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Structuring the Technology Entrepreneurship publication landscape: Making sense out of chaos

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ABSTRACT

Technology Entrepreneurship (TE) is a popular and interdisciplinary research field, which is currently published in many different journals. TE articles, once the proviso of management of technology and general entrepreneurship journals, can now be found in journals ranging from those focused on organizational behavior to those specializing in finance. Today's TE researchers embrace the field with vastly disparate disciplines and theoretical backgrounds. This adds to the complexity of the TE publication landscape and makes it difficult for readers and authors to navigate in and to contribute to TE.

Todays' journal rankings fall short in their ability to guide readers and authors searching for current thoughts and journals for specific TE research. This article structures the publication landscape in TE research. We provide a ranking of journals that focus specifically on TE. Our ranking is based on keyword searches that identify TE articles published until the end of 2011. We compile bibliometric indicators on both the impact of a specific journal and the impact of specific TE articles. We use primary indictors and combined indicators. Our analysis takes a reader-specific and an author-specific perspective. We identify a ranked list of TE journals.

1. Introduction

Technology Entrepreneurship (TE) TE has become a hotly debated topic between many researchers from diverse theoretical backgrounds. Many researchers harbor contrary near-held beliefs of the importance of entrepreneurial and small firms to our society. Neo-Marshallians, despite the mountain of data to the contrary, tend to negate the value of small and entrepreneurial firms to regional and national based job and wealth creation (Kirchhoff et al., 2013). However, a larger group of scholars has shown that entrepreneurial effort is a cornerstone of regional and national economies throughout the world (Birch, 1987; Phillips & Kirchhoff, 1989; Storey, 1994). The debate over the importance of TE does not stop there. The success that entrepreneurial firms have shown in embodying disruptive technologies into products (Abernathy & Clark, 1985; Abernathy & Utterback, 1978; Christensen, 1997; Walsh & Kirchhoff, 2002; Walsh & Groen, 2013) is hotly debated. Some TE authors argue that small firms that lack the capital, technology, history and the resources of their larger cousins (Christensen, 1997; Kirchhoff, 1994) can be as effective as large firms. Yet, other TE researchers have shown entrepreneurial firms often to be the underpinnings of Schumpeterian change or cycles (Linstone, 2011; Mangematin & Walsh, 2012; Schumpeter, 1912) based on disruptive technologies.

Now, due to TEs' popularity in the academic and public press, TE is under more scrutiny. More TE researchers than ever before are focusing on specific financial, ethical, organizational and other important issues. For example, the debacle that was Enron (McLean & Elkind, 2004) heightened awareness of TE researchers on subfields like sustainability and social entrepreneurship.

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We start with a definition of technology entrepreneurship (TE). We state that TE can be defined as recognizing, creating and exploiting opportunities, and assembling resources around a technological solution (Spiegel & Marxt, 2011; Bailetti, 2012), irrespective of the organizational context (Shane & Venkataraman, 2000). We further recognize that TE researchers have shown that technology entrepreneurs derive competitive advantage either by a combination or singularly utilizing three basis approaches. The three distinct competitive advantage pathways are the recognition of technological possibilities (Schumpeter, 1912), the ability to use technology to decrease transaction costs (Williamson & Kaiser, 2005), and the ability to use new technology product paradigm to provide a solution to a market gap (Kirzner, 1973).

The term "entrepreneur" conjures up positive social connotations. This is exemplified by the *International Encyclopedia of the Social Sciences* describing the entrepreneur as a "leading economic figure, even cultural hero, deriving from both the evident nature of the market system and the projected self-image of middle-class business leaders" (Darity, 2008, p. 604). Despite or perhaps because of the ambiguity, glorification and popularity of entrepreneurship, interested in and scope of the larger field has exploded. To demonstrate the increased research interest in the field we found that a Scopus query revealed 4555 entrepreneurship articles with "entrepr*" in their title or key words between 1992 and 2002. In the decade that follows, there were 16,317 articles, that is more than three times the amount of the previous decade. A source title analysis of this query reveals about 160 journals that publish entrepreneurship research.

Today traditional knowledge on TE is being extended by lines of inquiry that tap into the interface with neighboring fields such as innovation management (for example, the concept of customer development (Blank, 2013)), or expand into henceforth unrelated domains such as technology entrepreneurship for senior social entrepreneurship (Leadbetter, 1998). Researchers that are working on these and other emerging lines of inquiry in TE find outlets for their work not only in technology or general entrepreneurship journals, but in general management journals as well. We find that due to the silo approach of many current academic research communities, crosspollination, once the hallmark of TE research, is waning. In fact, many of these "new" concepts have deep roots in academic literature that is rarely acknowledged.

Are TE researchers, with their diverse academic backgrounds, benefiting from, disregarding, or unaware of prior knowledge generated in the field? Do the journals that publish TE research have mission fit (Linton et al., 2009)? Where are the leading journals in TE? The debate of TE importance, as harbinger of Schumpeterian cycles and its own popularity has increased researcher interest and ambiguity over where exceptional research in the field can be found. We provide this analysis of journals publishing TE research through a bibliometric effort.

We provide a novel method of ranking TE journals. We start by defining the locus of publication of TE by searching relevant pairs of keywords. We analyze articles and journals by addressing bibliometric indicators. We subsequently rank the journals using composite indicators that weigh the quantity and the quality of TE articles. We provide a ranked list of the top twenty journals that best serve the TE research community. We map the journal landscape and in doing so reflect a fractured field with the top 20 TE journals derived from Management of Technology and General Entrepreneurship journals. Finally, we find that those journals with exceptional mission fit can be more effective outlets for exceptional TE research. Hence, our contribution enhances the field by providing a clearer picture of exceptional TE journals for both readers and intending authors.

2. Growth and fragmentation of the TE field

From an academic point of view, the works of Schumpeter are the oldest cornerstone of TE research. Schumpeter placed the entrepreneur as the central driver of economic growth, as the actor most able to take advantage and drive technological change (Schumpeter, 1912; Schumpeter, 1942). The primary role that TE plays on developing creative advantage based on emerging technologies (Walsh & Groen, 2013) has deep roots in the works of Schumpeter (Schumpeter, 1912; Schumpeter, 1942), Birch (Birch, 1987), and Kirchhoff (Kirchhoff, 1994). Yet during the 1960s through today (Gartner, 1990; Davidsson, 2005; Grichnik & Harms, 2007), entrepreneurship research has decoupled from this explicitly technological dimension and become generally equated with the pursuit and exploitation of opportunities. The entrepreneurship field has become broader but more segmented. This has allowed journals to become more focused and to have tighter fit to their mission of serving subgroups of entrepreneurship research.

Still the importance of technological entrepreneurship to society is well known (Kirchhoff et al., 2013; Wong et al., 2005) and the cornerstone of the fields importance. Yet the search for relevant forums for entrepreneurship and more specifically TE is not as obvious. Indeed general entrepreneurship researchers only a few decades ago found it important to delineate the relevant forums for the general field of entrepreneurship (MacMillan, 1991). The process of delineating the relevant forums for specific fields such as TE is even more daunting.

As the field TE has become more and more popular, its scope has increased through the inclusion of different topics groups. The TE field was once exclusively tied to high-tech startups (Kirchhoff, 1994). Now the field encompasses successful formation of high and low tech firms (Yanez et al., 2010) as well as entrepreneurial action based on technology in established firms. TE is multidisciplinary in nature, requiring researchers to understand the fields of technology, management of technology and entrepreneurship (Yanez et al., 2010). Indeed both physical and social science researchers' are publishing in this field. A greater number of researchers are embracing TE with an ever more diverse academic background embracing topics such as incubation (Said et al., 2012; Sonne, 2012; Harms et al., 2010), academic spin offs (Freitas et al., 2013; Bathelt et al., 2010), research facility spin offs (Chang, 1992), entrepreneurial product development (Dowling & Helm, 2006), IP protection (Kidwell, 2013), entrepreneurship and emerging technology (Thukral et al., 2008), entrepreneurial competence development (Linstone, 2011), open innovation consortia and entrepreneurship (Allarakhia & Walsh, 2011), high technology opportunities for emerging and established economies (Romig et al., 2007), TE and family business (Kraus et al., 2011) and many more.

The field has also grown and diversified through the assimilation and development of new topics from the lager