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Content

Twitter: a Viable Marketing Tool for SMEs?

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Abstract

Purpose - The present research aims to explore whether Twitter is a tool that should be taken seriously by Small and Medium-sized Enterprises (SMEs) in their marketing strategies, taking the stance of SMEs – how they perceive, use and see the future of Twitter for their businesses. The research has three objectives: firstly, to explore how SMEs use Twitter in their marketing strategies; secondly, to explore their perception of Twitter's benefits/limitations as a marketing tool, compared to other social networks; and thirdly, to explore their plans for improvement/future use of Twitter in their marketing strategies.

Design/methodology/approach - Because the micro-blogging area is underexplored, especially from a business perspective, a qualitative-interpretivist-exploratory methodology has been chosen. The research method which will be utilized in the project is semi-structured one-to-one online synchronous interviews, conducted on a homogenous sample comprising 4-5 Romanian and British SMEs with around 2 employees from the marketing/PR departments of each company. The present paper comprises stage one of the project, which has been a pilot in-depth interview with a British SME, aimed to explore initial insights while testing the validity, reliability and trustworthiness of the research.

Findings - The present report only discusses the pilot findings, which are not definite conclusions but just provide guidance for further research, indicating whether the methodology/method/questions were suitable/useful and thus identifying new areas for further exploration. The interviewee's conclusion, also supported by the research findings, is that, although Twitter should not be viewed as "the be all and end all for our communications", it is still a critical platform to embark on, especially if companies want a chance to listen to/influence consumers' opinions.

Practical implications - In general, it is agreed that social media and Twitter can have as much benefits for the business in terms of networking, relationship and online branding opportunities as irreparable and costly damages caused by the negative electronic Word of Mouth (e-WOM). Consequently, the present project takes initiative towards a more clear understanding of how and what should be done, if anything, with models like Twitter as marketing tools.

Originality/value - Using social media and especially Twitter for marketing purposes is only a recent phenomenon, as it is mainly since 2008 that social networking sites exploded in user numbers and marketing applications. Therefore, there is limited academic research into this area and much of it is focused on the user side, with little known from the companies' perspective. Most information regarding Twitter has been based on best practice, industry trial and error, and a few research papers looking into how consumers perceive the micro-blogging tool. The business stance has been acknowledged as a significant gap in the literature, consequently demonstrating the value and originality of the present paper. Because social networking and especially micro=blogging is multi-faceted, the focus of this project has been Twitter as a word of mouth/ electronic word of mouth (WOM/ e-WOM) marketing tool, utilizing research proving the benefits/limitations of WOM/e-WOM for businesses.

Research limitations - The paper presents a qualitative study on the perceptions and uses of Twitter as a form of e-WOM marketing by small and medium-sized enterprises. These findings should be further explored in subsequent interviews, in order to compare perspectives, and even discover how Twitter can be used as a form of spreading commercial messages (for example, promotional codes) instead of simply informational messages. It would also be useful to explore companies that have encountered and dealt with negative e-WOM. Furthermore, since the present paper has been focusing on Twitter as a form of e-WOM marketing, further research could explore the potential of Twitter as a relationship marketing tool, as revealed by the research findings. Perspectives from B2C organizations or other countries could also be useful for a broader view of the Twitter area.

Keywords: Twitter, Marketing Strategies, SME, Media, WOM/e-WOM

Paper type: Research Paper

Introduction

2009 was the year when 800million monthly visitors thought "life wasn't worth living unless it was documented on Facebook and Twitter" (Clark, 2009, p.6; The Economist, 2010). Easy-to-use technologies and sensible privacy control settings allowed social networks like Twitter, Facebook or Linked-in to provide a streamlined experience to an exploding number of users and a valuable tool to marketers, with 53% of them claiming to increase their social media investments even further in 2010 (Davidson, 2009).

However, out of all social media platforms, Twitter stands out, in terms of both characteristics and growth. Launched in 2006, Twitter gained most of its popularity as a micro-blogging tool in 2009, when it reached 58.5million users world-wide, a 949% increase since September 2008 (Schonfeld, 2009). The specificity of Twitter lies in its messages – tweets – that can have maximum 140 characters, with the default setting public, which means that the essence of events can be transmitted on a large scale across the network, instantaneously (Jansen et al.,2009). This made Twitter's owner, practitioners and the few researchers in the field to define Twitter as "an information company" (The Economist, 2010, p.5) or a form of electronic word-of-mouth (e-WOM) communication (Jansen et al., 2009; Zhao and Rossen, 2009), which is the online projection of traditional word-of-mouth (WOM). This is very important since WOM essentially represents "the process of conveying information from person to person" and it is becoming acknowledged as one of the most effective forms of marketing (Jansen et al., 2009, p.2169).

Twitter is a versatile tool, used for socio-political campaigns, citizen journalism and increasingly for marketing purposes, with companies like Dell reporting to have gained £1.9million from sales and cost savings via Twitter (Campaign, 2009; Davidson, 2009). Practitioners also predict that Twitter will play a major part in the 2010 social commerce phenomenon that could significantly affect business models online (Marsden, 2010). Nevertheless, there are numerous open questions and controversies related to Twitter's actual business potential (Dorbian, 2010), especially due to little research (Zhao and Rossen, 2009), Return on Investment (ROI) measurement issues (Fisher, 2009) and a lack of strategic understanding and planning (Gunning, 2009); there are even critics questioning Twitter's actual future (The Economist, 2010). Furthermore, small and medium-sized enterprises (SMEs)[*] seem to have a more acute dilemma, since the lack of necessary resources, people and time have prevented most of them to experiment with Twitter (The Economist, 2010; Moran, 2010).

Out of all social media platforms, Twitter is one of the most controversial and outstanding networks, seeing praise for its spectacular 2008-2009 949% increase (Schonfeld 2009) and for its enormous untapped potential, especially in the electronic word-of-mouth (e-WOM) and social commerce arenas (The Economist 2010; Jansen et al. 2009; Zhao and Rossen 2009; Marsden

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[*] SMEs are defined by the European Commission as enterprises with less than 250 employees, and a turnover of less than €50 million (European Commission, 2010, http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/sme-definition/index_en.htm)

2010). Nevertheless, the model has also been questioned in terms of its future (The Economist 2010), and its business suitability (Dorbian 2010), with critics accusing the difficulty to understand Twitter and to measure results (Fisher 2009). The literature review completed in the previous part of the present research also concluded a severe lack of studies to explore the overall viability of Twitter for business purposes (Jansen et al. 2009) from companies' perspectives, especially small and medium-sized companies (SMEs[†]) (The Economist 2010; Moran 2010).

Consequently, the present research aims to explore whether Twitter is a tool that should be taken seriously by SMEs in their marketing strategies, taking the stance of SMEs – how they perceive, use and see the future of Twitter for their businesses. As informed by the identified literature gap, the research has three objectives:

1. To explore how SMEs use Twitter in their marketing strategies;

2. To explore their perception of Twitter's benefits/limitations as a marketing tool, compared to other social networks;

3. To explore their plans for improvement/future use of Twitter in their marketing strategies.

Because the micro-blogging area is underexplored, especially from a business perspective, a qualitative-interpretivist-exploratory methodology has been chosen. The research method which will be utilized in the project is semi-structured one-to-one online synchronous interviews, conducted on a homogenous sample (Daymon and Holloway 2002) comprising 4-5 Romanian and British SMEs with around 2 employees from the marketing/PR departments of each company.

Before the actual research project, a pilot interview has been conducted in order to gain prompting/probing skills, as the researcher was inexperienced in interviewing techniques (Bell 2005), and also to test whether the qualitative methodology, the interviewing method and the proposed questions (Appendix A) are suitable, logical and useful for answering the proposed aim/objectives, thus contributing to the trustworthiness of the research project; the researcher also asked for feedback from the interviewee, which will inform interviews in the main project.

Literature Review

Using social media and especially Twitter for marketing purposes is only a recent phenomenon, as it is mainly since 2008 that social networking sites exploded in user numbers and marketing applications. Therefore, there is limited academic research into this area (Zhao and Rossen, 2009; Jansen et al., 2009) and much of it is focused on the user side, with little known from the companies' perspective. However, there is a workable amount of research into the business and marketing benefits of WOM/ e-WOM, and, as previously discussed, Twitter has been recognized as a major representative of e-WOM (Jansen et al., 2009; The Economist, 2010; Trusov et al., 2009; Brown et al., 2007). Consequently, the literature that will be reviewed will deal first with the WOM phenomenon, and will then discuss the micro-blogging academic and industry studies available.

WOM

WOM was found as an important and effective marketing tool ever since the 1950s-1960s (Katz and Lazarsfeld, 1955; Dichter, 1966); however, these studies were frequently contested in more recent research, mainly because their inference methodology was considered less appropriate than an observational one (de Bruyn and Lilien, 2008; Trusov, 2009). Because it is a form of

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communication initiated by independent actors, WOM is perceived as more reliable and trustworthy, therefore generally agreed as a strong influencer on decision-making and brand advocacy (Godes and Mayzlin, 2004; Brown et al., 2007; Dichter, 1966). Nevertheless, while some researchers believe it is "the most important and effective communications channel" (Keller, 2007, p.448), other academics are more reserved, mainly because WOM has two limitations.

Firstly, WOM is a complex concept, difficult to measure and understand (Trusov, 2009; Dellarocas, 2003; Godes and Mayzlin, 2004), and while some scientists propose a customer service-customer satisfaction-WOM-new customer acquisition link to make its benefits more quantifiable in terms of sales, profitability and cost savings (Wangenheim and Bayon, 2007; Tax et al., 1998), this pitfall still made many researchers reach contradictory conclusions in successive studies (Van den Bulte and Lilien, 2001 and 2003, cited in Trusov, 2009).

Secondly, engaging in brand WOM depends upon involvement with the product/service or purchase decision – consequently, WOM effects cannot be replicated across all product/service categories. These arguments made de Bruyn and Lilien (2008) to posit that there is actually very little known about the effects of WOM communication and therefore, a more moderate view of WOM benefits should be adopted, where offline WOM and traditional marketing complement, rather than compete, each other (Stephen and Galak, 2009).

e-WOM

Currently there are various online applications (online feedback mechanisms, viral marketing, social networking, blogging) that are a form of WOM, however, considering the speed, scale and ubiquity of the Internet, many researchers agree that the effects of e-WOM are more impactful, and even different, from those of offline WOM, favouring rapid product adoption or leading to increased sales and brand advocacy through solving product and customer problems faster and cost-effectively (Godes and Mayzlin, 2004; Dellarocas, 2003; Trusov, 2009; de Bruyn and Lilien, 2008; Jansen et al., 2009).

Consequently, rather than a complement, e-WOM could actually become a serious threat to traditional advertising models, since increasingly more people base their decisions on e-WOM in the contemporary fragmented landscape (Smith et al., 2007; Dellarocas, 2003; Godes and Mayzlin, 2004).

Of course, there is also the disadvantage that, if mishandled, negative e-WOM can spread at alarming rates, having the potential to 'make or break' a brand (Davidson, 2009). Moreover, the WOM measurement difficulties also translate in the online world (Godes and Mayzlin, 2004), especially since e-WOM implies even more conversations, with only 19% of them actually referring to brands (Jansen et al., 2009) – de Bruyn and Lilien (2008) or Dwyer (2007) propose that different measurement methods are needed for e-WOM, however, so far, there does not seem to be a straightforward solution and measuring ROI is still a major drawback in the adoption of e-WOM marketing tools such as social media (Fisher, 2009).

Another pitfall is that online environments can allow companies to pose as independent consumers, thus manipulating the conversations and eroding WOM's primary advantage – credibility (Godes and Mayzlin, 2004; Brown et al., 2007); nevertheless, studies by Mayzlin (2004, cited in Godes and Mayzlin, 2004) and Smith et al. (2007) show that this is not an impediment in consumers still relying on e-WOM.

All the above-mentioned studies, however, focus more on WOM/e-WOM from the user perspective – motivations, mechanisms, and linkages – and only few infer, rather than explore, the business viewpoint. Researchers agree on a scarcity of studies exploring social networks as forms of e-WOM (Brown et al., 2007; Jansen et al., 2009; Zhao and Rossen, 2009); moreover, only one of the studies found by this research takes a more brand-related perspective.

The study conducted by Jansen et al. (2009) endeavors to understand micro-blogging not purely from a social view, but also from a commercial one. Nevertheless, their methodology only implies analyzing brand mentions in tweets. They consequently admit that the importance of Twitter as a form of e-WOM in marketing strategies should be tested taking a business stance.

Industry Controversies
As reviewed so far, the area of WOM/e-WOM communications is still relatively ambiguous; the social networking – micro-blogging and Twitter – arenas are even more under-researched – and not even industry views are helpful. Companies like Dell, Best Buy or Waterstones, having adopted Twitter as a marketing tool, reported benefits as described in the WOM/e-WOM sections (Moran, 2010; Davidson, 2009). Many articles agree that Twitter is still in its infancy, with a significant untapped potential for brands, and urge companies to embark now, when experimenting and mistakes are still allowed (Owen, 2009; Arnold, 2010).
Conversely, some practitioners believe the Twitter model is not so useful for business purposes (Dorbian, 2010), rather for "fermenting social revolutions" (Campaign, 2009, p.21), and claim that Twitter is only a hype (The Economist, 2010), with only 25% of brand owners giving it a central role in 2009 (Marsden, 2010). Industry articles also present failure scenarios (Skittles abusive tweets – Campaign, 2009), justifying them by the inappropriateness of Twitter/social media for marketing.
In general, it is agreed that mishandling social media and Twitter can have significant negative impacts, as e-WOM could produce irreparable or costly damage (Davies, 2010; Ritson, 2009; Paine, 2009) and that research is needed in order to clearly understand how and what should be done, if anything, with models like Twitter as marketing tools (Fisher, 2009; Rusbridger, 2010; Nettleton, 2010; Janusz, 2009; Bohi, 2010).
There is also another important issue – contrary to general belief, Twitter is not free, if properly undertaken as a marketing tool (Davies, 2010); it requires time to develop relationships, as well as commitment, people, finance and management buy-in (Nettleton, 2010; Jacobs, 2009), conditions easy for large companies like Dell to achieve, but very difficult for SMEs to comply with (The Economist, 2010) – only 17% of UK's SMEs use Twitter as a marketing tool, and not many are convinced of its strategic viability (The Economist, 2010; Moran, 2010).

Aim and Objectives
Consequently, the present research aims to positively contribute to this situation, by exploring whether Twitter is a tool that should be taken seriously by SMEs in their marketing strategies, taking the stance of SMEs – how they perceive, use and see the future of Twitter for their business.
The objectives of this study are informed by the gaps found in the literature review:
▪ To explore how SMEs use Twitter in their marketing strategy
   - Resources, time, people, training required;
   - Methods of using Twitter as a marketing tool;
▪ To explore their perception of the benefits of Twitter as a marketing tool, as compared to other social networks
   - Attitudes towards Twitter vs. other social networks – perceived advantages and disadvantages, improvements needed;
▪ To explore their plans for improvement/future use of twitter in marketing strategies.

Research Methodology
Method
The pilot aimed to preserve most of the main research's conditions, therefore data collection was handled through a semi-structured online synchronous one-to-one in-depth interview (Skype

chat), which allowed the data to be instantaneously recorded, therefore saving time for transcription, gave geographical flexibility, as the interviewee was in another town than the researcher and allowed comfort for the time-short interviewee (Wright and Crimp 2000). The interview lasted for 2hours 45minutes, more than predicted, and probably the length was also increased by the need to type, which should therefore be reconsidered in the main project, as it may cause inconvenience to participants, although the interviewee agreed chatting was useful for reviewing ideas/questions and being more reflective about the answers (Daymon and Holloway 2002). Furthermore, the participant's internet was disconnected at one point, which would have compromised the interview if longer-lasting; therefore, a solution should also be foreseen for this event.

The pilot sample is a Marketing Account Executive in a British SME (Appendix B). Two prospects were initially considered – the actual participant and a PR specialist from a Romanian SME; however, because of the latter's work commitments and time-pressure for the researcher, only an in-depth interview with the former prospect was undertaken.

Methodology

This study aims to take the business perspective, therefore making it a business-to-business (B2B) research (Wright and Crimp, 2000), where opinions of individuals as decision-makers in companies are important. Because the area of micro-blogging as a form of e-WOM is under-researched, especially from business perspective, a qualitative–interpretivist–exploratory approach will be chosen, in order to uncover how companies utilize Twitter, to gain practical insights into how employees perceive Twitter as a useful marketing tool and perhaps new ideas that could be recommended to other similar companies (Collis and Hussey, 2009; Churchill and Iacobucci, 2005).

Semi-structured one-to-one interviews will be utilized as the research method, since "they are a useful form of data collection that allow you to explore the perspectives and perceptions of various stakeholders" (Daymon and Holloway, 2002, p.166). It is an appropriate method mainly due to its flexibility: the answers can inform the conversation - which is extremely useful especially in a B2B context, when the interviewee is an expert or an actual practitioner (Wright and Crimp, 2000; Bell, 2005)-, useful ideas can spark off that have not originally been considered, and more in-depth views can be explored, some even related to more confidential or commercially-sensitive information (Daymon and Holloway, 2002) or views that the interviewees would not otherwise express in a focus group (Bell, 2005), especially in a business group discussion (Wright and Crimp, 2000).

The semi-structured approach is more flexible and more useful because the area is under-researched and the researcher herself is not so familiarized with this subject as business practitioners are – the guiding questions will be informed by the objectives previously outlined; moreover, considering the researcher's inexperience in qualitative research, an unstructured interview would be too risky in possibly deviating from the subject and not gathering the relevant data.

Considering the limited time frame for this research and the difficulty to gain company consent, the interview sample will consist of 4-5 Romanian and British SMEs (to be agreed, different countries have been chosen in order to get a more complete, transferable view, with UK more developed in online marketing technologies and Romania less developed in this perspective), with around 2 employees from the marketing/PR departments of each company (as these companies are relatively small, most probably there will only be 2-3 employees dealing with marketing in each), therefore online synchronous interviews will be conducted, because this is more cost-effective and time-saving for the participants, and it also allows them the comfort of their own environment while replicating the synchronous side of face-to-face interviews

(Daymon and Holloway, 2002; Wright and Crimp, 2000). Both the interviewer and the interviewees have the necessary technological skills, therefore this will not be a problem.

The most important disadvantage facing this method is that, despite the online approach, it is still time-consuming (Bell, 2005). Consequently, the communications used to gain consent will include a disclaimer of confidentiality and time, which at least allows for interviewees who accept the invitation to plan their schedule appropriately. Moreover, interviews are subjective, both the researcher and the respondent being prone to bias (Daymon and Holloway, 2002); however, peer reviews and tutorials will be undertaken, and a pilot interview will be conducted, in order to gain prompting, probing and accuracy experience (Bell, 2005).

The interviews will be transcribed and will then be analyzed using the coding method (Collis and Hussey, 2009; Daymon and Holloway, 2002). A raw analysis will be conducted after each interview and then re-checked with the literature, in order to find ideas that were under-discussed or new ideas that could be compared or further explored in subsequent interviews. The coding method will be helpful for structuring information according to the identified objectives; however, an open mind will be kept so that other issues, that might not be part of large categories but may still be of importance, will not be overlooked, therefore mitigating some disadvantages of coding (Daymon and Holloway, 2002) – again, this will also be supported through peer checking, ensuring more reliability and objectivity for the study.

Data Analysis

Fairclough (2003) proposes three levels of analysis for critical discourse analysis, which could also be applied to qualitative research analysis – description, interpretation and explanation. The description phase equates to reading and open-coding the interview in categories according to interesting emergent ideas or compared to the literature (Daymon and Holloway 2002; Miles and Huberman 1984); interpretation and explanation entail placing categories into important themes/patterns, whose meaning is discussed in relation to the research's aim/objectives.

However, it should be noted that the present report only discusses the pilot findings, which are not definite conclusions but just provide guidance for the main research, indicating whether the methodology/method/questions were suitable/useful and identifying new areas for further exploration. The three emerging themes of the pilot interview were related to a) networking and relationship-building, b) e-WOM and c) requirements, and will be used in our further researches.

a)   Networking and Relationship-Building

This was probably the most interesting theme that materialized from the interview. The literature review mainly intended to look at Twitter as a form of e-WOM (The Economist 2010; Jansen et al. 2009; Zhao and Rossen 2009), with tentative relationship marketing-customer service-customer satisfaction links (Wagenheim and Bayon 2007; Tax et al. 1998). Nevertheless, because the participant's agency is a small Business-to-Business (B2B) service company, servicing via Twitter was perceived as unsuitable, as public tweets contradict confidentiality agreements:

>   *None of them want to run the risk of putting out confidential info for the world to see.*
>   (L151-152, 47R).

Consequently, this area would only be suitable for Business-to-Consumers (B2C)/B2Bs products and will need further exploration in the main research to gauge Twitter's adaptability to different business models.

Instead, the interviewer's perception was that Twitter actually provides the abilities for exploratory networking with "like-minded people" (L268, 82R), for finding/speaking to potential clients or just for maintaining conversations with existing customers and "engaging with

supporters" (L62, 23R), therefore proving more suitable for business networking than other social platforms like Facebook, which is reserved for friends (L264-271, 82R).

The interviewee discussed using Twitter for building agency expertise via professional tweets/blogs, thus making potential customers feel more confident in the company:

> [blogging] *helps reassure them we know what we're talking about and what we're doing.* (L134-135, 42R),

and therefore increasing chances of conversion or of engaging in positive e-WOM, which might lead to even more new customer acquisitions (Wagenheim and Bayon 2007; Tax et al. 1998):

> *Basically, Twitter has been great in widening our network of contacts, which sometimes turn into new business or free help, and creating kudos for ourselves.* (L200-202, 59R).

However, the confidence boost is also given by the use of Twitter for pure relationship-building as well, so "not just sell, sell, sell" (L130, 41R), which presents "a human side to the agency" (L302-304, 91R; L127, 41R) and allows showing:

> *a bit of love to charities and other people we worked with* (L178-179, 53R) [or] *just* [to] *people we like talking to.*(L142-143, 44R).

Since current studies/trade articles mainly focus on large B2C/B2B product companies that cannot possibly engage in in-depth relationships with numerous customers, this theme was under-discussed in the literature review; nevertheless, this seems to be an important issue for B2B service companies and SMEs in generally, where relationships are critical and manageable; consequently, the main research should also explore Twitter-related networking/relationship-building possibilities.

b) e-WOM

Although not explicitly, the interviewee agreed that e-WOM is one of Twitter's main benefits, as found in the literature review (Zhao and Rossen 2009; Jansen et al. 2009), used for promoting the agency, events or blog-posts. Being public, tweets are more likely to reach a wider business audience, faster:

> *Not everyone subscribes to our blog's RSS feed, so they might not get read by nearly as many people if we didn't tweet the link.* (L135-137, 42R).

e-WOM could therefore contribute to the previously-discussed exploratory networking or expertise-building, while positive WOM can be spread by satisfied customers, bringing in new business:

> *Tweets about us are usually how nice we are and that we know our stuff.* (L156-157, 49R).

The interviewee took an interesting approach towards negative e-WOM on Twitter, arguing that:

> *whether you're on Twitter or not, people are already saying things about your company (…) Twitter is only one more online space they can talk about you. Being on*

Twitter will at least give you the opportunity to have your say about what other people are saying about you. (L242-247, 72R)

This points to the fact that, if properly understood, Twitter could be wisely used as a crisis management tool to influence e-WOM about the company. Nevertheless, this view should be taken cautiously, as the pilot participant has not had this situation with her agency yet:

We're lucky not to have any bad tweets about our agency, just good ones so far! (L155-156, 49R).

The interviewee's conclusion, also supported by the research findings (Stephen and Galak 2009), is that, although Twitter should not be viewed as "the be all and end all for our communications" (L304-305, 91R), it is still a critical platform to embark on, especially if the company wants a chance to listen to/influence consumers' opinions:

So the question really is, can companies afford not to be on Twitter? (L253-254, 75R).

These findings should be further explored in subsequent interviews, in order to compare perspectives, and even discover how Twitter can be used as a form of spreading commercial messages (for example, promotional codes) instead of simply informational messages. It would also be useful to explore companies that have encountered and dealt with negative e-WOM.

c) Requirements

As discussed in the literature review, the interviewee also admitted that Twitter needs consistency and commitment, a clear understanding of its purpose, functionalities and tools, and a strategic implementation if it is to yield the best results. She also admitted to the difficulty in measuring Return-on-Investment, as results "are more people-oriented than financial ones" (L194-195, 58R) and the tools provided by Twitter are still very basic. Time was also a repeating category – Twitter requires time for engaging with people and updating regularly, and time is money, whether for hiring specialized extra-staff or for working on social media platforms instead of on paid-accounts, and this confirmed the research findings that, contrary to popular belief, Twitter is not free (Davies 2010). Nevertheless, the most interesting issue, which was not found during research, was the organizational culture fit; Twitter requires management buy-in, flexibility, no-pressure, trust and passion. The interviewee's past experiences have convinced her that:

The company's culture is really important Twitter is such a fast and immediate media, it's nearly impossible to engage with people if you don't use it often and you don't respond to people within a time frame they expect you to respond (L226-229, 67R).

This view should be explored in the main research, in order to discover patterns/advice that could help SMEs to adapt for better implementation of their Twitter strategies.
Overall, a semi-structured approach with the proposed questions (Appendix A) proved useful for allowing interesting new themes to emerge; however, some amendments have been brought to the questions/prompts in order to better explore subsequent interviews (Appendix C). A need for variety also surfaced: the Twitter area should be discussed with other B2B service/product companies, but also with B2C service/products companies, as the business model strongly dictates the balance of Twitter application (WOM or relationship-marketing). Furthermore, the pilot company was a marketing agency, which naturally needs to know/apply new media developments, therefore a useful perspective would be from non-marketing SMEs.

Trustworthiness

The quality of this research is dependent upon the researcher taking steps to ensure qualitative research trustworthiness – credibility, confirmability, dependability, transferability – (Daymon and Holloway 2002; Silverman 2006). Already the presently-discussed pilot was undertaken to diminish bias by testing the appropriateness/accuracy/usefulness of the methodology/method/questions and by allowing emerging themes not previously considered/alternative explanations/negative cases and the participant's feedback to inform more appropriate research lines (Daymon and Holloway 2002), and this will also be considered in the main research. Member checking through collection of primary data from different sources will be utilized in the main research, allowing emerging ideas to be analysed/tested after each new interview (Daymon and Holloway 2002) and also a final report copy will be presented to each participant for validation/comments, if desired.

Furthermore, peer debriefing has been and will be used for checking the questions/coding/interpretation in order to identify 'blind spots'/bias and provide alternative explanations. The research decision-making process has been rationalized, and a rich description of participants will be given (Appendix B for pilot) in order to enhance transferability of the findings to other settings. Lastly, a reflective approach has been taken throughout the project and will be further employed for the main research, as discussed below.

Conclusions & Reflections

The research has been a lengthy and difficult process, especially due to the researcher's inexperience and the constant time-pressure, but time-management abilities were greatly improved. The primary challenge was to find an appropriate, relevant and manageable research topic for this small-scale project, and to focus the literature, while making connections with other marketing theories as the topic lacked proper research per se. Crafting a comprehensive plan helped the researcher with word-count fitting and with focusing the project for the first time, therefore useful planning skills were gained.

The researcher learned that, without a focused topic/clearly-identified literature gap, the aim/objectives/entire research would be compromised. Peer checking and tutorials were very important and useful in helping to maintain focus and in eliminating bias caused by the researcher being over-involved in the project. The importance of clear aim/objectives was proved at the methodology/method/question formulation stage – after spending days of reflecting/changing/re-writing the objectives, it took only a few hours to formulate and justify a qualitative/interview approach and the questions (which were then peer-checked as well), which, in turn, proved suitable and useful during the pilot.

The interview proved very complicated: one of the initial prospects encountered other work commitments, the researcher lacked interviewing skills, and the interview was frustratingly-long and interrupted by technology issues, which might have compromised the process unless the interviewee had been very helpful and willing to spend the 2hours 45minutes and the Interned had not fixed quickly. Furthermore, as the notes taken on the side of the transcript showed, although several questions were added on-the-spot in order to follow interesting leads, which got the interviewee to speak of several present/past experiences, more could have been done in this respective, because several views were not questioned further.

The participant's feedback proved the questions' validity, but also indicated that some questions were formulated poorly (sometimes because of the researcher's apparent intention to brag in front of a professional; however, they were always explained well afterwards).

The researcher also views that some questions were leading and found it difficult to identify the boundary between prompting to get people talking and leading to obtain the expected results. Sometimes, the researcher also prompted too soon, not leaving time for the participant to think, which resulted in some double-question situations. However, the researcher believes that further practice, especially with live interviews, will help to improve and a first step undertaken was to participate in other focus groups/interviews in order to observe/learn. The interviewee also considered that the researcher's inexperience with Twitter was a good case for semi-structured interview, but could have hindered potential findings that would have emerged, had the researcher been a heavy user. Nevertheless, the researcher believes this inexperience actually cleared some bias of pre-conceived ideas regarding Twitter usability, and could also be the perspective of many SMEs new to Twitter. During the coding/analyzing stage, peer checking again proved useful, as the researcher initially identified 5 themes, whereas there were only 3, and did not structure the analysis correctly, which was immediately identified by a peer. Lastly, upon reflection, it became clear that care should also be taken when trying to explore themes with new participants, as disclosing certain information regarding company strategies could potentially lead to serious ethical issues, although no explicitly sensitive information will be discussed. For this reason, all information will be anonymised and treated generally, with no reference to previous companies.

Appendix
Appendix A – Initial Questions
1. Do you use twitter in your marketing strategy? Since when have you been using it?
2. Do you use any other social networks/ which?
3. Why did you start using twitter?
4. How do you use twitter (purposes, relation to other media forms)?
5. What have you put in place for incorporating twitter into your marketing strategy (costs, time, people, other resources)?
6. What have been the results of using twitter? How do you measure them?
7. What challenges do you face with twitter/ are there major drawbacks?
8. What do you think are the offsets for other companies not adopting twitter?
9. What is your perception of twitter, compared to other social networks?
10. Have the results obtained using twitter as a marketing tool changed your opinions about it?
11. What future plans do you have for twitter as part of your marketing strategy?
12. What improvements would you need from a twitter model in order to consider it a more strategic part of your marketing (if any)? Why would you like these improvements?

Appendix B – Participant Profile
The interviewee is a Marketing Account Executive for a London-based fundraising, marketing and communications agency, specialized in the third sector: charities, non-profit organisations and social enterprises (therefore a B2B service company). The agency is a SME as it has 3 founding partners and 5 employees. The interviewee's role within the company comprises several tasks: account management, taking down notes during meetings, writing contact reports, drafting a communications plan schedule and day-to-day correspondence by phone or email to clients, being the face of the agency, both online and offline. One of the company's partners is a prolific Twitterer, so the agency has been engaging in Twitter ever since its 2009 opening, however they also have a Facebook page, a Flickr account and a blog. Twitter is used as a marketing tool for promoting the agency, but it is also something which may be recommended to clients. The participant considers herself as a heavy Twitter user, having explored it for both professional and personal use.

Appendix C – Amended Questions

1. Could you please tell me a bit about your company? (Prompting: profile, size, activity area, people in the marketing department)
2. What is your role within the company?
3. Do you use twitter in your marketing strategy? Since when have you been using it?
4. Do you use any other social networks/ which?
5. Why did you start using twitter? (Prompting: personal initiative, recommended, required)
6. What did you first think of Twitter as a marketing tool? (Prompting: useful, promising, useless)
7. How do you use twitter (purposes, relation to other media forms)? (Prompting: WOM – spread information or commercial messages, get leads, relationship marketing, networking, customer service, prove expertise, build confidence in customers/potential customers, put a human side to the company, crisis management tool)
8. What have you put in place for incorporating twitter into your marketing strategy (Prompting: costs, time, people, other resources)?
9. How did you find out what you needed to do in order to effectively use Twitter?
10. What have been the results of using twitter? How do you measure them?
11. How did you find out about these measurement tools? (Prompting: facilitated by Twitter for businesses, through third party applications, was it easy/difficult)
12. How flexible is your company culture/management team in relation to using Twitter as a marketing tool? (Prompting: difficult/easy to get management buy-in, tight/loose control of tweets, commitment/non-commitment to Twitter, flexibility/rigidity in using/measuring, pressure/no-pressure in demonstrating ROI)
13. What challenges do you face with twitter/ are there major drawbacks?
14. What do you think are the offsets for other companies not adopting twitter?
15. What is your perception of twitter, compared to other social networks?
16. Have the results obtained using twitter as a marketing tool changed your opinions about it?
17. (if it is another marketing company) Could you please tell me about a situation where you did not recommend Twitter to your clients for use in their marketing strategy, if any? Why did you not recommend it?
18. What future plans do you have for twitter as part of your marketing strategy? (Prompting: use it more/less, use it differently, make it more central in the company's communications mix)
19. Do you/would you use Twitter as an internal communications tool/ (like an Intranet) Why/ why not?
20. What improvements would you need from a twitter model in order to consider it a more strategic part of your marketing (if any)? Why would you like these improvements?

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Physiological Emotions and Entrepreneurial Decisions

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Abstract

Purpose - This paper focuses on the impact of the first bodily emotional reaction (blood-pressure and heart rate) in individuals when they go through the opportunity recognition process in the presence or absence of prior knowledge and prior entrepreneurial experience.

Design/methodology/approach - This study uses an experimental approach to measure blood pressure and heart rates of individuals when they are presented with entrepreneurial scenarios. The sample population comprised of ninety undergraduate and graduate students in a Northeastern technology based university in USA. In addition to the physiological measures, a questionnaire was also used to collect data about the participants' prior knowledge and experience. At the start of the experiment, after they consented to participate, the participant's blood pressure and heart rates were examined and observed at three different times during the opportunity recognition exercise. Structural Equation Modeling was used to analyze the relationships between the physiological emotions, prior knowledge and experience and decision to develop the opportunity.

Findings - A significant impact of blood pressure on the decision to develop the business opportunity, specifically between groups which had higher and lower prior knowledge and experience, was observed.

Practical implications - The study provides a good idea of "how" opportunity recognition might be taking place, thus allowing entrepreneurs to understand the importance of being aware of their own emotional reactions to situations before they take important decisions about developing a newly recognized opportunity hence reducing the chances of new venture failures.

Originality/value - This is one of the first research studies that measures physiological reactions like heart rate and blood pressure in the context of entrepreneurial decision making. It thus provides a significant objective measure, compared to earlier subjective self-reporting measures, about entrepreneurial processes.

Keywords: Opportunity Development, Physiological Emotions, Decision Making
Paper type: Research Paper

Introduction

In order to create a new venture the opportunity has to be discovered and the entrepreneur has to make a choice whether to exploit it or not (Shane and Venkatraman, 2000). While entrepreneurial processes begin with *intent* to start a new business (Krueger, 1993; Krueger and Brazeal, 1994), it has been suggested that the crux of the entrepreneurial process, is the opportunity recognition and development ability of entrepreneurs which differentiates them from non-entrepreneurs (Venkataraman, 1997). The creation of successful businesses only *follows* a successful opportunity development process (Ardichvilli, Cardazo and Ray, 2003). Understanding how the Opportunity Recognition process occurs will help extend current theory and provide entrepreneurs with insights regarding their decision making abilities increasing the likelihood of repeated success.

The Opportunity Recognition process has thus far been elucidated by examining cognitive factors with the strongest evidence being for prior knowledge and experience. Prior knowledge and experience can however, create mental ruts making it more difficult for entrepreneurs to recognize innovative opportunities (Shepherd and Detienne, 2005). Further the entrepreneur's passion and perception of the business as his or her own baby (Cardon, Zeitsma, Saparito, Matherne, Davis, 2005), and motivation (Karp, 2006) also contribute to the development of the opportunity. This would mean that the development of a business opportunity depends a lot on whether the entrepreneur likes the idea or not. Entrepreneurship is thus, a recurring pattern of both *thoughts and feelings* that shape entrepreneurial reality and therefore action and value creation (Karp, 2006). Emotions undoubtedly provide evaluative information and supply energy for motivational behavior in the entrepreneur (Ford, 1999). Considering that the neural systems of emotions interact extensively with their underlying cognitive processes (Gray, Schefer, Brower and Most, 2005) there is a definite need to include the study of affect in the field of entrepreneurship (Baron, 2007) in order to fully understand the venture creation process. Since the most significant evidence has been for prior knowledge and prior experience the *research question* is: Given that someone has prior knowledge and prior experience, will the same individuals be affected differently if they experience changes in blood pressure and heart rate due to positive versus negative emotions in a particular situation to the point that their decision to develop is different?

Even though many cognitive and emotional factors have different brain regions, there are certain regions of the brain that have definitely been shown to cater to both cognitive and emotional mechanisms namely the individual's ability to make personal judgments in decision making and the expression of feelings (Bechara, Damasio and Baron, 2007; Damasio, 2003). This highlights the importance of the role of emotions in the decision making stage of the opportunity recognition process. Emotions may be categorized as physiological, secondary or core emotions (Damasio, 2003; Russell and Barrett, 1999). The first type of emotional response however, is most relevant to this study since it is an immediate bodily (physiological) reaction that tells the individual whether they like the object or do not like it (Chauduri, 2006) and since we are measuring the decision made at a moment in time, the primary reaction that will impact the decision is the immediate physiological response.

The long term objective of this research is to contribute to an understanding of the role of all types and levels of emotions in each stage of the opportunity recognition process, however for the purpose of this study only the decision to develop stage and the impact of the first emotional response is investigated. Keeping this aspect in mind the study builds a theoretical framework from the literature in entrepreneurship, cognition and emotions to demonstrate the potential significant impact of physiological responses on the decision to develop a business opportunity.

Review of Literature
Opportunity Recognition
In this study opportunity recognition refers to the active, cognitive process (or processes) through which individuals conclude that they have identified a business idea that has the potential to create something new, that has the potential to generate economic value, and one that is viewed as desirable in the society in which it occurs (that is, its development is consistent with existing legal and moral conditions) (Baron, 2004).

Opportunities are recognized to be both a result of information available about the environmental conditions such as market trends, technology availability, and the result of the entrepreneur's cognitive ability to acquire and process information (Ucbasaran, Westhead, and Wright, 2000).

Reviewing the entrepreneurial cognition research we find that the key cognitive aspects outlined in the opportunity recognition literature are as follows: Prior Knowledge and Experience (Shepherd and Detiene, 2001; Shane, 2000); Regulatory focus theory (Baron, 1999); Risk

perception (Forlani and Mullin, 2000; Simon, Houghton and Aquino, 2000); Counterfactual thinking (Gaglio, 2004; Baron, 1999); Planning Fallacy (Keh, Foo, Lim 2002; Baron, 1999); Law of Small numbers (Keh, Foo, Lim 2002); and even some psychological factors like motivation, creativity and intention (goals) (Bird, 1992; Krueger, 1993; Hostager Neil, Decker and Lorentz, 1998; Hills, Schrader and Lumpkin, 1999).

When it comes to specifically recognizing opportunities, however studying the impacts of cognitive mechanisms merits rigorous investigation because these explain *how* entrepreneurs think and reason as they identify innovative opportunities (Gaglio, 2004). While opportunity recognition occurs in several stages it also occurs through an iterative and interactive process between the entrepreneur and the environment. As the entrepreneur uses his or her prior knowledge (Shane, 2000) or creativity (Hill, 1995) and mentally evaluates his or her environment (Kirzner, 1997) what is actually occurring is a set of cognitive processes in the form of perception, recall and use of memory, appraisal, assessment and interpretation. These processes then result in judgments and decisions that lead the entrepreneur to decide to start a new venture.

The Link between Prior Knowledge and Experience and Emotions

Prior knowledge and prior experience are tacit knowledge, and along with values and action processes, emotions are also a part of tacit knowledge (Siedler de-Alwis and Hartman, 2004). Emotions can thus serve as an interrupt signal when one's progress towards a goal is better than expected leading to positive affects, or worse than expected leading to negative affects (Oatley and Johnsson-Laird, 1987). Emotions enhance episodic memory for events (Christianson, 1992). One adaptive function of emotion is to enhance storage of episodic memories so that events that are linked to an emotional response and are potentially important for survival are not forgotten (McGaugh, 2000). This means that over time we are more likely to remember emotional events than neutral events. Such event/object associated emotions are triggered during the evaluation stage of the opportunity recognition process. The cognitive theorists (Roseman, 2001; Scherer, 2001), state that evaluations of situations/objects are expected to give rise to a range of emotions from anger, fear and shame to happiness, pride and joy in the individual appraiser. This indicates that the presence of prior knowledge and use of cognitive biases and heuristics (which may be to manage information overload) only provides one half of the story. Emotions thus bring to light, *how* the opportunity is recognized when entrepreneurs evaluate their environment before making a decision.

Emotions play the role of information providers telling entrepreneurs if they like/don't like an idea. This occurs first through bodily reactions that affect them physiologically. Next it occurs by eliciting positive or negative emotions and by influencing their drive and motivation to go ahead or not go ahead with the idea. In order to fully explore these emotions we next look at a detailed review of each of these emotional responses. Based on that review the research model of the role of emotions in the opportunity recognition process is put forth.

Emotions

"*Emotions allow organisms to cope successfully with a variety of objects and situations that are potentially dangerous or potentially advantageous. The adaptive value of feelings comes from amplifying the mental impact of a given situation and increasing the probabilities that comparable situations can be anticipated and planned for in the future so as to avert risks and take advantage of opportunities*". ... Damasio (2003).

Following Damasio's work (Damasio, 1994; 1999; 2003) emotions are understood to be a collection of changes in body and brain states governed by a dedicated brain system that responds to the content of our perceptions of a particular occurrence.

In this study our link to understanding emotions is its association with the cognitive processes in the opportunity recognition process. This means emotions either inform, or are impacted in turn by what the individual becomes cognizant of hence we base the reasoning and model of emotions on the above-mentioned definition of emotions as described by Damasio (1999).

Physiological Basis of Emotions

The James-Lange Theory of emotion, proposed in 1884, suggests that emotions occur from our cognitive appraisal of the commotion that occurs in our inner organs during certain vigorous behaviors. It primarily refers to the physiological events such as muscular tension, heart rate increase, perspiration, dryness of the mouth, etc. that cause emotions rather than the other way round. Diametrically opposite to the James-Lange Theory is Cannon's theory proposing that it is in fact emotions that are felt first which give rise to physiological changes. Chaudhuri (2006) and Buck (1999) combined the various theories of emotions and proposed three different types of emotional responses, namely: 1) Emotional responses that are an outcome of physiological responses like heart rate changes, blood pressure and sweating, which are altered in order to support action. 2) Emotional responses that are spontaneous, expressive behavior such as facial expressions, gestures, posture, which serve the function of social coordination and 3) Emotional responses that are immediate and direct subjective experiences, although they may be experienced indirectly as feedback from cognitive appraisals.

For the purpose of this study, we are only looking at the physiological emotional responses since we are measuring the immediate impact of the scenario on the individual's decision making process.

Physiological Emotional Responses- Measurement and Findings

Clinical studies (James, Yee, Harshfield, Blank, Pickering, 1986; Shimomitsu, Theoreil, 1996; Pury, McCubin, Helfer, Galloway, McMullen 2004) have shown that physiological responses to negative emotions usually result in elevated systolic or diastolic blood pressure and lowered blood pressure is related to happiness and positive emotions. When it comes to physiological reactions to their immediate environment, heart rate significantly increases for entrepreneurs versus non-entrepreneurs when they are in the process of recognizing an opportunity to be good (Craig, Lindsay, Kropp and Moores, 2000).

Negative emotions are related to higher blood pressure and heart rate, but happiness is inversely related to diastolic blood pressure (Shimomitsu and Theoreil, 1996; Flory, Mathew and Owens, 1998; Shapiro, Jamner, Goldstein and Delfino, 2001; James, et al, 1986). In other studies however, systolic blood pressure (SBP) alone predicted a significant proportion of the variance in emotional responses to visual stimuli (Pury, McCubin, Helfer, Galloway and McMullen, 2004). The systolic blood pressure when higher, was seen to drop when such individuals encountered either positive or negative stimuli. This finding was contrary to an earlier study that showed that any sudden unexpected situation can give rise to a vascular response and in such cases there would be a rise in the blood pressure and drop right immediately after (Randis and Guellette, 1925). In spite of the mixed results, we can summarize that individuals with normal resting blood pressures will generally experience a drop in their blood pressure if they are encountered with a positive stimuli and experience positive emotions. While there will be a rise in blood pressure when encountered with negative stimuli leading them to experience negative emotions.

Explanation of the role of emotions in the opportunity recognition process

From the entrepreneurship literature we identified two key cognitive factors that have repeatedly been shown to impact the opportunity recognition process. These are prior knowledge and prior experience and from the emotions and neuroscience literature we identified basic physiological

emotional responses that interact with these cognitive processes. When the individual is placed in a situation that has triggers or stimuli in the environment that can foster opportunity recognition, the individual begins to generate several ideas and then evaluates these ideas before deciding to develop them.

In order to recognize this idea as a business opportunity (as in the case of the entrepreneur) the individual will zero in on the idea. At this point there is an immediate reaction which will be a physiological response (Bechara et al, 2007; Chauduri, 2006; Buck, 1999; Craig and Lindsay, 2001; Damasio, 1999; 2003) and in this case it is proposed that it will be a change in blood pressure and heart rate. At this point if they have prior knowledge or experience in that area they will recall from memory the associated emotion, which if positive will make the individual feel good about the idea, if negative will make them aversive to the idea. This gradually elicited emotion, whether positive or negative, will accordingly lead to the individual deciding whether he or she wants to go ahead or not go ahead with developing the business opportunity further. Based on the above theoretical underpinnings the following relationships between the key variables in the opportunity recognition process are hypothesized.

Hypotheses

Prior knowledge and prior experience have been shown by entrepreneurship researchers as significant indicators of entrepreneurs' opportunity recognition ability (Shepherd and Detienne, 2005; Baron and Ensley, 2006).

Additionally these researchers have also shown that the feedback about the idea, the learning process at each stage and the pattern recognition process that aids in connecting of dots, all lead to entrepreneurs being better at recognizing opportunities. As described above, the first emotional response to an object when it is evaluated is a bodily or physiological reaction (Randis and Guellette, 1925). Clinical studies have demonstrated different results regarding the increase and decrease of systolic versus diastolic blood pressure and heart rate with emotional states. The predominant demonstration however, has been that negative emotions are related to higher blood pressure and heart rate and positive emotions are related to lower blood pressure and heart rate (Shimomitsu and Theoreil, 1996; Flory, Mathew and Owens, 1998; Shapiro, Jamner, Goldstein and Delfino, 2001; James, et al., 1986).

We therefore suggest that prior knowledge and prior experience leads to feelings of security making individuals feel very calm and collected when encountering a familiar situation or object thus decreasing their blood pressure and heart rate. The lowered blood pressure and heart rate enable greater clarity in thought and creativity (Tomasino, 2007). However individuals without prior knowledge and experience could feel scared and in fear, their blood pressure and heart rate will increase leading to lack of clarity in thought and lowered task performance (Tomasino, 2007; Frederickson, 1998; 2003).

We could thus expect to see immediate physiological responses which co-vary with either positive or negative emotions. Having recognized the opportunity the next step is deciding whether or not to proceed with the development of the idea. While the above physiological studies have all shown that lowered blood pressure is related to positive emotions and increased blood pressure is related to negative emotions, Shwartz, Warren and Pickering, (1994) have also shown that after anger which is a negative emotion, it is excitement that leads to the greatest increase in blood pressure and heart rate while tired states lead to decrease in blood pressure and heart rate. In essence what is expected is that individuals with prior knowledge and prior experience will not always decide to develop a business and individuals with no prior knowledge and experience can sometimes also decide to develop a business opportunity.

If positive emotions like excitement can also have increased physiological responses, it can energize the individual to decide to develop the opportunity further, which leads us to hypothesize that:

H1: An entrepreneur with high prior knowledge and prior experience who experiences increased blood pressure due to excitement instead of fear is more likely to decide to develop the opportunity

However

H2: An entrepreneur with low prior knowledge and prior experience who experiences decreased blood pressure due to lack of excitement but increased blood pressure due to fear is more likely to decide <u>not</u> to develop the opportunity

Methods

Shane, (2000), through his study and Gaglio and Katz, (2001) explain that the experimental or quasi-experimental approach opens up an interesting avenue for research in opportunity recognition because such studies help us control extraneous variables and focus more on the opportunities recognized. This study uses an experimental approach based on Christensen (2001) and Campbell and Stanley (1963) in order to allow us to control conditions to test the above hypotheses.

Dependent Variable

Decision to Develop- Based on the scenario presented and the opportunity recognized as the best business idea, participants were asked if they intended to develop it or not (on a 9 point scale) based on the method used by Dimov (2004) and (Reynolds and White, 1997) (alpha=0.84 for this study).

Independent Variables

Prior Knowledge- Participants were asked to rate how knowledgeable they were in the areas of material science, chemistry, nanotechnology on a scale of 1-9 (not at all knowledgeable to very highly knowledgeable) (alpha = 0.68)

Prior Experience - Participants were asked to rate how experienced they were in the areas of starting a company, managing a family owned business, developing a product and market, on a scale of 1-9 (not at all experienced to very highly experienced) (alpha = 0.84)

Physiological Emotions- For this the equipment used to measure the Blood Pressure (BP) and heart rate manufactured by coulbourn instruments, was used. The procedure included the placement of a cuff over the brachial artery. The cuff was placed over the upper arm of the participant just above their elbow. The BP monitor measured the systolic blood pressure, diastolic blood pressure and heart rate (pulse) of the participant. The emotional response was coded as the difference between the base-rate calculated at the start of the study and at the time of the scenario presentation and averaged with the difference between the base rate and the time the participants responded to questions about their secondary emotions regarding the scenario.

<u>Sample</u>: 90 Undergraduate and graduate students in a northeastern technology based university who enrolled to participate in a raffle driven event comprised the sample of the experimental study, of which all 90 provided fully useable data.

<u>Sampling:</u> The sampling took place in a non-systematic manner.

<u>Instrument and Procedure:</u> A questionnaire was developed which contains measures to collect data about the participants' prior knowledge and experience. At the start of the experiment, after they consented to participate, the participant's blood pressure was examined and observed at three different times during the opportunity recognition exercise. These included: a) when the participant read the scenario for the first time, b) when the participant responded to the questions about how they felt about the scenario, and c) finally just before they completed the study and were asked to indicate their prior knowledge and prior experience.

Description of Experimental Scenarios

In order to control for random knowledge that may be available about other technologies and their application a lesser known more recent technology was taken as the main scenario for this study. The scenario describes a new emerging technology discovery namely the carbon nanotubes. An explanation was provided to the participants about the properties of the discovery and potential areas of application. Participants were next presented with a list of business opportunities. Then based on which idea they thought was the best, they were asked to decide if they would develop that business opportunity or not.

Statistical Analysis

Structural equation modeling (SEM) method was used. This method allows us to simultaneously test the regression equations of all the theoretically designed relationships among the identified key variables in this study suggesting to us whether or not the proposed model is significantly acceptable. AMOS was used to carry out the analyses.

Results

The means and standard deviations of the key variables are listed in table 1.

Table 1

	N	Minimum	Maximum	Mean	Std. Deviation
Decision to Develop	90	2.60	9.00	6.93	1.17
SBP	90	-33.00	59.00	-6.76	14.47
DBP	90	-48.00	41.00	-1.01	12.02
HR	90	-30.00	84.00	-2.166	1.18
Prior Knowledge	90	1.00	8.00	3.91	1.68
Prior Experience	90	1.00	8.00	3.15	2.06

Meeting with all the requirements for structural equation modeling, the data was tested to check for a model fit. The overall model fit the data well (Chi-0.410; p-0.522; RMSEA-0.000; RFI: 0.921). For the overall model, at the time of presenting the scenario individuals who had high prior knowledge experienced a positive and significant relationship between systolic blood pressure and decision to develop (Critical Ratio: 2.269). However at the time when participants were asked how they felt about the scenario, there was a negative but significant relationship between systolic blood pressure and decision to exploit the opportunity (Critical Ratio: -2.077). Individuals with low prior knowledge, who experienced a drop in their diastolic blood pressure at the time they were asked about their knowledge and experience in the related area, decided to develop their opportunity (Critical Ratio:-2.567). Individuals with low prior experience on the other hand had lowered systolic blood pressure at the time of scenario presentation (Critical Ratio:-2.894) and low diastolic pressure just before completing the study (Critical Ratio:-2.489) and still decided to develop the idea. Individuals with low prior experience however, also had an increase in systolic blood pressure (Critical Ratio: 3.215) when they were questioned about their prior knowledge and experience and decided to develop the opportunity further in spite of no prior experience.

The responses were further divided into four groups namely, groups with high/low prior knowledge and groups with high/low prior experience.

Revisiting hypothesis 1 that an individual with increased blood pressure will decide to develop their idea, we observe that an increase in systolic blood pressure is significant and positive in its relation with decision to develop the opportunity only for the overall model and only at the time of presenting the scenario. It is significant and negative when the participants are asked how they felt about it or if they had prior knowledge or experience. Hypothesis 1 is supported only in the