



Yes, now we can: Technological change and the exploitation of entrepreneurial opportunities

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ABSTRACT

The paper investigates how technological change in an industry influence which individuals will identify and exploit entrepreneurial opportunities. We propose that the introduction of new development tools will change knowledge-barriers to entry because they enable the abstraction of specialized knowledge that was previously needed for development. Empirically we test the argument using data from the web design industry in a Nordic country during the period 1992–2003. We compare the education and experience of founders before and after the introduction of web administration tools in 1998 and find a significant difference, which supports the main thesis of our argument.

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1. Introduction

Within entrepreneurship research the nexus of opportunities and individuals has received a lot of attention (Eckhardt & Shane, 2003; Sarason, Dean, & Dillard, 2006; Shane, 2003; Shane & Venkataraman, 2000; Venkataraman, 1997). Instead of focusing separately on the enterprising individual or the opportunities that are generated by environmental change the emphasis has been on the importance of investigating the interaction of the individual and opportunities.

A central tenet within this line of research is the importance of prior knowledge for identifying and exploiting opportunities (Shane, 2000). Previous experiences and accumulated knowledge are believed to shape what opportunities individuals will discover and how they are further developed into a viable business. Such an approach implies that external knowledge development, for example the introduction of new technologies, will affect which individuals are likely to identify and exploit entrepreneurial opportunities (McMullen & Shepherd, 2006).

This is certainly not a new insight. Even if not formulated in the same manner this view is clearly shared by the economists that have stressed the role of entrepreneurs as change agents in the economy. This is particularly evident in the works of economists sharing the common ancestry to the Austrian economist Carl Menger, such as Joseph A. Schumpeter (1934, 1939, 1942) and Israel M. Kirzner (1973, 1997). Research following the tradition of Schumpeter have studied the linkage between innovation and the development of technology but have not stressed the role of the individual (e.g. Klevorick, Levin, Nelson, & Winter, 1995). Studies following more closely the subjective tradition of Menger, such as Kirzner (1973, 1997), have stressed the importance of individual action in the economic system, but have never given much attention to knowledge as a phenomenon (Lewin, 1996). This means that there is a dearth of studies dealing with in what ways technological change affects which individuals discover, create, evaluate and exploit entrepreneurial opportunities.

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The aim of this paper is advance the understanding of how the introduction of new technology in an industry influences which individuals identify and exploit entrepreneurial opportunities in that industry. More specifically, we investigate how the introduction of a new type of development tools affected what individuals started new businesses in the web design industry. We study the whole population of startups in the web design industry established 1992–2003 in a Nordic country. The development of the industry during that period was dominated by independent startups, and in the middle of the period web administration tools were introduced that helped simplify the creation and maintenance of web sites.

The paper is structured as follows. In the next section we develop our frame of reference resulting in three hypotheses. In the method section we describe our method of data collection and analysis followed by a section where the results of our empirical analysis are presented. Finally, we discuss the results and their implications for further research.

2. Development of hypotheses

2.1. Entrepreneurial opportunities and knowledge

Despite the current focus on the concept of opportunity in entrepreneurship research it is fair to say that there is yet to emerge a consensus on its definition or meaning. Two issues are of importance for the relationship between opportunities and knowledge. First, to what degree are opportunities objectively “out there” or subjectively “in the eye of the beholder”? Second, how does the kind and degree of novelty demarcate entrepreneurial opportunities from economic opportunities in general? To investigate these issues we use the definitions of opportunities put forward by [Shane and Venkataraman \(2000\)](#) and [Sarasvathy, Drew, Velamuri, and Venkataraman \(2003\)](#) as they represent different ontological views within entrepreneurship research.

Following [Casson \(1982\)](#), [Shane and Venkataraman \(2000\)](#) define entrepreneurial opportunities as “those situations in which new goods, services, raw materials, and organizing methods can be introduced and sold at greater than their cost of production” (p. 220). They add that entrepreneurial opportunities should be considered a subset of a larger set of profitable opportunities, the distinctive characteristic of entrepreneurial opportunities being the discovery of new means–ends relationships.² Further, they argue that opportunities are objective phenomena, but not known to all parties at all times because their recognition is a subjective process. The discovery of an opportunity occurs when a conjecture is made about differences in the current and future value of resources. If the conjecture is correct, entrepreneurial profits are created. If wrong, losses are incurred.

[Sarasvathy et al. \(2003\)](#) provide a similar definition, but they take a fundamentally different stand in terms of the ontology of the opportunity. [Sarasvathy et al.](#) define an entrepreneurial opportunity as consisting of a “set of ideas, beliefs and actions that enable the creation of future goods and services in the absence of current markets for them” (p. 142, italics in the original). Ideas refer to conjectures on how economic ends can be achieved, which may be correct or not. Beliefs refer to judgments of conditions favorable to the achievement of the sought ends. Actions refer to the generation and implementation of the sought ends through the introduction of new economic artifacts, such as goods, firms, markets or institutions. By including cognitive aspects of the opportunity [Sarasvathy et al. \(2003\)](#) presume an actor “for whom it is perceived as an opportunity” (p. 143, italics included in the original), which makes it a subjective phenomenon. By including action [Sarasvathy et al. \(2003\)](#) argue that they transcend a purely subjective or objective notion of the opportunity, as the meaning of the opportunity is obtained through individual action in the real world, within which it has to take shape.

Both views have empirical support; it is clear that cross-industry comparisons and longitudinal studies of the ‘amount’ of opportunities in an industry changes. At the same time, many studies do point to the idiosyncratic and subjective nature of opportunities. Indeed, [Buensdorf \(2007\)](#) argues that the distinction is not important as opportunities often emerge as an unintended consequence of market processes but that the ability to identify them clearly is subjective. As we will discuss in [Section 3](#), the important distinction is that regardless of perspective, a change in knowledge can create, change or destroy the opportunities that can be discovered or created.

Despite the difference in ontological assumptions there is less difference in the above definitions with regard to the degree and kind of novelty required for an opportunity to be considered an entrepreneurial opportunity. In both cases it is required that entrepreneurial opportunities are innovative, such as opportunities for introducing new goods into the economy or new methods of supplying them ([Schumpeter, 1934](#)). This requirement has consequences for the cognitive aspects of the opportunity. It requires ideas about the new goods or methods being proposed, how they create economic value and how appropriation of returns takes place ([Holmén, Magnusson, & McKelvey, 2007](#)). This means that information about price differences is not sufficient and the entrepreneur also needs to possess and act upon knowledge about products, processes, customers and markets.

A focus on entrepreneurial action as innovative usually implies a distinction between the innovators who lead the way to the market and the imitators that follow ([Schumpeter, 1934](#)). Economic opportunities pursued by the former are considered entrepreneurial, while opportunities pursued by the latter are not. The former are considered to introduce new means–ends relationships on different markets, while the latter are seen to ‘optimize’ their use ([Shane & Venkataraman, 2000](#)).

The distinction between innovators and imitators may not be particularly helpful when studying the cognitive aspects of entrepreneurial opportunities. In the case of a technological innovation, for example when a good based on new technology is

² Means–ends relationships are relationship between results sought through action (ends) and what serves to attain these results (means) ([von Mises, 1998, pp. 92–94](#)). In general terms these relationships include both direct and indirect relationships for satisfying human wants. New means–ends relationships may include new means, new ends, or new ways of linking the two.

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