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Schumpeterian and Kirznerian opportunities: An empirical investigation of opportunity types

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Abstract

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INTRODUCTION

Shane (2003) proposes "the nexus between enterprising individuals and valuable opportunities" (p. 9) as the general framework to understand entrepreneurship. The individuals who engage in the entrepreneurial process, are those that identify, perceive as valuable, and exploit opportunities to meet or create new market demands, or to fulfill existing demands in new ways, by mobilizing and organizing resources in new organizational forms. The existence of a closely connected nexus implies that different individuals will pursue different types of opportunities through the entrepreneurial process. Perhaps the most known characterization of opportunities reflects Schumpeter (1934) and Kirzner (1973) views, generally regarded as antithetic, about the role of the entrepreneur in the process of market competition. In Schumpeter's view, the entrepreneur is an innovator and a leader who, by introducing new combinations in an economic system in equilibrium, temporarily undermines the economic rents and lives of incumbent firms, leading to a dynamic process of "creative destruction". In Kirzner's view the entrepreneur is an arbitrager who, by being passively alert and in a position to see opportunities that others do not see, because of specific and unevenly distributed prior knowledge, exploits imperfections currently existing, or perceived to exist, in the market and, by doing so, through price adjustments, brings back the system into equilibrium.

The opportunity-based theory of entrepreneurship (Holcombe, 1998; Shane and Venkataraman, 2000; Fu-Lai Yu, 2001) regards Schumpeter and Kirzner perspectives not as mutually exclusive, but as alternative representations of different types of opportunities that can coexist in the economy at the same time. In other words they provide a typology of opportunities, which Venkataraman (1997) for example compares to a strong and a weak form of entrepreneurship. Furthermore, in view of the individual-opportunity nexus assumption, "Schumpeterian and Kirznerian *opportunities*" would require "Schumpeterian and Kirznerian *entrepreneurs*", that is, individuals with distinctive traits, abilities and strategic visions. As Shane pointed out "the individual-level attributes necessary for the discovery and exploitation of opportunities, the processes of resource acquisition and organizing, and the strategies demanded by

Schumpeterian opportunities are different from those demanded by Kirznerian opportunities" (2003, p.21). Despite the general recognition in the entrepreneurship literature that the Schumpeterian versus Kirznerian perspective provides a useful typology, a way to map opportunities and entrepreneurial traits, less attention has been paid to its empirical validation, and to the implications for the individual-opportunity nexus. Our aim is to map empirically Kirznerian and Schumpeterian opportunities, and to disentangle the connection linking the nature of entrepreneurial opportunities and the personal characteristics of entrepreneurs, as distinct ends of the relationship.

The concept of entrepreneurial opportunity is now widely recognized as a core concept in the field of entrepreneurship research (Shane and Venkataraman, 2000), and an increasing number of studies have attempted to illustrate the nature and sources of entrepreneurial opportunities (Eckhardt and Shane, 2003; Dutta and Crossan, 2005). Within this literature studies grounded on the psychology of entrepreneurship have mainly focused on how individuals with different personalities and traits identify and act upon opportunities, to a large extent independently of the specific nature of the opportunities involved (Gartner, Carter and Hills, 2003). On the other hand, approaches drawing on economics and sociology, have emphasized the context in which entrepreneurs operate, and therefore the importance of understanding how the nature of opportunity shapes opportunity identification and exploitation processes (Shane, 2003). Yet most of the contributions on entrepreneurial opportunities are of theoretical nature, as they focus on the definition and qualification of the opportunity construct. For example, in the 2007 special issue of *Small Business Economics* dedicated to entrepreneurial opportunities, only one study carried out an empirical analysis (see McMullen, Plummer and Acs, 2007). Furthermore they tend to emphasizes the nature of the environment in which opportunities emerge or the kind of process through which opportunities unfold (Dutta and Crossan, 2005), while little in known on how these characteristics are connected to individual entrepreneurs with specific traits. In our paper we bring together the two approaches (individual-centered and opportunity-centered) by examining how the

nature of entrepreneurial opportunities, defined at the level of product ideas, can be related to the individual-level characteristics of the entrepreneurs that pursue those ideas.

Recent studies suggest that the Kirznerian and Schumpeterian typology of opportunity can help to understand differences in the entrepreneurial process. For example, Samuelsson and Davidsson (2009) observed in a sample of Swedish citizens that the number of gestation activities in the venture creation process differ between types of venture ideas, whether they are innovative or imitative, distinction that bear some common property with the Schumpeterian-Kirznerian categorization. Likewise, Craig and Johnson (2006) tried to identify different patterns of opportunity recognition, of Schumpeterian type (through innovation) or Kirznerian type (through alertness) in a sample of business and engineering students, as potential entrepreneurs, although the type of education, business versus engineering, did not seem to influence the probability for a student of recognizing opportunities of one versus the other type. While these studies focus on specific aspects that distinguish Kirznerian and Schumpeterian opportunities (radical versus incremental innovation, innovation versus alertness), we adopt a comprehensive definition of Schumpeterian and Kirznerian opportunities, based on the 5-dimensions framework proposed by Shane (2003).

In this paper we explore empirically the nature of entrepreneurial opportunities, by identifying and validating a Schumpeterian versus Kirznerian typology, and to what extent the presence of different opportunity types simultaneously across new ventures can be explained on the basis of differences in the personal attitudes, experience and visions of individual entrepreneurs. The contribution of our study is threefold. First we develop a scale to measure the degree to which entrepreneurial opportunities can be considered of Schumpeterian versus Kirznerian nature, measure that captures and summarizes the dimensions identified in Shane's model. Second, we provide evidence of the coexistence of different types of entrepreneurial activities within a fairly homogenous environment. Third, we shed insights on the existence and nature of a nexus linking opportunities, of Schumpeterian or Kirznerian type, to the characteristics of individual entrepreneurs.

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KIRZNERIAN AND SCHUMPETERIAN OPPORTUNITIES

Several scholars in the Entrepreneurship and Austrian economics literature have extensively elaborated on the elements that distinguish Schumpeter and Kirzner's views. Here we concentrate our discussion on the framework that Shane (2003) propose in summarizing these perspectives into a typology of entrepreneurial opportunities. Shane identifies five bipolar dimensions to differentiate Schumpeterian and Kirznerian opportunities: (i) disequilibrating/equilibrating; (ii) requires new information/ does not require no new information; (iii) very innovative/ less innovative; (iv) rare/ common and (v) involves creation/ limited to discovery (Shane 2003).

The first dimension refers to the effects of entrepreneurship on the market process. In Schumpeter, the role of the entrepreneur is to bring change and disruption (and therefore economic development) into a system that runs smoothly following "the circular flow of economic life" (1934). The economic system is in equilibrium unless change is generated from outside it (in virtue of the personal drive and ambition of the entrepreneur-innovator), change that threatens the profits and existence of incumbent firms, and creates opportunities for entrepreneurial rents: the economic system thus abandons its status of equilibrium (Kirzner 1997). In Kirzner, change is generated from inside the economic system, in virtue of earlier errors and misjudgments of economic agents that lead to misallocation of resources (prices are either too high or too low), and therefore create opportunities for economic rents for the entrepreneur-arbitrager (who buys where prices are low and sell where prices are high). It is the existence of a disequilibrium that create valuable opportunities for entrepreneurial action. As such action takes places, and market prices adjust to it, unbalances will vanish and the economic system will move back towards equilibrium (Kirzner 1973).

An important caveat is that in both perspectives entrepreneurship is associated with change (and innovation), as the exploitation of opportunities cannot occur by mere replication of existing conditions (Shane 2003). As Kirzner highlights in the 1999 paper where he responds to the dominant interpretation of his work in relation to Schumpeter's, it is not innovation per se that distinguishes his notion from Schumpeter's, but the

consideration that new opportunities emerge out of forces that are internal to the functioning of the market process, rather than being externally driven by Schumpeterian heroic action (Kirzner 1999). The difference is in the "coordinative quality of innovation" (in the sense that through innovation misallocated resources find more efficient use) as compared to the disruptive quality of Schumpeterian innovation, "destroying the pre-existing state of equilibrium" (Kirzner 1999, p. 5 and 14).

The second dimension of Shane's framework posits the question of whether the existence of opportunities requires the production of new information (Schumpeterian opportunity) or is limited to access to information (Kirznerian opportunity), which already exist but is available, or perceived to be valuable, to different individuals who 'happen to be' in specific circumstance at certain times (Hayek 1945). Buenstorf (2007) criticizes the use of this particular dimension in Shane's model, observing that in the Schumpeter the entrepreneur-innovator is not necessarily an inventor, and innovations do not requires a basis of new technological knowledge or new scientific advances. As Schumpeter (1934) states, innovations "need by no means be founded upon a discovery scientifically new" (p.66); innovation as "the carrying out of new combinations, means ... simply the different deployment of the economic system's existing supplies of productive means" (p. 68). However, this view of innovation as a re-combinatorial activity, is consistent with the consideration that in times of technological and socio-economic change, new information becomes available, which will enhance the opportunity for the entrepreneurs to find new and valuable ways of recombining existing resources (Shane 2003, Dutta and Crossan 2005).

Although innovation can be present in both perspectives, Shane (2003) points out that its role and significance remains different. Schumpeterian opportunities are very innovative, while Kirznerian opportunities are of incremental nature. Schumpeter (1934) makes the distinction between incremental innovations, when "new combinations may in time grow out of the old but continuos adjustment in small steps" (p. 65) and radical innovations, when "new combinations appear discontinuously" (p. 66). He then observes that while incremental innovations can generate economic growth, the phenomenon of

economic development, which is the true object of his analysis, can only emerge out of radical innovations. Conversely, for Kirzner, innovation can be present but is not a necessary element of the entrepreneurial process. In his later contribution Kirzner (1999) recognizes that the consideration of true uncertainty and change can add realism to the description of the "pure entrepreneur" that he used in his initial work. However, as he also points out, such a description (although hypothetical) remains an important analytical device to illustrate what is the essential nature of entrepreneurship, that is the arbitrage function. And this function applies independently of the nature of innovation, and can be as well limited to replicating or adapting existing solutions across different contexts.

Related to the previous consideration is another, forth dimension of Shane's typology of entrepreneurial opportunities, distinguishing between rare (Schumpeterian) opportunities and common (Kirznerian) opportunities. Schumpeterian opportunities with their disruptive nature and potential for breakthrough innovations are of greater value but also more rare to be found (Tushman, Anderson and O'Reilly, 1997). Finally, the last dimension highlighted by Shane contrasts Schumpeterian opportunities that involve creation and Kirznerian opportunities that are limited to discovery. As Kirzner himself (1999) remarks, the "pure alert entrepreneur" may represent an abstraction that does not account of a phenomenon such as innovation, yet this does not alter the essential role of the entrepreneur, which is that of "alertly noticing earlier errors", of discovering opportunities that exist in virtue of the market (mis)functioning. And, in all cases, Kirzner (1999) highlights, even when opportunities involve change and innovation, it is the market price mechanism that discloses to individuals their existence and value (Kirzner 1999). In contrast, breakthrough innovations are rarely initiated in response to relative price variations (Dosi 1988) and demand Schumpeterian creative action; as Foss (1994) states it they require individuals to "create new data" rather than "to react to new data".

The first objective of this paper is to validate empirically the Schumpeterian versus Kirznerian typology of entrepreneurial opportunities on the basis of the five dimensions identified by Shane. Both types are thought of as counterparts on a

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continuum. We then measure the extent to which opportunities are Schumpeterian (versus Kirznerian) in terms of their disequilibrating (versus equilibrating) nature, embodiment of new (versus existing) information, degree of innovativeness, rarity (versus being common), and creativity (versus discovery). Each dimension is measured at the level of single opportunities, in the sense that individual entrepreneurs were asked to indicate one specific opportunity that they had recently exploited and to assess it according to the aforementioned dimensions. A necessary condition in the validation of any multidimensional measure is that its proposed dimensions contribute to an overall construct. Simultaneously however, it is required that, though related, the dimensions reflect distinct components (Campbell and Fiske, 1959). We therefore hypothesize:

Hypothesis 1a: The five bipolar dimensions proposed to characterize Schumpeterian versus Kirznerian opportunities (namely: ....) contribute to define one overall bipolar construct of opportunity type, namely the Kirznerian-Schumpeterian (KS) construct

Hypothesis 1b: The underlying dimensions of the KS construct are distinct dimensions

OPPORTUNITIES AND ENTREPRENEURS

In Schumpeter's view, entrepreneurs represent only a small proportion of the population and they distinguish themselves for qualities that he calls of "hedonistic" nature (page number), and which presume a different psychology between entrepreneurs and non-entrepreneurs. As well, Kirzner points out that the Schumpeter's conception of the entrepreneurial process can best describe the personality traits of the individuals who take personal initiative, not necessarily motivated by profits, and drive such a process. In contrast, his own conception, Kirzner continues, can usefully describe the operating of market forces that generate opportunities for entrepreneurial profits. To identify these opportunities individuals do not need to possess special qualities or show distinctive behavior, but simply they need to be in a state of general alertness. Schumpeter's portrait of the entrepreneur outlines unique qualities.

"First of all, there is the dream and the will to found a private kingdom, usually, though not necessarily, also a dynasty....Then there is the will to conquer: the impulse to fight, to prove oneself superior to others, to succeed for the sake, not for the fruits of success, but of success itself.....Finally, there is the joy of creating, of getting things done, or simply of exercising one's energy and ingenuity." (Schumpeter 1934, p.93).

The entrepreneur is thus a leader, who with boldness and ambition challenges conventional wisdom and overcome social resistance and skepticism (Shane 2003). Entrepreneurs trying to exploit disruptive innovations may face greater obstacles in the markets for products and for resources, especially when the value of highly uncertain outcomes is difficult to prove; o overcome which, entrepreneur need a dream and a will to conquer. Based on Schumpeter's description of entrepreneurial qualities, we expect that individuals exploiting Schumpeterian opportunities are more likely to have ambitions to grow their business.

Hypothesis 2: Entrepreneurs that are pursuing Schumpeterian opportunities are likely to have greater growth ambition for their ventures than entrepreneurs that are pursuing Kirznerian opportunities

Another image that emerges from Schumpeter's account of entrepreneurial qualities is that of an entrepreneur acting not because motivated by a rational assessment of future profits and of the odds attached to them, but because of an intrinsic motivation to strive for and achieve success, without deliberate consideration of how likely that success could be. One can argue that such entrepreneur would be more inclined to take risks, and to 'prefer' highly skewed distributions of economic returns (Åstebro 2003), which are more likely to emerge for Schumpeterian opportunities, being these radically new and more uncertain, than in the case of Kirznerian opportunities. As Shane also points out, the risk

associated with Schumpeterian opportunities, because they are more innovative and break away from existing routines, should be higher than for Kirznerian opportunities, which are of incremental nature and tend to replicate existing business or product concepts (Shane, 2003). On this basis we formulate the following hypothesis:

Hypothesis 3: Entrepreneurs that are pursuing Schumpeterian opportunities are likely to have higher risk taking propensity than entrepreneurs that are pursuing Kirznerian opportunities

Creativity, together with a proactive attitude (the joy of getting things done), is another quality to be found in the Schumpeterian entrepreneur. Schumpeter recognizes that the entrepreneur is an innovative person, that combine creativity and a proactive stance. The Schumpterian entrepreneur is in search of innovation. In contrast, Kirzner argues that the discovery of valuable opportunities always take entrepreneurs by surprise, and a proactive behavior or intentional search is not required to the passively alert entrepreneur. "An opportunity for pure profit cannot, by its nature be the object of systematic search. [...] What distinguishes discovery [...] from successful search [...] is that the former (unlike the latter) involves the surprise that accompanies the realization that one had overlooked something in fact readily available" (Kirzner 1997, pp. 71 and 72). Thus, we expect that Schumpeterian opportunities are more likely associated with individuals that engage in innovative behavior, in the sense that they combine their own ability to generate new ideas (their creativity) with a deliberate search for new ideas, as well as for the means necessary to successfully implement those ideas. We state this as follows.

Hypothesis 4: Entrepreneurs that purse Schumpeterian opportunities are more likely to actively engage in innovative behavior than entrepreneurs that pursue Kirznerian opportunities

In a recent contribution, Kirzner (2009) clarifies another element that sets apart his view of the entrepreneur from Schumpeter, even when departing from the hypothetical assumption of a "purely alert" entrepreneur, and instead recognizing the fact that real-word entrepreneurs are often innovators. Kirzner observes that in the real world, subject to continuos and unpredictable changes, "opportunities 'exist' only in the speculative sense (i.e. they can be *realized* only in the future)" (p.150). Therefore entrepreneurs need to formulate subjective guesses and expectations. The difference from the Schumpeterian entrepreneur, Kirzner (2009) points out, is in this speculative element, which shapes the way individuals perceive opportunities. Even when facing uncertainty about the future, the entrepreneur considers opportunities as they are readily available, "waiting to be grasped". As Kirzner (2009) states "in a relevant sense they 'exist' *now.* That is, to the entrepreneur who sees such an opportunity, it appears in the form of an opportunity to buy and sell at different prices' (p.150). In this sense, even to an entrepreneur-innovator, the perception of opportunities is no different from the perception of price differentials in a situation of pure arbitrage. Innovation takes place not because of new discoveries, but because of the perception that resources are misallocated, that demands are not currently met in the market, and, through innovation, these resources can find a more efficient employment, and unmet demand can be fulfilled. Following this line of reasoning, we argue that entrepreneurs with a different strategic vision for their firms will purse different types of opportunities. Entrepreneurs who perceive opportunities for their business in new solutions to match future developments are more likely to engage with Schumpeterian opportunities. Entrepreneurs who perceive opportunities for their business as existing today, and seek to provide solutions to current demands are more likely to engage with Kirznerian opportunities. We summarize this in the following hypothesis.

Hypothesis 5: *Entrepreneurs that pursue Schumpeterian opportunities are likely to have a strategic vision oriented towards future needs, entrepreneurs that purse Kirznerian opportunities are likely to have a strategic vision focused on today's needs.*

Together with personal attitudes and vision, the human capital that an entrepreneur brings into the new venture, through prior experience and education, can shape the type of opportunities followed. Samuelsson and Davidsson (2009) discuss the role of human capital in the process of new venture creation for different types of new venture ideas, which they distinguish in innovative and imitative type. In particular, they find that the entrepreneur's general knowledge, as expressed by formal education, is, in the case of innovative venture ideas, more important to make progress with the many activities involved in the process of setting up a new venture, than in the case of imitative venture ideas. Samuelsson and Davidsson (2009) offer multiple explanations. Innovative ideas are more complex and uncertain than imitative ideas, and therefore may require the entrepreneur to master a broader set of knowledge and skills, attainable through formal education. Innovative ideas are also more ambiguous and difficult to communicate: the entrepreneur formal education can "signal" to its stakeholders (for example customers) the value of an enterprise, which still lacks legitimacy and suffers of a "liability of newness". Finally, innovative ideas tend to be of greater magnitude and impact than imitative ones. Greater expected gains would then motivate the efforts of individuals which, in virtue of their human capital, could otherwise find attractive alternatives to setting up a business. The distinction between innovative and imitative ideas, which Samuelsson and Davidsson (2009) link to the level of the entrepreneur's formal education, bears common elements with Shane's typology of Schumpeterian and Kirznerian opportunities. On this basis, we formulate the following hypothesis.

Hypothesis 6: Entrepreneurs that pursue Schumpeterian opportunities are likely to have higher level of formal education than entrepreneurs that pursue Kirznerian opportunities

Sample and data collection

The data was collected via a a survey of high tech small firms in the Netherlands, carried out in collaboration with EIM, a research institute specializing in entrepreneurship and

small businesses. EIM monitors periodically and manages a panel of high tech small firms, on behalf of the Dutch Ministry of Economic Affairs. The panel is composed of small firms, with less than 250 employees and often less than 100 employees. These firms are focal in most Dutch innovation and entrepreneurship policies, but poorly covered in official statistics. High tech small firms are defined as active R&D-performers which intentionally develop and/or apply new technologies in their products. The panel members are active in industries such as manufacturing of machinery and equipment, chemical and pharmaceutical products, and also in services, including software developers, engineering firms and commercial R&D firms.

The choice of the EIM panel of high-tech startups as basis for our enquiry was motivated by the anticipation that the sample would contain many firms exploiting Schumpeterian opportunities. Schumpeterian opportunities are expected to be rare, and, in a broader sample we would predict to find mostly Kirznerian opportunities. Instead in a sample of high-tech firms, which are known to engage in potentially disruptive opportunities (Grinstein and Goldman, 2006), the distribution was likely to be much more even – enabling a comparison between the two opportunity types.

The survey consisted of two steps. First, as part of the annual telephone survey that EIM regularly conducts to gather general information and key indicators about the panel members, and to ask if they are still willing to participate, we were able to include screening questions to identify those members who had recently engaged in opportunity exploitation. Respondents were all owners or general managers, i.e. the business' main decision makers, and usually the person who had started the company. We first asked whether they had developed any new product in the past three years and introduced it to the market. If yes, we asked them to describe the product via an open-ended question. In case respondents had developed multiple products they were asked to report their most recent example. A wide variety of products was mentioned, for example an onboard monitor and routing system for sea vessels, a filtering unit to purify drinking water, a geo-phone to explore treasures of the soil, a combined adjustable spanner for plumbers, a new type of herbal cheese, and a disinfection device for medical applications.

The telephone survey was implemented in December 2006, with the full panel of 779 members as target. Of these, 532 were successfully contacted by EIM over a four-week period. Within this group, 429 panel members fulfilled our screening criteria: they recently introduced a new product in the market and were willing to continue participation in the panel. In comparison with the full panel these respondents were not selective. Drawing on χ^2- and t-tests we found that they did not differ from non-respondents and others that failed to pass the screening. In terms of industry types, size classes, education level and age, significance of difference tests gave no significant results (p > 5%) regardless of the distribution that we tested.

The second step consisted of a pen-and-paper survey that EIM sent out to all respondents. To the standard questionnaire that EIM administers as part of its regular data collection procedures, we were able to submit a dedicated section with additional questions to the 429 respondents that had passed our first screening. The introduction to this section explicitly indicated that we were interested in the specific product that respondents had described on the phone. The full description of the product was printed first. The respondents were then asked to rate the new product on the basis of a semantic differential scale which involved the use of bipolar items. We used this scale to assess whether the opportunity could be characterized as Schumpeterian or Kirznerian. At this second stage we received 184 completed questionnaires, with 43 percent response rate. Table 1 describes the composition of the sample of individuals selected from the EIM panel, and of the respondents, by size class and industry of the firm and by age and education of the entrepreneur (owner, general manager, or founder). When we applied χ^2- and t-tests, the two groups did not display significant differences with respect to size class (p=.46), sector of activity (p=.55), and age of the respondent (p=.75), while respondents appeared to be slightly more likely to hold a formal education degree than the sample (p=.06), overall suggesting that response bias was not a significant problem.

< Insert table 1 about here >

MEASURING OPPORTUNITY TYPES

In order to build a measure of opportunity types, potentially able to discriminate between Schumpeterian and Kirznerian opportunities, we created a semantic differential scale composed of 15 items. Within this set five groups of three items each were defined to capture the five dimensions of Shane's typology of Schumpeterian and Kirznerian opportunities (because of space restrictions in the broader EIM survey questionnaire we could not add more items). All items were bipolar sentence completers so that respondents could report on the nature of their product, and completed on a 7-point scale. For example, we asked respondents to mark if the product was to one extreme 'entirely new' (Schumpeterian) or, to the other end of the scale, 'applying something incumbent' (Kirznerian). Appendix 1 reports the full list of the items.

Our strategy to analyze the items and develop our measure was as follows. First, we conducted a range of exploratory factor analyses (EFA) to explore feasible factor structures and remove superfluous items. Second, we performed confirmatory factor analyses (CFA) to find the best factor structure and to test our first hypothesis.

Exploratory factor analysis

We started by computing pre-analysis tests on our 15 items to establish if the data were suitable for EFA, as recommended by Hair et al. (2007). The Kaiser-Meyer-Olkin measure of sampling adequacy was .85, and the Bartlett test of sphericity was significant at $p < .001$, indicating suitability of the data. An initial EFA, computed without iteration, produced only four factors with eigenvalues larger than one. An additional analyses with oblique rotation suggested that the two dimensions of radical-incremental and creation-discovery could in fact be merged. However, an alternative EFA that was forced to extract five factors indicated that the proposed five dimensions were feasible. Both solutions, with four or five factors, contained some ambiguous items, and, for this reason we performed an item-selection process to remove confusing items. Following Hair et al. (2007) this was done considering the factors one-by-one on the basis of factor loadings

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(which should preferably be > .50 while cross-loadings should be < .30). The item-selection process generated a 10-item scale, with two items for each dimension, and explaining 83% of the variance (see Appendix for the dropped items). Table 2 reports the results of the EFA on the selected items for the five-factor solution. As the Cronbach's α (> .70) and the mean correlation > .40 indicate, each factor is sufficiently reliable.

< Insert table 2 about here >

For the four-factor solution a similar matrix was found in which the items corresponding to the dimensions of radical-incremental and creation-discovery were merged, and in which the same items had been selected (results available from the authors on request).

Confirmatory factor analysis

Next, confirmatory factor analysis (CFA) was applied to validate our scale as stated in Hypothesis 1a and Hypothesis 1b. In other words, we want to test whether a measure of a SK-construct can be derived from our scale that is consistent with the 5-dimensions typology of Schumpeterian and Kirznerian opportunities, proposed by Shane (2003). It has been argued that the strongest test of a model fit is to identify and estimate competing formulations with a different factors' structure (Hair et al., 2007). Based on the results of the EFA, we identified three alternative models. In the first model all items load into one single factor. This is a baseline model that is routinely estimated in the process of developing measures, equivalent to assuming that the distinction between Schumpeterian and Kirznerian opportunities can be captured in one single dimension. The second model adopts a four-factor structure in which the items that belong to the categories radical-incremental and creation-discovery load all on one factor, as a possible solution emerged in the EFA. The third model assumes a five-factor structure where all items load on the hypothesized five dimensions. The latter models were both specified to account for empirical correlations betweens the five dimensions, i.e. to account for the proposed contribution of the various dimensions to an overall measure of opportunity type.

Table 3 reports goodness-of-fit indexes for the three models based on maximum likelihood estimation. They consist of absolute fit measures (GFI and RMSEA, both indicating recovery of observed correlations between the items), incremental fit measures (TLI and NFI, comparing a proposed model to a baseline one-factor model with all items having unity factor loadings) and a parsimonious fit measure (χ^2/df, indicating whether model fit has been achieved by 'overfitting' the data with too many coefficients). The threshold values for the indexes reported in the table are taken from Hair et al. (2007) and are generally considered conservative. The estimated indexes indicate that the five-factor model provides the best fit. The four-factor model is marginally acceptable, but is clearly less feasible than the five-factor model. Also, we find that all items load significantly on their proposed dimensions at p < .001[i]. These results strongly suggest that the five dimensions contribute to an overall bipolar construct of Schumpeterian-Kirznerian opportunity type, thus supporting Hypothesis 1a.

< Insert Table 3 about here >

To test Hypothesis 1b, stating that the five dimensions underlying the one measure of opportunity type are distinct constructs, we followed Fornell and Larcker (1981), by comparing the average variance extracted (AVE), i.e. the average variance shared between a construct and its items, with the variance shared with the other constructs in a model (i.e. the squared correlation between two constructs). Table 4 reports the off-diagonal correlations between the five dimensions of our model, and the square root of the AVE on the diagonal. Since the square root of the AVE exceeds all relevant correlations we can conclude that the five dimensions are sufficiently distinct (Hypothesis 1b is supported).

< Insert table 4 about here >

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[i] Output available on request

We can conclude that the confirmatory factor analysis supports the validity of a bipolar measure that allows us to rate the degree to which an opportunity is of Kirznerian rather than Schumpeterian nature, on the basis of five distinct dimensions. Table 5 reports the descriptive statistics of the measure and its underlying dimensions (derived from a 10-items scale) in our sample of high-tech small firms. The mean of the SK-measure (equal to 3.09) is below the expected value (4.0), indicating that opportunities of Schumpeterian type are slightly overrepresented in the sample. Nevertheless, the distribution of the measure in the sample is sufficiently dispensed to enable a comparison between types.

< Insert table 5 about here >

LINKING OPPORTUNITY TYPES AND ENTREPRENEURS

In this section we apply the proposed SK measure to test whether opportunities of different type are identified and exploited by different types of entrepreneurs. Hypotheses 2 to 6 identified the characteristics of entrepreneurs (personal attitudes, strategic vision and education) that are expected to be associated with either Schumpeterian or Kirznerian opportunities. To measure these variables we use the data from the broader survey that is part of EIM's regular efforts to study the behavior and performance of high-tech small firms. Table 6 summarizes the measurements and descriptive statistics for these variables.

< Insert table 6 about here >

The growth ambition of the entrepreneur was measured combining two questions of the survey, where respondents were asked to indicate the rate of growth (on a predefined interval scale) that they wanted to achieve in the following three years, both in terms of revenues and workforce (Cronbach's $\alpha = .64$ and mean inter-item correlation $r = .47$). The risk-taking propensity was captured by calculating the mean of three items ($\alpha = .81$ and $r = .59$), which were inspired on the work by Gomez-Mejia and Balkin (1989). The individual innovative behavior was assessed through a four-item measure, based on Scott

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and Bruce (1994), showing Cronbach's α = .77 and r = .46. The reliability levels satisfied common threshold values (α > .70 and r > .40) for all the self-constructed measures, with the exception of growth ambition. However, this measure is derived from only two items, and in such cases lower values of α are acceptable (Hair et al., 2007).

To discern the strategic vision that individual entrepreneurs hold and impart on their companies, we considered two other indicators. In the survey, respondents were asked to indicate to what extent their strategic focus included (i) the development of new products to satisfy future needs, and (ii) the exploitation of opportunities to better satisfy today's needs. For our last independent variable, the level of formal education of the entrepreneur, we used a dummy variable indicating whether the respondent had at least a master's degree. As a control variables, we included firm size, measured by the number of employees in full-time equivalents, and the entrepreneur's age.

The correlation matrix for the variables included in the empirical model (see Table 7) do not indicate problems of multicollinearity among regressors. To explore the relationship between opportunity type and characteristics of the entrepreneur, we estimate an ordinary least squares regression model using the proposed SK scale as dependent variable. This variable assume positive values for predominantly Kirznerian opportunities, and negative values for predominantly Schumpeterian opportunities.

< Insert Table 7 about here >

The estimated coefficients reported in Table 8 show that the strategic vision of the entrepreneur most significantly discriminates between the kind of opportunities pursed. Having a strategic vision projected towards future developments exerts a negative and statistically significant effect on the SK opportunity scale (β= -0.425 and $p < 0.001$), meaning that the most recent opportunity exploited by an entrepreneur with such strategic vision was most likely of Schumpeterian type. Conversely, having a strategy vision concentrating on present demands positively influences the SK opportunity scale (β= 0.261 and $p < 0.001$), implying that the most recent opportunity exploited by an

entrepreneur holding such vision was most likely of Kirznerian type. These results support *Hypothesis 5*, and Kirzner's interpretation that at the core of the distinction between his and Schumpeter's view is the entrepreneur's perception of whether opportunities are presently available or instead they reside in the future.

< Insert Table 8 about here >

Another individual-level characteristic that significantly influences the nature of opportunity is the entrepreneur's growth ambition. Having a stronger ambition to growth a new venture, in employment and sales, has a negative and statistically significant effect on the SK opportunity scale (β= -0.172 and p=0.039). In other words, individuals expressing stronger growth ambition are more likely to have recently exploited an opportunity of Schumpeterian type (*Hypothesis 2* is thus confirmed).

Statistically significant but moderate is the effect of the innovative behavior of the individual entrepreneur on the nature of the opportunity. The effect on the SK opportunity scale is negative and significant but only at 10 percent probability level (β= -0.259 and p= 0.082): individuals that engage actively in innovative activities, generating and searching for ideas and for the financial means to realize them, are more likely to have recently exploited an opportunity of Schumpeterian type (supporting *Hypothesis 4*).

Contrary to our expectations (as stated in *Hypothesis 3*) we do not find a statistically significant effect of the entrepreneurs' risk taking propensity on the SK opportunity scale, and therefore on the type of opportunity. Here we can remark that Schumpeter (1934) himself advocated that risk taking is not an entrepreneurial trait. To him, it would be the providers of finance (capitalists) who are bearing the risk of innovation. The assumption of a relationship between the level of formal education of the entrepreneur and the type of opportunity exploited (*Hypothesis 6*) does not find support in our data. As shown in Table 8, the estimated coefficient for the dummy variable indicating whether an entrepreneur has achieved at least a master degree is not statistically significant. With regard to the control variables, we observe a negative and

statistically significant effect of the entrepreneur's age on the SK opportunity scale (β= -0.015 and p= 0.060), indicating that older entrepreneurs are more likely to have exploited an opportunity of Schumpeterian type than of Kirznerian type. Finally, firm size does not exert a statistically significantly influence on the SK opportunity scale. Thus, the consideration that Schumpeterian vis-a-vis Kirznerian opportunities are more likely to be recognized and exploited by individuals in larger organizations (Shane 2003) does not find support within our sample of high-tech small firms (with less than 250 employees).

DISCUSSION

This paper has examined the nature of entrepreneurial opportunities and its relationship to individual-level characteristics of entrepreneurs, using a sample of 184 high tech small business entrepreneurs in the Netherlands. We developed a multidimensional scale with the purpose of measuring on a continuum the degree to which an entrepreneurial opportunities, identified at the level of new products introduced in the market, could be considered of Schumpeterian vis-a-vis Kirznerian nature. Respondents to a survey of high-tech small business entrepreneurs were asked to describe the nature of the (most recent) new product they introduced in the three year prior to the survey by completing a bipolar, multiple-item scale. The items were formulated to capture the 5-dimensions that, according to the framework proposed by Shane (2003), distinguish Schumpeterian and Kirznerian opportunities: disequilibrating-equilibrating, new information-no new information involved, very innovative - less innovative, rare-common, and creation-discovery. Each dimension was operationalized by two items with good reliability. The results of a confirmatory factor analysis showed that a valid scale could be built using Shane's 5-dimension model, where the dimensions proved to converge to an overall construct of opportunity type (Schumpeterian versus Kirznerian), but at the same time, they were sufficiently distinct.

The scale allowed us to bring to light the heterogeneity of entrepreneurial opportunity that entrepreneurs pursue in a certain environment, in our study limited to high-tech small firms, where opportunities of both Schumpeterian and Kirznerian types

could be found. The distinction between Schumpeterian and Kirznerian opportunities can be made empirically. This outcome supports the view from the opportunity-based entrepreneurship theory that Schumpeter and Kirzner perspectives are not antithetic but instead represent the variety of opportunities that can simultaneously be present in the economy; they define a typology of entrepreneurial opportunities. Such reconciliation between the two perspectives is expressed in Kirzner's (2009) words:

> *In spite of the contrast with Schumpeter that I emphasized in 1973, the truth is that my understanding of the dynamic market process certainly can (and should!) also encompass the consequences of Schumpeterian entrepreneurship (...) Casual observation surely confirms Schumpeter's insights into entrepreneurial creativity (...) Apparently, there must be scope for both a creative entrepreneur (...) and a passive, alert entrepreneur (...) It seems reasonable to see the full dynamic of the capitalist system as being the outcome of two distinct kinds of entrepreneur-driven changes' (p. 148-149).*

If heterogeneous opportunities coexist, the question arises of what explain their coexistence. Such heterogeneity can originate in multiple factors at various level of analysis, but as Schumpeter and Kirzner seem to suggest there are differences in the profile, or personal characteristics, of the entrepreneurs that pursue one or the other type of opportunity. This is so to the point that often studies in the entrepreneurship literature refer to Schumpeterian (or Kirznerian) opportunities and Schumpeterian (or Kirznerian) entrepreneurs indifferently, with the implicit assumption that certain types of opportunities are closely associated to certain personality traits of the individuals that identify and exploit them. In this paper we tried to make explicit this link, what Shane (2003) labels the individual-opportunity nexus, exploring how the nature of Schumpterian and Kirznerian opportunities is related to individual-level characteristics of entrepreneurs, specifically to their attitudes, human capital and strategic vision.

We found that the way individual entrepreneurs perceive opportunities that shape their business strategy, whether they see them realizing in the future or in present time, contributes to explain the emergence of Schumpeterian vis-a-vis Kirznerian type of opportunities. Thus, the nature of opportunities pursued reflects, among other factors, the strategic orientation of the entrepreneur; this is an element of distinction that Kirzner in

more recent writings asserts as fundamental. Also, and as expected, we observe that more creative and pro-active entrepreneurs, who actively search for innovation, and those that are more strongly oriented towards growing their ventures, are more likely to identify and exploit Schumpeterian opportunities than Kirznerian opportunities. In contrast, the risk taking propensity of the individual entrepreneur does not seem to matter in our data when it comes to the nature of the opportunity exploited. With regard to the entrepreneur's experience, the formal education of the entrepreneur does not help to predict the type of opportunity exploited, although the results observed for the entrepreneur's age could suggest that it is life experience more than formal education to direct entrepreneurs towards Schumpeterian opportunities as compared to Kirznerian opportunities.

Overall, our empirical results confirm that Schumpeterian and Kirznerian opportunities coexist, that they can be identified on the basis of distinct dimensions, and that they are pursued by different individuals. The results indicate that the typology can be a useful tool to illustrate various aspects of the entrepreneurial process, and some directions for future research directly follow from the limitations of our research. First, more can be done to validate the empirical bipolar measure of opportunity type. It proved to be very satisfactory in terms of reliability, and convergence and distinctiveness of its dimensions. For further validation we stress that application in other contexts, including broad samples of entrepreneurs rather than just high-tech ones, is merited. Second, we focused on individual-level characteristics of entrepreneurs as antecedents of Schumpeterian and Kirznerian opportunities; more sophisticated models could be elaborated to account for factors influencing the nature of opportunity at multiple levels of analysis, such as the organization or the external environment. Finally, it would be interesting to explore if and how both opportunity types interact to enhance enterprise performance and economic growth.

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Table 1. Distributions of sample and respondents from the panel members

	Sample (n=429)	Respondents (n=184)
(Size class)		
1-9 employees	45%	42%
10-49 employees	41%	43%
50-> employees	<u>14%</u>	<u>15%</u>
	100%	100%
(Industry type)		
manufacturers of chemicals, rubbers and plastics (NACE codes 23-25)	8%	9%
manufacturers of machinery, electrical devices, transport equipment (29-34)	26%	27%
other manufacturers (NACE 15-22, 26-28; 35-37)	11%	10%
technical wholesale firms (NACE 51.8)	8%	11%
IT and telecom services (NACE 64.2; 72)	21%	19%
engineering and commercial R&D services (NACE 74.2; 73)	21%	19%
other services	<u>5%</u>	<u>5%</u>
	100%	100%
(Education)		
bachelor or master degree	84%	87%
(Age)		
in years	45.4	45.6

Table 2. Exploratory factor analysis of opportunity type items (n=184)

This product…	factor 1 (disequilibrating-equilibrating)	factor 2 (new info-no new info)	factor 3 (creation-discovery)	factor 4 (rare-common)	factor 5 (radical-incremental)
…is entirely new - …applies something incumbent	.09	.13	-.09	.07	**-.60**
…is revolutionary - …is an incremental improvement	-.02	-.02	.02	.05	**-.90**
…is very influential - …has no external impact	**.87**	-.03	-.09	-.08	-.13
…forces others to change - …only induces internal change	**.67**	.03	.05	.09	.05
…is self-created - …is due to being alert on market opportunities	-.04	.00	**-.70**	.18	.05
…is primarily our own idea - …has an external source	.06	.04	**-.77**	-.16	-.12
…is unique - …is seen very often	-.01	.05	-.01	**.83**	-.11
…is rarely seen - …is commonplace	.19	.00	-.10	**.51**	-.07
…mainly applies new knowledge - …benefits from established knowledge	.07	**.82**	-.02	.00	.00
…draws on new information - …uses existing information	-.06	**.84**	.02	.00	.00
Cronbach's α(of bold items)	.76	.81	.72	.76	.83
Mean correlation (of bold items)	.61	.69	.57	.61	.71

Table 3. Overall fit indices for opportunity type models (threshold values in brackets) (n=184)

Model	Absolute fit		Incremental fit		Parsimonious fit
	GFI (> .95)	RMSEA (< .05)	TLI (> .95)	NFI (> .95)	χ²/df (< 3.0)
One factor	.81	.178	.65	.70	6.78
Four factors	.94	.081	.93	.92	2.20
Five factors	.96	.048	.97	.96	1.42

Table 4. Distinctiveness of the proposed dimensions of opportunity type (n=184)

	(1)	(2)	(3)	(4)	(5)
Radical-Incremental (1)	.84				
Disequilibrating-Equilibrating (2)	.50**	.82			
Creation-Discovery (3)	.55**	.31**	.76		
Rare-Common (4)	.55**	.47**	.39**	.78	
New info-No new info (5)	.43**	.26**	.27**	.30*	.84

** $p < .001$. Square root of the Average Variance Extracted is presented on the diagonal.

Table 5. Descriptive statistics of SK-measure of opportunity type and underlying 5-dimensions

Variables	Description	Mean	SD
SK opportunity scale	Mean score of five dimensions indicating to what extent an opportunity is Schumpeterian (coded 1) or Kirznerian (coded 7)	3.09	1.06
Dimensions			
Disequilibrating - equilibrating	Mean score of two items coded 1 (disequilibrating) to 7 (equilibrating)	3.26	1.27
New information - no new information	Mean score of two items coded 1 (requires new information) to 7 (no new information)	3.00	1.51
Radical - incremental	Mean score of two items coded 1 (radical) to 7 (incremental)	3.34	1.63
Rare - common	Mean score of two items coded 1 (rare) to 7 (common)	2.58	1.24
Creation - discovery	Mean score of two items coded 1 (creation) to 7 (discovery)	3.26	1.66

Number of observations = 184

Note: The description of the 10 single items used to build the SK scale is in the Appendix

Table 6. Descriptive statistics of entrepreneur's characteristics and control variables

Variables	Description	Mean	SD
Growth ambition	Mean score of two items on 5-point scale ('not at all', 'less than 10%', 'about 10 to 25%', 'about 25 to 40%', 'more than 40%') "In the next three years, I want to grow my revenues by…" "In the next three years, I want to grow my workforce by..."	2.70	.88
Risk taking propensity	Mean score of three items on 5-point scale ('totally disagree'-'totally agree') "I never mind to engage in risky ventures" "I am willing to take risks" "I like to take a chance"	3.82	.65
Innovative behavior	Mean score of four items on 5-point scale ('never'-'always') "I search out new technologies, techniques or products" "I generate creative ideas" "People consider me an innovative person" "I investigate and secure funds needed to implement new ideas"	4.12	.50
Strategic focus on future needs	Strategic focus: new product development to satisfy future needs (5-point scale: 'not at all' - 'to a large extent')	4.06	.78
Strategic focus on today's needs	Strategic focus: exploitation of opportunities to better satisfy today's needs (5-point scale: 'not at all' - 'to a large extent')	3.64	1.17
Education	Respondent has completed his/her master's degree (0=no; 1=yes)	.48	.50
Controls			
Firm size	Number of employees in full-time equivalents	27.6	41.1

Number of observations = 184

Table 7. Correlation matrix

	Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	SK opportunity scale	1							
2	Growth ambition	-0.223*	1						
3	Risk taking	-0.061	0.227*	1					
4	Innovative behavior	-0.187*	0.086	0.225*	1				
5	Focus on future needs	-0.360*	0.134*	-0.025	0.187*	1			
6	Focus on today's needs	0.353*	-0.123*	0.008	-0.075	-0.067	1		
7	Education	-0.089	0.081	0.051	-0.075	0.066	-0.066	1	
8	Founder's age	-0.070	-0.184*	-0.127*	-0.058	-0.032	-0.009	-0.037	1
9	Firm size (in log)	-0.063	-0.010	0.111	-0.211*	-0.036	-0.041	0.011	-0.025

Note: * $p < .10$

Table 8: Determinants of SK opportunity type

Variable	Coeff.	Std. Err.	P>|t|
Growth ambition	-0.172**	0.083	0.039
Risk taking propensity	-0.010	0.114	0.933
Innovative behavior	-0.259*	0.148	0.082
Focus on future needs	-0.425***	0.095	0.000
Focus on today's needs	0.261***	0.060	0.000
Education	-0.105	0.139	0.453
Founder age	-0.015*	0.008	0.060
Firm size	-0.075	0.056	0.178
Constant	6.36***	0.921	0.000

N = 181

F(8, 172) = 8.36

Prob > F = 0.000

R-squared = 0.28

Adj R-squared = 0.25

Notes:
Dependent variable: Opportunity type score ranging from
Schumpeterian (negative) to Kirznerian (positive).
*** $p < .0001$; ** $p < .05$; p* $< .10$

APPENDIX: MEASURES AND ITEMS

Opportunity type

(7-point bipolar scale of Schumpeterian versus Kirznerian opportunity; items marked * were discarded)

This product…

(innovation - abitrage)

…is entirely new - …applies something incumbent

…is revolutionary - …is an incremental improvement

…is full of risks - …is on the safe side*

(disequilibrating - equilibrating)

…is very influential -…has no external impact

…forces others to change - …only induces internal change

…disturbs market relationships - …respects market relationships*

(creation - discovery)

…is self-created - …is due to being alert on market opportunities

…creates new market opportunities - …utilizes existing opportunities*

…is primarily our own idea - …has an external source

(rare - common)

…is unique - …is seen very often

…is hard to imitate - …is easy to copy*

…is rarely seen - …is commonplace

(requires new information - no new information)

…mainly applies new knowledge - …benefits from established knowledge

…draws on new information - …uses existing information

…introduces new concepts - …builds on existing concepts*