked through their corporate directorships. Any one trustee was no more than a half a step away from any other. The trustees met regularly on a face-to-face basis on their corporate and university boards. Public universities trustees were by and large not connected to this network and, when they are connected to corporations, are less tied to patenting firms (see Fig. 1, and Slaughter et al., forthcoming). In 2001, for instance, public universities were tied to 113 (13 percent) of the 866 corporations in the network created by trustee interlocks. Private universities, by contrast, were tied to 789 (91%) of the network.

Despite the dense network of private university trustees, little is known about the trustee selection process. About 70 percent of the private AAU sample were alumni. Given that these universities routinely graduate men and women who disproportionately head the central institutions in the US, ranging from corporations to government, sitting trustees had an ample alumni base from which to select distinguished new trustees (Domhoff and Dye, 1987; Dye,

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