

# A classification of social media methods of environmental scanning for entrepreneurial opportunity development

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## Abstract

A limited amount of scholarly literature has focused on environmental scanning and the use of social media by nascent entrepreneurs. This paper aims to address these deficiencies in literature. A theoretical framework is presented that describes the level of scanning towards entrepreneurial opportunity development and includes fifteen social media based methods for scanning the environment with the objective of entrepreneurial opportunity development. These methods are reviewed on their data collection, interpretation and learning. Several implications for both practice and future research derive from this framework and are discussed.

Keywords: web 2.0; environmental scanning, entrepreneurship; opportunity development

## Introduction

Entrepreneurs in early stages of developing their entrepreneurial opportunity often do not have a great deal of internal secondary data or historical experience to help fill their information needs (Mohan-Neill, 1995; Lang, Calantone & Gudmundson, 1997; McGee & Sawyerr, 2003). As a result they resort to the usage of information from outside the organization (McGee & Sawyerr, 2003). One way of collecting such information is by environmental scanning, which aims at providing current information that facilitates the identification of opportunities, detect and interpret problem areas and implement strategic or structural adaptations towards the environment entrepreneurs operate in (Daft & Weick, 1984; Daft, Sormunen, & Parks, 1988; McGee & Sawyerr, 2003; McEwen, 2008; Choo, 1999; 2001).

With the advent of social media opportunities arise for entrepreneurs to scan the environment. An abundance of user-generated content is created (Chen, 2010) that is freely available to the general public and hence to entrepreneurs. Many customers share their ideas, problems, knowledge and experience via social media (Kozinets, 2002). This offers opportunities to listen-in into socially generated knowledge (De Valck, van Bruggen, & Wierenga, 2009; Moor & Weignand, 2005). A majority of social media focus on a specific issue, theme or topic. This enables entrepreneurs to identify target groups relevant to their entrepreneurial opportunity and involve them in developing their entrepreneurial opportunity.

Research on environmental scanning and social media are quite limited in the field of entrepreneurship (Stewart, May & Kalia, 2008; Song, Di Benedetto & Perry, 2009; Peters & Brush, 1996). Research on environmental scanning has mostly centered around mature firms and not on entrepreneurs that are in the process of developing their entrepreneurial opportunity. The use of social media by entrepreneurial and established organizations is of sufficiently recent occurrence that there is a limited scholarly literature on the subject (Fischer & Reuber, 2010). Research conducted on social media has mostly centered on social media as marketing tool. Ensuing these deficiencies in literature the following research question arises:

*What social media methods are available for entrepreneurs environmental scanning activities with the objective entrepreneurial opportunity development?*

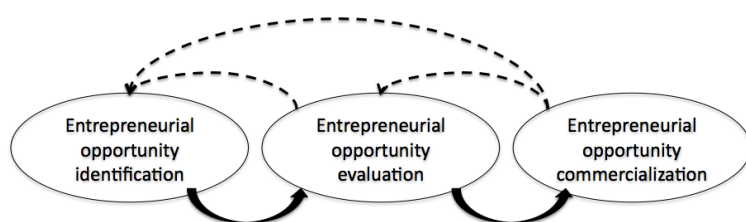
The paper is organized as follows. The first section elaborates on the stages of the entrepreneurial opportunity development. The second section discusses environmental scanning. Based on a review of various environmental scanning typologies, four levels of scanning are identified. These levels are described according to the three stages of Daft and Weick's (1984) Model of Organizational Interpretation: data collection, interpretation and learning. The third section applies these four level of scanning to the stages of entrepreneurial opportunity development. The fourth section, discusses opportunities social media offers for environmental scanning and proposes fifteen methods for scanning the environment that integrate the use of social media. These methods are mapped on the dimensions stage of entrepreneurial opportunity development and level of scanning. The last section discusses implications for research and practice.

## Theoretical background

### Entrepreneurial opportunity development

The entrepreneurship literature offers many definitions for entrepreneurial opportunities. This paper follows the definition of the cultural cognitive school. This school views entrepreneurial opportunities as subjective phenomena that are defined and enacted by entrepreneurs through social interaction (Companys & McMullen, 2007). Changes in interpretation of data are the source of entrepreneurial opportunities (Companys & McMullen, 2007). These opportunities do not go from an initial conception of a rough business idea to a running business venture with regular sales in one step (Davidsson, 2005). Just as ideas for new product development (NPD) need further development to become viable (Urban & Hauser, 1993; Veldhuizen, Hulthink & Griffin, 2006; Veryzer, 1998), this also holds for entrepreneurial opportunities (Ardichvili, Cardozo, & Ray, 2003; De Koning & Muzkyka, 1999; Bhava, 1994). In this paper we refer to this as entrepreneurial opportunity development (EOD) and discerns three entrepreneurial development stages (1) identification (2) evaluation and (3) exploitation (Ardichvili et al., 2003; Shane & Venkatarman, 2007). Although the use of stages might imply a linear and stage-gate process it is in practice a nonlinear feedback-driven process (De Koning & Muzkyka, 1999; Bhava, 1994). Information generates feedback that provides new insights that induces a potential revision of the entrepreneurial opportunity (Bhava, 1994; Daft & Weick, 1984). This suggests that the three stages are interconnected through feedback loops. The stages of EOD and the feedback loops are depicted in figure 1.

**Figure 1: Stages of entrepreneurial opportunity development**



The initial stage, entrepreneurial opportunity identification, refers to the process of creating an initial vision for an entrepreneurial opportunity (Wakee & Van der Veen, 2004; Ardichvili et al., 2003; Shane & Venkatarman, 2007). This stage is often associated with 'prior knowledge' and 'entrepreneurial alertness' (Kirzner, 1973; Gaglio & Katz, 2001; Ardichvili et al., 2003; Shane, 2000; Venkatarman, 1997). Prior knowledge refers to individuals' mental models that represent an individual's knowledge and beliefs about how physical and social worlds work (Gaglio & Katz, 2001). Entrepreneurs express a state of heightened alertness to information related to their mental models (Gaglio & Katz, 2001). Although they do not actively search for information they may engage in 'passive search' - a state in which they are receptive to opportunities (Baron, 2006; 2004; Fiet & Norton, 2007). This implies that information and experience is collected without aiming to identify an entrepreneurial opportunity (Csikszentmihalyi, 1996; Lumpkin & Lichtenstein, 2005; Corbett, 2005).

Mental models enable individuals to perceive connections between seemingly unrelated changes or events (Baron, 2006). These patterns may form the basis for identifying entrepreneurial opportunities and results in an initial vision of the opportunity. Hence, this stage involves making the decision of whether an entrepreneurial opportunity is identified that is worth investigating its potential to base a new venture on.

The intermediate stage is the confidence-seeking part of EOD (Lumpkin & Lichtenstein, 2005; Corbett, 2005). It is in this stage entrepreneurs evaluate the identified opportunity on its value. For this various forms of investigation such as preliminary market testing and financial viability analysis (Corbett, 2005) are used. Entrepreneurs engage in a deliberate effort – following a pre-established plan, procedure or methodology – to secure specific information or information relating to their opportunity to decide to exploit the opportunity or to withdraw. If entrepreneurs decide for exploiting the opportunity they continue to the third stage. If the decision is made to withdraw the opportunity entrepreneurs return to the initial stage.

In the last stage the actual business planning begins and the venture is launched (Corbett, 2005). This stage involves selecting options and finalizing choices (Lumpkin & Lichtenstein, 2005). These choices concern strategic launch decisions (e.g. product strategy, market strategy and firm strategy) and tactical launch decisions (e.g. product, price, promotion and distribution) (Hultink, Griffin, Robben, & Hart, 1998). This stage is the most time-consuming part of EOD (Lumpkin & Lichtenstein, 2005; Corbett, 2005).

### **EOD information processing**

The description of EOD shows that in each stage entrepreneurs need to decide on which course of action they need to follow (Choi et al., 2008). For this they acquire and interpret data to base their actions on (Lumpkin & Lichtenstein, 2005; Corbett, 2005; Minnity & Bygrave, 2001). How entrepreneurs process data is described on the base of Daft and Weick's (1984) Model of Organizational Interpretation. This is a widely accepted information-processing model that consists of the three (1) data acquisition (2) interpretation and (3) learning.

Data acquisition is the monitoring activity that provides environmental data (Daft & Weick, 1984; Choo, 1999; 2001). Environmental data may include data on the task environment (competitors, customers, suppliers, technology) and/or the general environment (economic, social and political conditions). In the second stage, interpretation, data are given meaning (Daft & Weick, 1984). This involves turning circumstances into a situation that is comprehended explicitly in words and serves as a springboard into action (Weick, Sutcliffe & Obstfeld, 2005). The third stage involves learning and is defined as a new response or action based on the interpretation (Daft & Weick, 1984).

In the initial stage of EOD data acquisition is driven by alertness towards issues of interest related to an entrepreneur's prior knowledge. This suggest that acquisition takes place by passive attention – data is obtained without intentional seeking- and passive search – other data collection activities result in the acquisition of data that happens to be relevant (Wilson, 1997). Data is given meaning by entrepreneur's mental models. This aligns with Klein's (Klein, 2008) statement that opportunities are subjective phenomena that are neither discovered nor created, but imagined. Opportunities only exist in the minds of decision makers. Interpretation of data results in the initial vision of an entrepreneurial opportunity. This outcome is for this stage considered to be the learning aspect.

In the evaluation stage, entrepreneurs actively seek for data to verify the value of the opportunity. For this they conduct various forms of investigation. This implies that data collection in this stage takes place by active search (Wilson, 1997) and that this search is focused on an issue or event and with specific information needs in mind. Conducting methods like preliminary market testing and financial viability analysis imply that entrepreneurs do not mere use their mental models for interpretation but base it on results of statistical data analysis. Based on the interpretation of the obtained data, entrepreneurs decide whether or not the opportunity is worth pursuing. This decision is the learning aspect of this stage.

In the last stage of EOD entrepreneurs build on their framework of knowledge, ideas and beliefs that were established in the previous EOD stages. Entrepreneurs in this stage focus on extending their knowledge and collect data by ongoing search (Wilson, 1997). Interpretation of data is mainly centered on futuristic forecasting methodologies that help decide on which target markets entrepreneurs need to focus on and help finalizing choices regarding the launch of the product or service. These decisions imply the learning aspect of this stage.

### **Level of environmental scanning**

Many entrepreneurs that are still in the process of developing their entrepreneurial opportunity use information from outside the organization because many often lack internal secondary data or historical experience (Mohan-Neill, 1995; Lang et al., 1997; McGee & Sawyerr, 2003). One way of acquiring data from outside the organization is through environmental scanning. Environmental scanning aims at providing current information that facilitates the identification of opportunities, detect and interpret problem areas and implement strategic or structural adaptations towards the environment entrepreneurs operate in (Daft & Weick, 1984; Daft, Sormunen, & Parks, 1988; McGee & Sawyerr, 2003; McEwen, 2008; Choo, 1999; 2001). Literature provides diverse typologies of environmental scanning that help build understanding how individuals undergo the process of data collection, interpretation and learning.

Aguilar (1967) and Choo (1999; 2001) identified four modes of scanning. In undirected viewing individuals are exposed to information with no specific information needs in minds (Aguilar, 1967). Information seeking centers on a broad diversity of sources and information use is focused on sensing (Choo, 1999, 2001). Conditioned viewing involves directed exposure, not involving active search, to a more less clearly identified area or type of information (Aguilar, 1967). Hence, information seeking is directed on pre-selected sources and pre-specified topics of interest and information use involves sensemaking (Choo, 1999; 2001). Formal search is a deliberate effort usually following formal methodologies for obtaining information for specific purposes or information relating to a specific issue (Aguilar, 1967). Information needs derive from specific formulated queries, information seeking focuses on an issue or event and information use centers on increasing knowledge within narrow limits. Informal search consists of a relatively limited and unstructured effort to obtain specific information or information for a specific purpose (Aguilar, 1967). Information needs focus on specified targets, information seeking is characterized by systematic information gathering following some method or procedure and information needs center on formal use of information for planning, acting and deciding (Choo, 1999; 2001?)

Daft & Weick (1984) expand the four modes of Aguilar by emphasizing that organizations vary in their beliefs about the environment and their intrusiveness into the environment. Undirected viewing reflects a passive approach of data collection and assumes the environment to be unanalyzable (Daft & Weick, 1984). Actions are based on intuition, rumors or chance (Daft & Weick, 1984). Conditioned viewing assumes an analyzable and objective environment. There are no specific information needs that request active data acquisition (Daft & Weick, 1984). Enacting mode reflects an active, intrusive manner of data collection and perceives the environment as unanalyzable. Information search includes testing or manipulating the environment, performing trials in order to learn what error may occur and discover what is feasible by testing presumed constraints. Discovering mode includes active data acquisition that is focused on detecting the correct answer to an information need.

Jain (1984) describes scanning in terms of four phases instead of modes. Phase one reflects the most primitive stage of scanning and phase four the most sophisticated. The first phase depicts a situation in which organizations face the environment as it appears. Exposure to information is without purpose and effort. In phase two organizations are vigilant for a likely impact of the environment. They are sensitive to information on specific issues to enhance understanding of a specific event. In phase three organizations deal with the environment to protect the future. They scan the environment in an unstructured and random effort to make an appropriate response to markets and competition. In phase four organizations scan the environment to predict the environment for a desired future. They

engage in a structured and deliberate effort to collect specific information and use pre-established methodology.

Another way of looking at scanning is described by Fahey, King and Narayanan (1984). Their typology describes three types of scanning systems used by organizations: irregular, periodic and continuous. Irregular systems are crisis initiated, are used on ad hoc basis and make use of simplistic data analyses (Fahey et al, 1984). Periodic systems are forecasting oriented, are limited in their scope and methodologies, and use simple statistical methodologies (Fahey et al, 1984). Continuous systems are focused on opportunity finding and problem avoidance, information gathering is a continuous, structured activity and uses forecasting methodologies (Fahey et al, 1984).

Based on the aforementioned scanning typologies, four levels of scanning are identified. These levels are described in terms of the three information-processing stages: data collection, interpretation and learning. Table 1 summarizes the four levels of scanning.

**Table 1: Levels of scanning**

<b>Environmental scanning modes</b>	<b>Information process</b>	<b>Description</b>
Level 1: Undirected viewing	Data collection:	General areas of interest; scan broadly a diversity of sources; passive attention; irregular data collection
	Interpretation:	Based on mental models
	Learning:	Serendipitous discovery
Level 2: Conditioned viewing	Data collection:	Able to recognize topics of interest; browse in pre-selected sources and pre-specified topics of interest; passive search; periodic data collection
	Interpretation:	Simplistic data analysis
	Learning:	Increase understanding of a specific event, trend or issue
Level 3: Formal search	Data collection:	Able to specify target; systematic gathering of information on a target; following some method or procedure; ongoing search; extension
	Interpretation:	Futuristic forecasting methodologies
	Learning:	Formal use of information for planning, acting, deciding; make an appropriate response to markets and competition
Level 4: Informal search	Data collection:	Search is focused on an issue or event, active search; continuous
	Interpretation:	Statistical forecasting oriented
	Learning:	Increase knowledge within narrow limits; lookout for competitive analysis

The classification of table 1 has several implications for EOD. In the initial stage of EOD data collection takes place through alertness and prior knowledge (Gaglio & Katz, 2001; Shane, 2000). There are no specific information needs and the initial vision for an entrepreneurial opportunity is more based on judgment and intuition than on objective data. Hence, it is argued that entrepreneurs in this stage perform scanning on level one and two. In the evaluation stage, entrepreneurs follow a specific procedure or method for data collecting and for testing their opportunity. This suggest that they scan on level three. In addition, it is argued that entrepreneurs mental models are always active and entrepreneurs are alert to information related to their mental models. Therefore, we propose that level three scanning consist of an accumulation of level one, two and three. In the last stage of EOD, entrepreneurs focus on extending their knowledge by ongoing search. This indicates that entrepreneurs perform scanning on level four. In addition, entrepreneurs may also have specific information needs which requires a specific procedure or method for data collection. Also entrepreneurs' mental models

are also argued to direct data collection on a unconscious level for the reason as mentioned before. This indicates that scanning activities performed in this stage is an accumulation of level one, two, three and four.

### Social media methods, environmental scanning and EOD

Social media is often used to describe a variety of online sites and tools that enable individuals to contribute and share their knowledge freely with other individuals; that enable the joint and simultaneous creation of content by many end-users (Kaplan, 2010; Adebajo, 2010); that enable users to connect, to collaborate and have online social interactions with other individuals (Lee, 2007; Schillewaert et al., 2007; Adebajo & Michealides, 2010). There are numerous tools and sites that are labeled as social media and new ones appear in cyberspace everyday (Kaplan & Haenlein, 2010). The academic literature provides an overview of social media classifications. These are presented in Appendix A.

The abundance of user-generated content created with social media implies new opportunities for environmental scanning. Social media enable collective consumer creativity – social interactions trigger new interpretations and new discoveries that consumers “thinking alone”, could not have generated (Kozinets, 2008, p.341). Every individual brings his knowledge and experience to the social media application. This generates a great variety of ideas to use for ideation and solutions to particular consumption-related problems (Kozinets, 2008; Von Hippel, 2005) that is unelicited and unobtrusive. This socially generated knowledge is freely accessible to the public (Fuller et al., 2006; Sawhney et al., 2005) and hence to entrepreneurs. Using social media tools are proposed to effect the opportunities entrepreneurs recognize and the ways they can go about bringing those opportunities to fruition (Fischer & Reuber, 2010). Including social media in environmental scanning activities is proposed to provide better insight in latent and future consumer needs than information obtained via formal methods like surveys or through informal methods like personal networks. Second, as mentioned before, individuals with a common interest gather on specific social media platforms. This allows entrepreneurs to target a specific population that is relevant to the entrepreneurial opportunity and obtain information from that sample.

Fifteen methods are proposed for environmental scanning that make use of opportunities social media have to offer. These methods are commonly used for NPD and encourage consumer involvement (Jansen & Dankbaar, 2008; Van Kleef, van Trijp & Luning, 2005). Since these methods are mainly conducted in an offline setting, the principles of these methods are converted into a social media environment.

**Figure 2: Theoretical framework social media based environmental scanning methods for EOD**

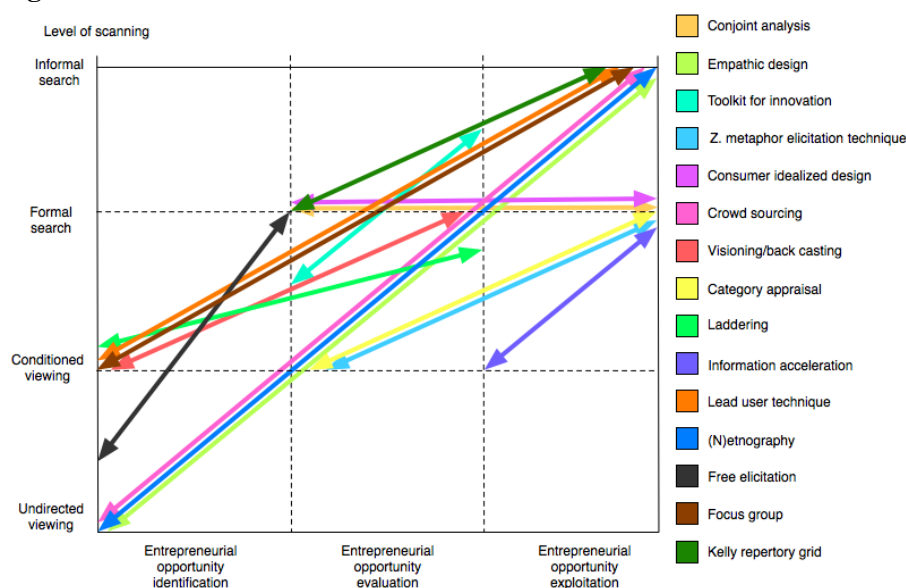


Figure 2 maps the fifteen methods on their level of scanning and appropriateness to EOD stages. All methods are analyzed according to the information processing stages data collection, interpretation and learning. Following the description of information processing the level of scanning and social media categories appropriate for conducting the method are proposed.

### *(N)etnography*

Ethnography is an anthropological method that is based on participation and observation in particular cultural arenas (Kozinets, 2002). Netnography is ethnography on the internet and studies the cultures and communities that are emerging through computer-mediated communications (Kozinets, 2002). It is a marketing research technique that uses the publicly available information to identify and understand customer needs (Kozinets, 2002).

- Data collection: Data collection takes place by copying the computer-mediated communications between online community members that take place on the pre-selected social media platforms. In addition, notes are made on observations of the community and its members' interactions and meanings.
- Interpretation: Obtained data is analyzed with content analysis software like Atlas.ti and N'Vivo. In addition there are social media applications available that facilitate interpretation of data like sentiment- and opinion mining tools and tag clouds (see Appendix A).
- Learning: Understand consumer behavior and determine consumer needs.
- Level of scanning: Informal search.
- Social media categories: social networking, syndication, tracking and filtering content, trends, blogging, sentiment analysis.

### *Category appraisal*

Category appraisal refers to a set of procedures to obtain a visual representation of positions that products hold in the consumers mind. The basic principle of this method involves selecting a set of competing products and presenting them to respondents. Subsequently, they are asked to rank, rate or sort the products on sensory preference or perceptual attributes (Van Kleef et al., 2001).

- Data collection: The sets of competing products are posted on pre-selected social media platforms that enable respondents to rate or rank the sets of competing product like poll tools.
- Interpretation: In an offline setting statistical analysis like factor analysis and multidimensional scaling are often used. In a social media environment poll tools provide simple data analyses options like visualizing the frequency of chosen options that help to interpret the data.
- Learning: discover product opportunities and identify attributes which drive product choice; learn the intensity of competition between products; segmentation.
- Level of scanning: formal search
- Social media categories: social networking; content rating and reputation management.

### *Free-elicitation*

Free elicitation is a personal interviewing technique in which the respondent is asked to express the attributes he/she considers relevant in the perception of a particular product set (Van Kleef et al., 2005). Respondents are presented with stimulus probes or cues (usually words) and subsequently are asked to verbalize the concepts that come to mind.

- Data collection: Data collection takes place by asking visitors of pre-selected social media platforms what comes to mind when thinking of the concept that is subject of the research or ask them to tag a picture that visualizes the concept. A more passive variation to this approach is to examine how individuals have tagged pictures that visualize the concept on platforms like Flickr, Google Images or Picasa.
- Interpretation: Statements and elicited attributes need to be categorized. Categorization can be done manually or with the use of social media tools like word clouds or data mining tools. Word clouds are visual representations for text data, in which tags are listed alphabetically and

the importance of each tag is shown with font size and/or color. This suggests that word cloud mainly assist with determining the importance of the elicited attributes. Data mining tools like Rapid Miner provide more sophisticated analysis like cluster analysis that help categorize terms.

- Learning: Determining attributes consumers perceive as relevant to a particular product.
- Level of scanning: informal search
- Social media categories: Social tagging, social networking sites, syndication, data mining

#### *Conjoint analysis*

The basic principle of conjoint analysis is determining user preferences' regarding product attributes and the ideal combination of these preferred attributes (Green, Krieger, & Wind, 2001). The first part of the method is developing a set of product attributes (e.g. price) and corresponding attribute levels (€10 or €20). This set could be based on the output of in-depth-interviews, focus groups or personal expertise (Van Kleef et al., 2005; Green et al., 2001). Based on these attributes and corresponding attribute levels hypothetical products are presented to respondents and are asked to rate these on criteria like preference, acceptability or likelihood of purchase (Van Kleef et al., 2001; Green et al., 2001).

- Data collection: For developing a set of product attributes and corresponding attribute levels, free elicitation techniques or focus groups are proposed for data collection. For the rating of hypothetical products, it is proposed to post these on pre-selected social media platforms and ask respondents to rate these products. A variation to this is asking respondents to customize their own product based on the set of product attributes and corresponding attribute levels. Thus, respondents develop their own hypothetical product.
- Interpretation: Traditionally statistical procedures like multiple regressions and MANOVA are used to interpret the data.
- Learning: Determine importance of attributes as function of consumers' preferences; learn how consumers might react to changes in current products or to new products introduced into an existing competitive array (Green et al., 2001).
- Level of scanning: informal search.
- Social media categories: social networking sites, collaboration platforms and content rating applications.

#### *Focus groups*

The basic principle of this method is based on the systematic questioning of several individuals simultaneously in a formal or informal setting (Fontana & Free, 2005, p. 703).

- Data collection: Questions are posted on social media applications. The first question should be broad and unfocused so that it allows the participant to lead the researcher "on a grand tour of the topic or setting" (Deggs et al., 2010, p. 1031). Then follow up with questions that are based on the comments of participants. Such questions elicit more information and greater feedback from the participants (Deggs et al., 2010). Researcher must have a consistent presence in the online focus group without attempting to steer the conversation or attempting to coerce participants. Instead of posing question and responding to comments, free webinar software could be used to conduct vocal focus session. In this case, the webinar sessions should be recorder and notes should be taken.
- Interpretation: When bulletin boards or other comparable social media are used for focus groups, the output of the communication between research and respondent is text based, interpretation takes place by content analysis. This can be done manually or social tools like data mining and sentiment analysis also be used for interpreting the data. When focus groups are held via webinars, interpretation is mainly done manually. The focus is on categorizing what respondents have said during the session.
- Learning: Identify the most important drivers of consumer choice for a particular product, learn more about consumer views and opinions.



- Level of scanning: informal search
- Social media categories: social networking sites, online message boards, question and answering applications

#### *Information acceleration*

Information acceleration (IA) is a concept testing method employing multimedia stimuli and experimental set-ups (Urban et al., 1996). In this method a virtual buying environment is created that simulates information accessible in a future buying environment (Urban et al., 1997; Eliasberg, Lilien, Rao, 1995; Herstatt & Lettl, 2004). This method already embraces the possibilities offered by social media. However, conducting this method costs about a hundred thousand dollar, which makes it not a very accessible method. Therefore, a variation to this method is proposed.

- Data collection: Already existing virtual reality worlds related to the product concept can be observed. For this the guidelines for netnography apply. Another variance is developing a variety of mock-ups and spread them via various social media channels that include potential customers.
- Interpretation: Reactions and comments can be analyzed manually by following the guidelines for content analysis. In addition, free content analysis tool can be used for interpreting the obtained data.
- Learning: Determine customer perceptions, preferences or buying intentions, forecast sales, develop strategy alternatives.
- Level of scanning: informal search
- Social media categories: social networking sites, crowdsourcing, question and answer platforms.

#### *Lead user technique*

Lead user technique is based on identifying customers who face needs months before the bulk of the marketplace and are expected to gain high benefits from obtaining a solution to the needs they face (Von Hippel, 1986; Von Hippel & Franke, 2009). Finding lead users involves screening a large number of potentially relevant users and by asking them questions regarding user innovations and lead users characteristics (Eric von Hippel, 2005).

- Data collection: Collecting data for identifying lead users is the guidelines of netnography apply (Baumbach, 2010). Next to this, social media tools that focus on identifying experts like Klout and Listorious, are also relevant to include in the data collection stage.
- Interpretation: Obtained data is mainly in the form of text. For interpreting the data content analysis is suggested. Analysis should be centered on on the following lead user characteristics: ahead of trend, dissatisfaction, product-related knowledge, use experience, involvement and opinion leadership (Baumbach, 2010; Spann, Ernst, Skiera, & Soll, 2009).
- Learning: Identify lead users for detecting future problems and to find solutions for problems lead users experience regarding the product/service.
- Level of scanning: informal search.
- Social media categories: trends, blogging, collaborating, social networking, crowdsourcing, question and answer application.

#### *Laddering*

Laddering is “an in-depth, one-on-one interviewing technique used to develop an understanding how consumers translate the attributes of products into meaningful associations” (Reynolds & Gutman, 1988). The objective is to uncover how product attributes, usage consequences and personal values are linked in a person’s mind (Wansink, 2003; Veludo-de-Oliveira, Ikeda, & Campomar, 2006). The first part of this technique involves asking individuals to express spontaneous thoughts and other associations linked to the product category (Van Riel et al., 1998). The line of questioning proceeds from product characteristics to user characteristic, which attempts to abstract reasons of why an attribute is important.

- Data collection: A possible obstacle that hinders data collection for this method is that most social media applications are accessible to the general public and encourage joint interaction of members. This makes it difficult to simulate an online one-on-one interview. A solution to this problem is to first conduct the lead-user method (Gruber, Szmigin, Reppel, & Voss, 2008) and conduct the laddering method with lead-users via chat or skype. For eliciting association linked to the product category, the guidelines for free elicitation apply.
- Interpretation: The content of the one-on-one interviewing technique needs to be analyzed and categorized into attributes, relating consequences of these attributes and thereto relating values (Veludo-de-Oliveira, Ikeda, Campomar, 2006; Gengler & Reynolds, 1995).
- Learning: Understand the link between brand attributes, the benefits or consequences of using it and the personal values it satisfies (Wansink, 2003; Gengler & Reynolds, 1995).
- Level of scanning: informal search.
- Social media categories: social networking, question and answer applications.

#### *Consumer idealized design*

Consumer idealized design encourages potential consumers to develop their ideal product (Janssen & Dankbaar, 2008; Piller, 2006; Kaulio, 1998). In proposing the design they are free of all constraints except two: (1) the design should not include any technology that does not currently exist and (2) it must conform to the law (Ciccantelli & Magidson, 1993). In a general way this method is similar to a focus group (Ciccantelli & Magidson, 1993). Like the focus group, a group of individuals are put together. They are told that the existing product that they are familiar with has been destroyed and they are asked to discuss specifications that need to be included in the new design. The output of this session is in general the input for new product development (Ciccantelli & Magidson, 1993; Kaulio, 1998).

- Data collection: Adhering to the similarities between this method and focus group methods, it is advocated to follow the formerly given guidelines for social media based focus group sessions. For selecting the target group for this method, the lead user technique could be used for selecting participants that are involved with the product and have the expertise to give suggestions for ideal product attributes.
- Interpretation: the tools as suggested for focus group apply to this method as well.
- Learning: New design, list of articulated requirements and/or record of the underlying reasons for the design choices (Kaulio, 1998).
- Level of scanning: undirected viewing and conditioned viewing.
- Social media categories: trends, blogging, social networking sites.

#### *Kelly repertory grid*

Kelly's repertory grid is a personal interviewing technique used to elicit the constructs by which consumers structure and interpret a product category (Van Kleef et al., 2005). The technique is based on the notion to determine in which way two or more things are alike and thereby different from a third or more things (Kelly, 1969). This method is often just to identify a corporate's image and that of its major competitor or to determine how one of the product lines is positioned relative to those similar lines offered by competitors (Van Riel et al., 1998). For this method respondents are presented a set of products in groups of three (e.g. names or brands) and are asked how one trait differs from the other two and why.

- Data collection: Visitors of pre-selected platforms are presented with a set of products in groups of three and are subsequently asked to how and why one of the traits differs from the other two.
- Interpretation: Applications on social media provide tools (like polls) that help interpreting the data.
- Learning: Identify constructs by which consumers structure and interpret a product category (Van Kleef et al., 2005); determine aspects on which people differentiate between products.
- Level of scanning: formal search
- Social media categories: blogging, social networking sites, question and answer applications.

### *Crowdsourcing*

Crowdsourcing is outsourcing of idea generation to the crowd of users (Poetz & Schreier, 2010). The process often includes a company that posts a problem online, a vast number of individuals offer solutions to the problem, the winning ideas are awarded some form of a bounty and the company mass produces the idea for its own gain (Brabham, 2008).

- Data collection: Post a problem online and subsequently ask for potential solutions.
- Interpretation: The offered solutions need are rated on their relevance to the problem. This is done by content analysis or rating applications.
- Learning: Identify possible solutions to encountered problems; test these solutions amongst each other.
- Level of scanning: conditioned viewing
- Social media categories: crowdsourcing, question and answering applications.

### *Zaltman Methaphor Elicitation Technique*

Zaltman metaphor elicitation technique is a projective technique in which consumers create collages that visualize their feelings, experiences and attitudes regarding a product or research topic (Zaltman & Coulter, 1995; Coulter & Zaltman, 1994). Individuals are given a set of instructions and guidelines about the research topic (e.g. brand name, product). They are instructed to take photographs and or collect pictures that indicate what the topic means to them. This is followed-up by a personal interview in which respondents describe the story of the picture in relation to the research topic. In step four researchers ask respondents which issues and images were not mentioned that should. In addition, the respondent is asked to sort the pictures into piles and provide a label or description for each pile. Based on this pile the Kelly Reportory Grid and Laddering technique are conducted. Then the respondent is asked to indicate the picture that best represent his/her feelings and which one conveyed the opposite of that feeling. Last, the research summarizes the constructs discussed and asks participants if the constructs are accurate. This method can be converted into a social media environment by asking respondent.

- Data collection: Respondents are asked to collect six to eight pictures from platforms like Google Images, Flickr and Picasa that represent what the topic under investigation means to them. There is one constraint for selecting pictures, namely that they should not refer to or contain relating to the brand or other product relating to the brand. Consequently they are asked to describe for each picture how it represent their perception of the product. Next
- Interpretation: Content is analyzed by content-analysis.
- Learning: Identify what the customer know not but unconsciously
- Level of scanning: formal search
- Social media categories: blogging, tagging, collaborating, social networking sites.

### *Toolkit for innovation*

Toolkit for innovation provides consumer with user toolkits that help them create a product that they want (Piller, 2006; Prandelli et al., 2006). Toolkits shift development and design tasks from the locus of the manufacturer to users (Piller, 2006). For example, in the software industry users can download beta versions in order to identify possible bugs. This example shows that work done by others is publicly available and can be used by freely. Although resource-constraint entrepreneurs may not have the resources to provide users with such toolkits, they could use the output of these toolkits as input for their product development.

## **Discussion and Implications**

In this paper we have sought to develop a framework for understanding how social media can be used for environmental scanning for the objective of entrepreneurial opportunity development. Prior research on environmental scanning has mainly focused on mature firms instead of entrepreneurs in the pre-founding stages of the new venture. In general entrepreneurs in the pre-founding stage do not

have sophisticated information management systems, historical experience or secondary data to fill their information needs. Despite the benefits nascent entrepreneurs can derive from environmental scanning, there is limited scholarly literature focused on environmental scanning for this group of entrepreneurs. In addition, with the advent of social media new opportunities arose for environmental scanning. Social media is of sufficiently recent occurrence that little scholarly literature is available. This paper aimed to address these deficiencies in literature and centered on answering the research question ‘How can entrepreneurs towards opportunity development use social media for environmental scanning?’.

To address this question it was required to first examine the level of environmental scanning of each stage of the entrepreneurial opportunity development. Four levels of scanning were identified: undirected viewing, conditioned viewing, formal search and informal search. The theoretical examination of how entrepreneurs scan the environment in each stage of EOD revealed that entrepreneurs environmental scanning follows a Guttman scaling. To elaborate, scanning on level four also indicates that entrepreneurs perform scanning on level one, two and three. The highest level of scanning is considered to be the dominating level of scanning that determines the presence of other scanning modes.

To determine how social media opportunities can facilitate environmental scanning for the objective of entrepreneurial opportunity development, fifteen methods commonly used for NPD were converted into a social media environment. All methods were reviewed on their data collection, interpretation and learning. Subsequently these methods were categorized on their level of scanning and were linked to the stages of EOD. This theoretical review showed that social media offers opportunities in terms of facilitating both passive and active data collection and provides tools that enhances interpretation of data. Hence, it is proposed that these tools enable entrepreneurs to make more informed decisions than when they mere base their decision on informal methods like personal networks and secondary data.

Furthermore, it is suggested that social media makes conducting formal methods more accessible. Before the advent of social media, entrepreneurs were to a large extent obliged to have advanced knowledge regarding the methods, since complex statistical analysis were required for interpreting the obtained data. Social media offers many free available tools that are developed by the general public and up to a certain point are freely available to anyone that help interpret data. Examples of such tools are data mining tools, sentiment analysis tools and rating tools.

This paper has mainly focused on exploring the opportunities that social media has to offer for environmental scanning. It should be noted that social media is not free from problems. Content available on social media platforms have a high variance of information quality (Agichtein, Castillo & Donato, 2008). Individuals that contribute content on social media platforms can do this anonymously and under false identities, which make it difficult to assess information validity (Bawden & Robinson, 2008). The abundance of content made available via social media makes it hard to differentiate relevant data from irrelevant (Pal & Saha, 2010; Kozinets, 2002). These suggested problems of social media bring the notion of issues like reliability and validity of these instruments.

On the other, research on environmental scanning by entrepreneurs showed that they mainly use informal methods that to a large extent do not take into account reliability and validity issues as well. Hence, the suggested methods in this paper may well be better than the information obtained via informal methods many entrepreneurs currently use. A significant challenge for future research is to ascertain the causal nature of using social media for environmental scanning and the effect is has on entrepreneurial opportunity development.

To conclude, the framework in this paper implies a specific level of scanning and appropriate methods for every EOD stage. This is only based on theory and has not yet been empirically tested. To assist nascent entrepreneurs environmental scanning for EOD and to expand and improve the list of proposed scanning methods for EOD, future research needs to examine the information processing of entrepreneurs towards EOD. In addition, assess how the use of social media facilitates this process. This paper has aimed at providing a theoretical framework that can serve as guide for future empirical research.

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Appendix A: Categories of social media tools

Category social media application	Description	Example application
Social networking	Facilitate meeting people, finding like minds, sharing content, using ideas from harnessing the power of the crowd, network effect and individual production/user generated content.	Facebook, Hyves, LinkedIn, Ping.fm, Friendfeed.com, Hyves.
Syndication	Gather information from diverse sources across the Web and publish in one place. Example of such applications is the RSS feed aggregator that creates a single webpage with all your feed and email in one place. It facilitates enhanced decision-making by speeding the dissemination of information about preselected topics to people who want it.	Friendfeed, Technorati, Google Blog Search, Blogpulse, Twitter Search, Dipity, Kosmix, knowabout.it, Addict-o-matic, Social mention, Scour, Samepoint, Whos Talkin, BoardTracker, Omgili, TalkDigger, Google Alerts, RSS .
Data mash-ups	Web services that pull together data from different sources to create a new service (i.e. aggregation and recombination)	Yahoo Pipes, Mashmaker, Mashup Feeds
Tracking & Filtering content	Services that keep track of, filter, analyze and allow search of web 2.0 amounts of web 2.0 content from blogs, multimedia sharing services	Facebook Analytics, Google Analytics, Topsy, Youtube Insight, Tweetstats, Twitter Analyzer, Klout, Social Mention, Twitter Counter, Backtype, Boardreader, CoComment, HowSocialable
Collaborating	Platforms that provide a place for people to collaborate. People can directly edit and hence extend, update, modify or even delete the content.	Dropbox, Wikis, google docs, presentlyapp.com, buzzable.com
Source ideas or work form the crowd/question and answer application	Seek ideas, solutions to problems or get tasks completed by outsourcing to users of the web	Yahoo! Answers, Aardvark, Yahoo! Groups, Google Groups, Twitter, Facebook, Hunch, Quora, Linkedingroups.
Trends	Applications that monitor how popular or unpopular a particular topic have been over a range of time.	Google Trends, big xRank, Trendrr, Blogpulse, Trendpedia, Hashtags.org.
Social Tagging/Social Bookmarking	Social tagging describes the collaborative activity of marking shared online content with keywords or tags as a way to organize content for future navigation, filtering, or search	Flickr, del.icio.us, connotea.org, bluedot.us, magnolia, digg, simpy, blogmarks, reddit, furl.net, blinklist, spurl, delirious,
Content rating and reputation management	Applications that let participants rate other participants or content	StumbleUpon, Last.fm., Facebook likes
Competitive research	Applications that provide information about competitors, such as who works there, what kind of roles they're hiring, opinions on the company from former employees, current employees, industry analysts and outsiders.	LinkedIn, Jigsaw. Crunchbase, ChubbyBrain, Glassdoor
Blogging	Blogs are expressions of personal or professional opinion or experience which other people can at most comment	Googleblogs; Opensiteexplorer (blogrank). Alltop, blogsearch, Icerocket
Sentiment analysis		Tweetfeel, Twendz, Twitratr, Rankspeed, Newssift, Moodviews, Socialmention, Alertrank, Sentiwordnet, Opinionfinder