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Collective Intelligence for Competitive Advantage: Crowdsourcing and Open Innovation

CAPSTONE REPORT

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Running Head: Collective Intelligence for a Competitive Advantage

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Abstract

This literature review examines collective intelligence through analysis of literature published between 1985 and 2009. Focus is on (a) definitions and applications of collective intelligence related to crowdsourcing and open innovation, and (b) creation of competitive advantage. The final outcome presents five recommendations for how these two types of collective intelligence may be used to support innovation, including the need to create a collective intelligence (CI) system and use of an open innovation business model.

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Collective Intelligence for Competitive Advantage: Crowdsourcing and Open Innovation

Introduction

Purpose

The purpose of this study is to examine the use of collective intelligence (Chesbrough, 2003; Howe, 2008) in relation to creating a competitive advantage in the marketplace within the context of for-profit corporations. In this study, collective intelligence is broadly defined as a group of individuals doing things collectively that seem intelligent (Malone, et al., 2009, p. 2). Collective intelligence involves groups of individuals collaborating to create synergy, something greater than each individual part (Castelluccio, 2006). Focus is on two specific types of collective intelligence: (a) crowdsourcing (Howe, 2008) and (b) open innovation (Chesbrough, 2003).

This study is designed as a literature review and focuses on literature published between 1985 and 2009. The years represent a time beginning when innovation became a topic of inquiry (Drucker, 1985), through the years in which innovation has become integral to creating a competitive advantage (Chesbrough, 2003). Literature in two areas is selected for examination, including: (a) definitions and applications of collective intelligence through crowdsourcing and open innovation, and (b) creation of competitive advantage. These two areas provide the foundation needed to answer the main research question "How can an organization apply collective intelligence through open innovation (Chesbrough, 2003) and crowdsourcing (Howe, 2008) to create a competitive advantage?"

The assumption underlying this study is that "companies that don't innovate, die" (Chesbrough, 2003, p. xxvi). Peters (1997) states the "pursuit of COMPETITIVE ADVANTAGE = I-N-N-O-V-A-T-I-O-N." (p. 30). Many organizations no longer rely solely on

their internal employees knowledge to innovate (Chesbrough, 2003). For the purposes of this

study, innovation is defined as "a new way of doing something. It may refer to incremental and

emergent or radical and revolutionary changes in thinking, products, processes, or organizations"

(Innovation, 2009 para. 1). The concept is further refined in this study to focus on the processes

of open innovation, as one type of collective intelligence. Open innovation is defined in this

study as valuable ideas that can come from inside or outside the organization and can go to

market from inside or outside the organization (Chesbrough, 2003). Chesbrough (2003) provides

an example where open innovation has proven successful. He reports:

> In 1999, Proctor & Gamble decided to change its approach to innovation. The firm
>
> extended its internal R&D to the outside world though an initiative called Connect and
>
> Develop. This initiative emphasized the need for P&G to reach out to external parties for
>
> innovative ideas. The company's rationale is simple: Inside P&G are more than 8,600
>
> scientists advancing the industrial knowledge that enables new P&G offerings; outside
>
> are 1.5 million. (p. xxvii).

A second type of collective intelligence and how it supports competitive advantage is also

examined: crowdsourcing. In this study, crowdsourcing is defined by Howe (2006) as "the act of

taking a job traditionally performed by a designated agent (usually an employee) and outsourcing

it to an undefined, generally large group of people in the form of an open call" (p. 135).

However, mechanisms also need to be in place to protect against competition sabotaging the

crowd system ((Malone, Laubacher, & Dellarocas, 2009). For example:

> The Schaumburg Flyers, a minor league baseball team near Chicago, showed what can
>
> happen when this condition is not met. The Flyers management experimented with a
>
> system like that used by Ebbsfleet United, the English soccer team, with fans voting to

make decisions usually made by the front office and on-field coaching staff. But while

Ebbsfleet restricted voting to fans who owned shares of their team, the Flyers let anyone

vote. This led to a very disappointing season. Many people suspected that fans of

opposing teams were purposely voting for moves that undermined the Flyers. (p. 15)

This example illustrates that relying on the crowd may not be appropriate for all actions, or all

tasks. Therefore, systems that leverage the crowd for creation decisions should ensure that the

final decision passes through a governing body (Malone et al., 2009).

Problem

More and more companies are turning to external knowledge, through various forms of

collective intelligence methods, to solve complex problems (Howe, 2008). Chesbrough (2003)

states that as organizations are presented with complex problems, they can rely on their internal

resources and knowledge (called closed innovation) to provide innovative solutions, or they can

rely on external knowledge (called open innovation), or both.

As noted by Howe (2008), as technologies advance and become more accessible,

amateurs have access to the same tools that professionals have, enabling their passion to be

leveraged, thus democratizing productions (p. 71). Howe's notion of 'democratizing' is worth

further review. Von Hippel (2005) states that democratized innovation is proliferating through

the industries such as information, software, and various physical productions like surfboards

and software security features. His research illustrates that companies innovations are more

commercially attractive when the product and service developments involve "lead users",

defined as users of the product or service, that freely share their knowledge and innovations.

Companies that leverage "lead users" are most often ahead on industry trends (p. iii). Schrage

(2003) states that innovation requires improvisation, it is not about following the rules of the

game, but more about rigorously challenging and revising them. Johansson (2006) identifies two

characteristics in challenging the rules of the game. The first is self-education. He says, "By

learning different fields and disciplines on our own we have a greater chance of approaching

them from different perspectives" (p.52). The second is focused on breaking down associative

barriers, or unlearning what we have learned. Forcing a breakdown of associative barriers means

directing the mind to take unusual paths while thinking about a situation, issue, or problem.

This notion of 'democratizing' can be further described through examination of the

concept of crowdsourcing (Howe, 2008), which refers to leveraging the collective intelligence of

crowds, where groups of people outperform individual experts (p. 132). There are four questions

that form the building blocks of collective intelligence, the premise for which crowdsourcing is

set, presented in the diagram below (Malone et al., 2009).
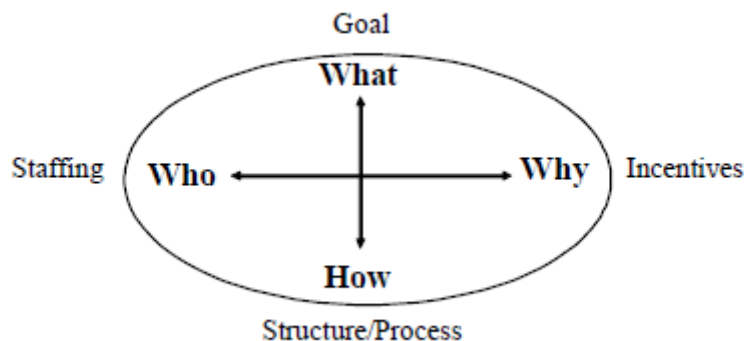
Figure 1: Elements of collective intelligence building blocks or "genes"

When combined with the crowdsourcing concept as described above, open innovation

(Chesbrough, 2003) enables both marketing professionals and crowds of amateurs to solve

organizational problems, thus leveraging the development of innovative products, which often

leads to competitive advantage (Porter, 1985). Porter (1985) states that one of the principal

drivers of competition is technology (p. 164). However, O'Conner (2003) states that "at the

heart, of every great product is an unfulfilled need. For example, O'Conner notes that as people

began traveling more, they needed better ways to communicate, so cell phones and internet were

invented" (p. 18). Organizations that create innovative solutions to fulfill those basic needs will

be more likely to create and sustain a competitive advantage (p. 19). Technology is imperative

to an organization, as it impacts its competitive advantage or the overall structure of its industry.

As Chesbrough (2003) states "companies that don't innovate, die" (p. xxvi). Johansson (2006)

supports this same notion, and posits that innovation is the essential element in maintaining and

creating a competitive advantage.

Significance

Industries are on the verge of a significant change in the way they innovate (Malone, T.

W., Laubacher, R. & Dellarocas, C. N., 2009). The internet over the past decade has enabled

communities to connect and collaborate, creating a virtual world of collective intelligence

(Malone et al., p. 2). Von Hippel (2005) states that innovation by users tends to be widely

distributed across a base of users rather than a select few. Utilizing the global crowds of

amateurs who now have access to the same tools as professionals to augment solving complex

organizations problems is often cheaper and faster than relying on in-house expertise (Howe,

2008). For example, L'Oreal often relies on user-generated content for programming and

advertising. One user generated ad can cost as little as $1,000.00, whereas a similar add would

take L'Oreal's in-house resources roughly $164,200 to produce (Hempel, 2006).

According to Howe (2008), the world of innovation is being seized by the amateurs;

those that now have access to the same tools and means for production as professionals. For

example, amateur photographers have access to high resolution digital cameras at lower costs

enabling professional quality pictures. This type of access has created a shadow workforce on a

global scale (Howe, 2008), where barriers to groups of people with passion and knowledge in various areas are being removed. Networks of amateurs and professionals are being connected through technology and the Internet. Consumers of goods and services and producers of goods and services are becoming one and the same (Howe, p. 71).

*Audience/Outcom*e

This study is written for the executive leadership and their management teams in for-profit organizations with a responsibility to maintain competitive advantage over its competition. The primary objective is to provide leadership and their teams with information about how to use collective intelligence, specifically crowdsourcing and open innovation, to support innovation as a way to create a competitive advantage. The outcome of the study is presented in the form of recommendations for how these two types of external knowledge should be implemented to support innovation.

Delimitations

Topic Definition. According to Howe (2008), innovation and the use of external knowledge are linked to the larger context of maintaining or creating a competitive advantage. Organizations are on the cusp of a new age, where countries are starting to invest in collaborative tools that leverage the collective intelligence of communities around the world (Libert & Spector, 2007).

Timeframe. The literature for this review is primarily focused on material between 1999 and 2009, due to the emergence of crowdsourcing enabled by technology (Howe, 2003) and to ensure relevance to current innovation related to competitive advantage. Literature prior to 1999

is used only when it maintains relevance to current trends or to provide historical views and patterns for innovation.

    Focus. Leveraging collective intelligence of crowds through open innovation and crowdsourcing is an emergent practice, which is providing a new avenue for competitive advantage (Howe, 2008; Chesbrough, 2003). Companies like P&G, Amazon, and Netflix are exposing their challenges to the external world, offering rewards for solutions and finding phenomenal success beyond what they had imagined (Libert & Spector, 2007).

    Audience. Executive level management in an organization has a responsibility to shareholders to create and maintain a competitive advantage. The aim of this study is at that audience which has the most compelling reason to create and maintain a competitive advantage.

    Inquiry Context. For-profit organizations in any industry where competition and competitive advantage play a critical role in the survival of said organization. For profit is chosen for the focus of this study based on the driving motivation to maintain a competitive advantage, as noted by Kim and Mauborgne (2005).

Data Analysis Plan Preview

    This study focuses on the analysis of existing published literature. Existing knowledge is synthesized with a focus on creating a new perspective. Through the analysis process, the information is organized into a logical format focused on four key phrases: (a) collective intelligence, (b) crowdsourcing, (c) open innovation, and (d) creation of competitive advantage. The specific approach to data analysis is conducted in accordance with the conceptual analysis process described by Busch, De Maret, Flynn, Kellum, Le, and Meyers (2005). This process

provides a research tool which can be used to verify the presence of certain words or concepts within texts or sets of texts.

Writing Plan Preview

This review utilizes journals, books, and articles as the primary source of information to form recommendations for how external knowledge should and should not be used to support innovation. This section of the literature review seeks to understand common themes, relevant facts, and connections between sources. The objective of the set of recommendations is to provide a context for creating and maintaining a competitive advantage through the use of collective intelligence as it relates to crowdsourcing and open innovation.

A typical approach to structuring the Review of the Literature section includes an introduction, and presentation of the results of the data analysis process, often in a thematic manner, (Hewitt, 1998). The plan in this study is to organize a set of recommendations through common themes aligned with the four main areas used to address the main question and guiding questions: (a) definitions and applications of collective intelligence, (b) crowdsourcing, (c) open innovation, and (d) creation of competitive advantage.

Definitions

Terminology specific to this study is used in throughout the literature review and is drawn from selected literature, academic sources, and reference materials. The definitions provide context for the main themes of the research. This section of the literature review is intended to provide key definitions that pertain to the research that may be less familiar to the intended audience. A few terms are defined in-text, where it does not inhibit the flow of information or deter the audience from the focus of the research; however the majority of terms are located in this section of the document.

Amateur – Generally considered a person attached to a particular pursuit, study, or science, without formal training or pay (Amateur, 2009).

Closed Innovation – It is fundamentally inwardly focused, utilizing internal research and development to develop innovation (Chesbrough, 2003).

Collective Intelligence – Broadly defined as a group of individuals doing things collectively that seem intelligent (Malone, et al., 2009, p. 2).

Competitive advantage – A competitive advantage exists when the firm is able to deliver the same benefits as competitors but at a lower cost (cost advantage), or deliver benefits that exceed those of competing products (differentiation advantage). Thus, a competitive advantage enables the firm to create superior value for its customers and superior profits for itself (Porter, 1985).

Crowdcasting – Broadcasting a problem to the widest possible audience in the blind hope that someone, somewhere will come up with a solution (Howe, 2008 p. 147).

Crowdsourcing – Jeff Howe, who coined the term in an article in Wired in 2006, defined it as "the act of taking a job traditionally performed by a designated agent (usually an employee) and outsourcing it to an undefined, generally large group of people in the form of an open call".

Democratizing Industry – An economy of the people, by the people, and for the people (Libert & Spector, 2007).

Democratizing Innovation – User centered innovation. Innovating users – both individuals and firms – often freely share their innovations with others, creating user-innovation communities and a rich intellectual commons (von Hippel, 2005).

Innovation – A new way of doing something. It may refer to incremental and emergent or radical and revolutionary changes in thinking, products, processes, or organizations (Innovation, 2009).

Intellectual property (IP) - A number of distinct types of legal monopolies over creations of the mind, both artistic and commercial, and the corresponding fields of law. Under intellectual property law, owners are granted certain exclusive rights to a variety of intangible assets, such as musical, literary, and artistic works; discoveries and inventions; and words, phrases, symbols, and designs. Common types of intellectual property include copyrights, trademarks, patents, industrial design rights and trade secrets in some jurisdictions (Intellectual Property, 2009).

Marketing – Consists in coordination of four elements called 4P's: (1) identification, selection, and development of a **product**, (2) determination of its **price**, (3) selection of a

distribution channel to reach the customer's **place**, and (4) development and

implementation of a **promotional** strategy (Marketing, 2009).

Open Innovation – Valuable ideas can come from inside or outside the organization and can go

to market from inside or outside the organization (Chesbrough, 2003).

Professional – Professional Person formally certified by a professional body of belonging to a

specific profession by virtue of having completed a required course of studies and/or practice.

And whose competence can usually be measured against an established set of standards

(Professional, 2009).

Systematic Innovation – Consists in the purposeful and organized search for changes, and in the

systematic analysis of the opportunities such changes might offer for economic or social

innovation (Drucker, 1985 p. 35).

Research Parameters

This section provides the methods deployed to address the primary research question, as well as guiding questions. It outlines the search strategy, search terms, databases, and search results used to for exploration to identify and evaluate relevant literature for review. Included are details on how the search was conducted and documented, evaluation criteria used to select sources and references, and full details about the data analysis and writing plans that explain how information is identified, organized and presented in this study.

Research Questions

Main question. The main question driving the research for this literature review is: How should an organization apply two forms of collective intelligence (open innovation (Chesbrough, 2003) and crowdsourcing (Howe, 2008)) to maintain or create a competitive advantage?

Sub-questions. A set of sub-questions has been developed to amplify the main question; sub questions support the two larger areas of focus, either external knowledge or competitive advantage. Questions that address the use of external knowledge and factors an organization should consider are listed in this section.

- What factors should an organization consider when using the concepts of Open Innovation (Chesbrough, 2003)?

- How can an organization leverage Crowdsourcing to create a competitive advantage (Howe, 2008)?

The questions in this section focus on different competitive advantage strategies an organization can develop related to external knowledge. These questions are important to the

main question because they create a framework for innovation and how to employ external

knowledge in that strategy.

- How can organizations approach innovation problems by using collective intelligence?

  (Johansson, 2006)?

- What innovation strategies should an organization consider when focusing on creating a

  competitive advantage (Drucker, 1985; Kim & Mauborgne, 2005)?

Search Strategy

Several search engines and local libraries have been explored to search for relevant

literature. The literature is collected primarily through journals and published books. Journals

and books are accessed to examine current trends and concepts. Journals are accessed to address

scholar research, history, and recognized works.

The research for this literature review focuses on four areas (a) definitions and

applications of collective intelligence, (b) crowdsourcing, (c) open innovation, and (d) creation

of competitive advantage.

The initial search for literature is grouped in the following manner by types of sources:

peer reviewed scientific research, government publications, vendor publications, and journalist

pieces. The preliminary goal is to establish where the general thinking is on the issue and where

the most applicable sources of information might be.

Literature is obtained from multiple sources; primarily books, journals, and articles using

keyword searches. Each keyword search is created using a spider diagram (Hewitt, 1998, p. 17).

Each source is evaluated against specific criteria, such as peer reviews to ensure it is relevance

and quality (p. 21). Relevance is determined by assessing the relationship to topics that answer

the main question and sub-questions. Quality is determined by assessing whether or not the

reference is peer reviewed and by conducting a detailed material review for organization,

content, and accuracy of information presented.

A spider diagram (Hewitt, 1998) (see Figure 2 below) is used to identify the search terms

to locate literature related to the main question and sub-questions. Search terms include:

- Innovation

- Innovate

- Information Technology

- Creating an innovative

  environment

- Measuring Innovation

- Innovative Organizations

- Competitive Advantage

- Competitive Innovation

- Innovation Competencies

- Innovative Strategy

- Open Innovation

- Crowdsourcing

- External Knowledge

- Collective Intelligence

Broader Terms
Create
New

Narrower Terms
Innovate
Crowdsourcing

Narrower Terms
Competitive
Product
Development

Broader Terms
Competition

Innovation

Similar Terms
Improvement
Advance

**Competitive
Advantage**

Related Terms
Competitive
Innovation
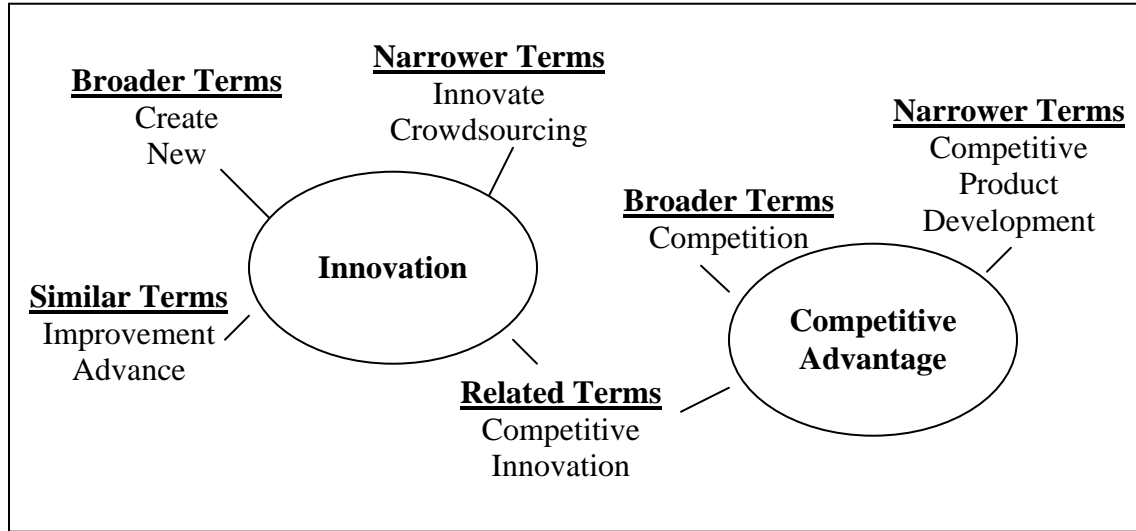
Figure 2: Example Spider Diagram (Hewitt, 1998)

The search report is provided in Figure 3, below.

Search Db	Keywords	Quantity	Quality	Types
Google	Creating an innovative environment case studies	2,420,000	Excellent	Blogs, articles, books, and journals
Google	Creating an innovative environment	15,700,000	Excellent	Blogs, articles, books, and journals
Google	Innovation Competencies	2,910,000	Fair	Blogs, articles, books, and journals
Google Scholar	Measuring Innovation	951,000	Good	Blogs, articles, books, and journals
Dogpile	Measuring Innovation	No Count (4 pages of links)	Good	Sponsored links, articles, books, blogs, and journals

Business Source Premier	Innovative Organizations	3,140	Good	Need to refine the search
JSTOR	Innovative Organizations	781	Excellent	Need to refine the search
UO Libraries	Crowdsourcing	122	Excellent	Provided many relevant articles
Nike Library	Innovation	1,270	Excellent	Books, magazines, case studies, journals

Figure 3: Search Report

Evaluation Criteria

The literature selected for this review is collected from a variety of sources. Literature is primarily collected using keyword searches from online indices and local libraries. The majority of sources are drawn from EBSCO, Business Source Premier, Google Scholar and local libraries.

Results are not restricted prior to conducting keyword searches on the various indices. However, results identified as relevant are published on or after 1997. This ensures results with currency for key themes. Eliminating dated information is important since this literature review is intended to convey themes associate to current use of collective intelligence to create a competitive advantage.

The results within each index are examined to identify whether or not the inclusion of information within the results will be valuable to the intended audience for this review. Abstracts are reviewed for titles that deem relevant to the main question. In the event that no

results with relevant titles are included in the first few pages of results, the keywords are revised and the search continues with revisions.

After identifying resources in which content is relevant to this study's audience, the credibility of each resource is evaluated to ensure the quality of the source is appropriate for this academic literature review (Hewitt, 1998). Sources written by academics or experts where peer reviews are completed are given preference.

Credibility of sources is evaluated based on the inclusion of citations or a bibliography. Where there is not a bibliography, peer-reviews and author searches are conducted to evaluate the credibility of the source. Peer-reviewed sources are those that have been assessed by experts within the industry for which the source is targeted (*Peer review*, n.d.).

Data Analysis Plan

This literature review uses the eight coding steps for conceptual and relational content analysis as described by Busch, et al. (2005) at the Colorado State University Writing Lab. The analysis identifies meanings and relationships through key word counts, terms, and themes. As the analysis unfolds, the steps guide the process for reviewing the literature that supports this study. Details relevant to this study are provided below.

1. **Level of analysis**: Words and phrases are coded.

2. **Pre-defined concepts and categories**: Only selective words and phrases relative to the main concepts of the study are coded. These words and phrases may evolve through the literature review and are modified based on significance.   The initial set of concepts includes: definitions and applications of (a) collective intelligence through (b) crowdsourcing and (c) open innovation, and (d) creation of competitive advantage.

3. **Existence of a concept**: Existence of a topic is of greater importance to this study than the number of times it is coded.

4. **Level of generalization**: Terms that pertain to similar concepts and categories are recorded as the same. For example "innovation" and "innovate" are treated as the same category. Whereas, similar terms that pertain to different concepts are coded as separate and distinctive categories. For example, "competition" and "competitive advantage".

5. **Translation rules**: Translation rules are used to ensure consistent and coherent coding of terms and phrases. Translation rules guide the process of coding across all forms of literature in this study. For example, "competitive performance" is coded under "competitive advantage" throughout the literature reviewed.

6. **Irrelevant information**: Content that is initially considered to be unrelated to this study is examined. If it is determined to be relevant, the coding scheme is modified.

7. **Code the texts**: All literature in this study is coded and reviewed manually. Online literature uses automated word/phrase counts, which are manually reviewed for accuracy. Offline literature, such as books are manually coded. All analysis coded is tracked using a Microsoft Excel spreadsheet to track terms and phrases.

8. **Analyze results**: Cognitive mapping is used on coded literature to connect relationships and identify patterns across the literature over time as it relates to the coded concepts, themes, and terms (Palmquist, Carley, & Dale, 1997).

Writing Plan

Information regarding the use of collective intelligence through crowdsourcing and open innovation to create a competitive advantage are derived from resources that are relevant to this review. Relevance is based on the conceptual analysis process, described above in the

Data Analysis Plan section of this study. Key factors are grouped based on the coding

exercise and cognitive mapping to present a thematic schema broken down into two main

sections related to (a) definitions and applications of collective knowledge through

crowdsourcing (Howe, 2008) and open innovation (Chesbrough, 2003), and (b) creation of

competitive advantage.

Subsections are identified and further grouped based on key themes. Sub-questions

identified for this study will guide the grouping of key themes under the two main themes. As

themes emerge and patterns are identified throughout the study they are organized into

subsections (Leedy & Ormrod, 2005).

A preliminary review of the literature has presented five potential themes, relevant to

the main research question. The themes deal with the use of collective intelligence as an input

into innovation and the relationship of innovation to create a competitive advantage. The

themes may evolve and adjust throughout the course of this study based on analysis. A

preview to the potential themes is presented below:

1. Emergence of collective intelligence and its application to a competitive advantage

    (Malone, T. W., Laubacher, R. & Dellarocas, C. N., 2009)

2. Factors an organization should consider when using the concepts of Open

    Innovation (Chesbrough, 2003)

3. Leveraging Crowdsourcing to create a competitive advantage (Howe, 2008)

4. Solutions to innovation problems by using collective knowledge (Johansson, 2006)

5. Innovation strategies an organization should consider when creating a competitive

    advantage (Drucker, 1985; Kim & Mauborgne, 2005).

Annotated Bibliography

All references selected for use in this study are evaluated and those that are found to be most significant to the use of crowdsourcing and open innovation in pursuit of a competitive advantage are selected for presentation in this section of the document. This annotated bibliography, consisting of 21 entries, provides citations for the literature that encompass the core data set used for content analysis. Each annotation includes a summary of content in the form of an abstract derived from the reference, an assessment of credibility according to a set of evaluation criteria defined in the Research Parameters section of this study, and a reflection about its relevancy to this study (Stacks & Karper, 2008).

Anthony, S. D., Johnson, M. W., Sinfield, J. V., & Altman, E. J. (2008). *Innovator's guide to growth: Putting disruptive innovation to work*. Boston, MA: Harvard Business School Press.

Abstract. More than a decade ago, Clayton Christensen's breakthrough book The Innovator's Dilemma illustrated how disruptive innovations drive industry transformation and market creation. Christensen's research demonstrated how growth-seeking incumbents must develop the capability to deflect disruptive attacks and seize disruptive opportunities. In The Innovator's Guide to Growth, Scott Anthony, Mark Johnson, Joseph Sinfield, and Elizabeth Altman take the subject to the next level: implementation. The authors explain how to create this crucial capability for unlocking disruption's transformational power. With a foreword by Christensen, this book provides a set of market-proven tools and approaches to innovation that have been honed through fieldwork with innovative companies like Procter & Gamble, Johnson

& Johnson, Pepsi, Intel, Motorola, SAP, and Cisco Systems. The book shows you how to: Follow a market-proven process -- so your company can reliably create blockbuster businesses; Create structures, systems, and metrics -- so the disruptive innovations that will power your firm's future growth receive the funding and personnel needed to succeed; Create a common language of disruptive innovation -- so managers can reach consensus around counterintuitive courses of action Incisive and practical, this book helps your company take the steps necessary to benefit from disruption -- instead of being eclipsed by it.

Comments: This book establishes the connection between innovation and growth. The connection helps to bridge innovation to competitive advantage through growth and market share. The resource is considered credible in that the book is provides extensive bibliographic information and the main authors have written other peer reviewed articles on the subject of innovation.

Brown, J. S., Duguid, P., and Duguid, P. (2000). *The Social Life of Information*. Harvard Business School Press.

Abstract: Drawing from recent research and practical examples across a range of organizations, The Social Life of Information dispels many of the futurists' sweeping predictions that information technology will obliterate the need for everything from travel to supermarkets to business organizations to social life itself. The authors examine the potential and limitations of technology with regard to intelligent software agents, the automated home office, business reorganization for innovation, knowledge management and work practices, the paperless society, and the digital university. Arguing eloquently for the important role human sociability plays in the world of bits,

Brown and Duguid present an optimistic look beyond the simplicities of information

and individuals. They show how a better understanding of the contribution that

communities, organizations, and institutions make to learning, knowledge, and

judgment can lead to the richest possible use of technology in our work and everyday

lives

Comments: This book links to the larger context of information management and

social networks. It develops the framework for where information management and

knowledge were trending in the early part of the decade. This book is written by

credible authors: John Seely Brown was the Chief Scientist of Xerox Corporation until

April 2002 and was also the director of the Xerox Palo Alto Research Center (PARC)

until June 2000—a position he held for twelve years. Paul Duguid is adjunct professor

at the School of Information Management and Systems (SIMS) at the University of

California, Berkeley, professorial research fellow at Queen Mary, University of

London and senior research fellow at the Center for Science, Technology, Society at

Santa Clara University. He is also an honorary fellow of the Institute for

Entrepreneurship and Enterprise Development at Lancaster University School of

Management.

Chesbrough, H. (2003). *Open innovation, the new imperative for creating and profiting from*

technology. Harvard Business School Press.

Abstract. In today's information-rich environment, companies can no longer afford to

rely entirely on their own ideas to advance their business, nor can they restrict their

innovations to a single path to market. As a result, says Harvard Business School

professor Henry W. Chesbrough, the traditional model for innovation--which has been

largely internally focused, closed off from outside ideas and technologies--is becoming

obsolete. Emerging in its place is a new paradigm, "open innovation," which strategically leverages internal and external sources of ideas and takes them to market through multiple paths. This path-breaking analysis is based on extensive field research, academic study, and the author's own longtime experience working in Silicon Valley. Through rich descriptions of the innovation processes of Xerox, IBM, Lucent, Intel, Merck, and Millennium, and the many spin-offs that have emerged from these firms, Open Innovation shows how companies can use their business model to identify a more enlightened role for R&D in a world of abundant information, better manage and access intellectual property, advance their current business, and grow their future business. Arguing that companies in all industries must transform the way they commercialize knowledge, Chesbrough convincingly shows how open innovation can unlock the latent economic value in a company's ideas and technologies. *Comments*: This book supports the premise of this literature review, which .links the use of external knowledge (or collective intelligence) to innovation and growth. Chesbrough has written several industry related articles, journals, and books on the subject of open innovation. This book is supported by an extensive bibliography. Henry W. Chesbrough is an Assistant Professor and the Class of 1961 Fellow at Harvard Business School.

Drucker, P. F. (1985). *Innovation and Entrepreneurship*: *Practice and Principles*. New York: Harper and Row.

Abstract. The first book to present innovation and entrepreneurship as purposeful and systematic discipline which explains and analyzes the challenges and opportunities of America's new entrepreneurial economy. A superbly practical book that explains what

established businesses, public survey institutions, and new ventures have to know,

have to learn, and have to do in today's economy and marketplace.

Comments: This book establishes innovation as a practice and a discipline within

organizations. While this book is older than many others in this literary review, written

in 1985, it is referenced throughout many other works on the subject. The late Peter

Drucker is often referred to as the pioneer on the subject of business and innovation

and published books starting in 1939.

Howe, J. (2008). *Crowdsourcing: Why the power of the crowd is driving the future of*

business. New York, NY: Crown Business.

Abstract. Howe reveals that the crowd is more than wise, it's talented, creative, and

stunningly productive. Crowdsourcing activates the transformative power of today's

technology, liberating the latent potential within us all. It's a perfect meritocracy,

where age, gender, race, education, and job history no longer matter; the quality of

work is all that counts; and every field is open to people of every imaginable

background. If you can perform the service, design the product, or solve the problem,

you've got the job. But crowdsourcing has also triggered a dramatic shift in the way

work is organized, talent is employed, research is conducted, and products are made

and marketed. As the crowd comes to supplant traditional forms of labor, pain and

disruption are inevitable. Jeff Howe delves into both the positive and negative

consequences of this intriguing phenomenon. Through extensive reporting from the

front lines of this revolution, he employs a brilliant array of stories to look at the

economic, cultural, business, and political implications of crowdsourcing. How were a

bunch of part-time dabblers in finance able to help an investment company consistently

beat the market? Why does Procter & Gamble repeatedly call on enthusiastic amateurs to solve scientific and technical challenges? How can companies as diverse as iStockphoto and Threadless employ just a handful of people, yet generate millions of dollars in revenue every year? The answers lie within these pages. The blueprint for crowdsourcing originated from a handful of computer programmers who showed that a community of like-minded peers could create better products than a corporate behemoth like Microsoft. Jeff Howe tracks the amazing migration of this new model of production, showing the potential of the Internet to create human networks that can divvy up and make quick work of otherwise overwhelming tasks. One of the most intriguing ideas of _Crowdsourcing_ is that the knowledge to solve intractable problems—a cure for cancer, for instance—may already exist within the warp and weave of this infinite and, as yet, largely untapped resource. But first, Howe proposes, we need to banish preconceived notions of how such problems are solved. The very concept of crowdsourcing stands at odds with centuries of practice. Yet, for the digital natives soon to enter the workforce, the technologies and principles behind crowdsourcing are perfectly intuitive. This generation collaborates, shares, remixes, and creates with a fluency and ease the rest of us can hardly understand. Crowdsourcing, just now starting to emerge, will in a short time simply be the way things are done.

Comments: This book supports the premise for this literature review, which links the concepts of using collective intelligence and external knowledge outside the organization to innovation. This book is chosen for its impact on the subject of collective intelligence and its relevance to crowdsourcing. Jeff Howe is a contributing editor at Wired Magazine and has written other articles on the subject.

Jenkins, H. (2004). The cultural logic of media convergence. *International Journal of Cultural Studies*, 7(1):33-43. Retrieved from:

http://eng1131adaptations.pbworks.com/f/Jenkins,+Henry++-+The+Cultural+Logic+of+Media+Convergence.pdf

Abstract: Responding to the contradictory nature of our current moment of media change, this article will sketch a theory of media convergence that allows us to identify major sites of tension and transition shaping the media environment for the coming decade. Media convergence is more than simply a technological shift. Convergence alters the relationship between existing technologies, industries, markets, genres and audiences.

Comments: While this article focuses on media convergence, it also discusses the culture and shift to collective intelligence and information gathering and processing activities that have emerged within a web community. The article is well supported by references and the author is the director of the comparative media studies program and holds the John E. Burchards chair in the humanities at MIT.

Johansson, F. (2006). *The Medici effect, what elephants & epidemics can teach us about innovation.* Harvard Business School Press.

Abstract. Frans Johansson argues that breakthrough ideas most often occur when we bring concepts from one field into new, unfamiliar territory. In this space which Johansson calls "the Intersection" established ideas clash and combine with insights from other fields, disciplines, and cultures, resulting in an explosion of totally new ideas.

The Medici Effect, referring to a remarkable burst of creativity in Florence during the Renaissance, shows us how to get to the Intersection and how we can turn the ideas we discover there into pathbreaking innovations. From the insight that created the first Cherokee written language to the ideas that enabled scientists to read the mind of a monkey The Medici Effect is filled with vivid stories of intersections across domains as diverse as business, science, art, and politics.

Johansson reveals the core principles including breaking down associative barriers, routinely combining unlike concepts, and executing past your failures that can enable individuals, teams, and entire organizations to create their own Medici effects in any arena of work and life.

Comments: This book develops the link between innovation and insights from different points of view. The use of collective intelligence is bridged by this fact and those intersections are where solutions to issues are created, which is key to the concepts presented in this research. The author of this book has been a previous CEO of a software firm and has business development expertise.

Johnson, S. (2006). *The ghost map*. New York, NY. Riverhead Hardcover.

Abstract: The Ghost Map takes place in the summer of 1854. A devastating cholera outbreak seizes London just as it is emerging as a modern city: more than two million people packed into a ten-mile circumference, a hub of travel and commerce, teeming with people from all over the world, continually pushing the limits of infrastructure that's outdated as soon as it's updated. Dr. John Snow — whose ideas about contagion had been dismissed by the scientific community — is spurred to intense action when

the people in his neighborhood begin dying. With enthralling suspense, Johnson

chronicles Snow's day-by-day efforts, as he risks his own life to prove how the

epidemic is being spread. When he creates the map that traces the pattern of outbreak

back to its source, Dr. Snow didn't just solve the most pressing medical riddle of his

time. He ultimately established a precedent for the way modern city-dwellers, city

planners, physicians, and public officials think about the spread of disease and the

development of the modern urban environment.

Comments: This book adds another dimension to this literature review. It links

patterns from a historical perspective that influence the disaggregation of people and

urban environments, impacting the way we do work. It also links to innovation

through associative barriers and innovative solutions to problems by focusing on

patterns. Democratizing Innovation speaks to the future of how we work and live

based on historical events. The author, Steven Johnson's books focus on the

http://www.stevenberlinjohnson.com/intersection of science, technology and personal

experience. His writings have influenced everything from the way political campaigns

use the Internet, to cutting-edge ideas in urban planning, to the battle against 21st-

century terrorism.

Kaplan, R. S. & Norton, D. P. (2008), *The execution premium: Linking strategy to operations*

for competitive advantage. Harvard Business School Publishing.

Abstract. In a world of accelerating competition, business strategy is more crucial than

ever. Yet most organizations struggle in this area--not with formulating strategy but

with executing it, or putting their strategy into action. Owing to execution failures,

companies realize just a fraction of the financial performance promised in their

strategic plans. It doesn't have to be that way, maintain Robert Kaplan and David

Norton in The Execution Premium. Building on their breakthrough works on strategy-

focused organizations, the authors describe a multi-stage system that enables you to

gain measurable benefits from your carefully formulated business strategy.

Comments: This book establishes the concepts of competitive advantage and provides

a link between innovation and competitive advantage. This book is determined to be

credible based on the fact that Robert Kaplan is a Baker Foundation Professor at

Harvard Business School and David Norton is the founder of Balanced Scorecard and

a director in a consultant organization.

Kim, C. W. & Mauborgne, R. (2005). *Blue ocean strategy: How to create uncontested market*

space and make competition irrelevant. Boston, MA. Harvard Business School Press.

Abstract. Winning by not competing: a fresh approach to strategy. Since the dawn of

the industrial age, companies have engaged in head-to-head competition in search of

sustained, profitable growth. They have fought for competitive advantage, battled over

market share, and struggled for differentiation. Yet these hallmarks of competitive

strategy are not the way to create profitable growth in the future. In a book that

challenges everything you thought you knew about the requirements for strategic

success, W. Chan Kim and Renée Mauborgne argue that cutthroat competition results

in nothing but a bloody red ocean of rivals fighting over a shrinking profit pool. Based

on a study of 150 strategic moves spanning more than a hundred years and thirty

industries, the authors argue that lasting success comes not from battling competitors,

but from creating "blue oceans": untapped new market spaces ripe for growth. Such

strategic moves—which the authors call "value innovation"—create powerful leaps in

value that often render rivals obsolete for more than a decade. Blue Ocean Strategy

presents a systematic approach to making the competition irrelevant and outlines

principles and tools any company can use to create and capture blue oceans. A

landmark work that upends traditional thinking about strategy, this book charts a bold

new path to winning the future.

Comments: This book focuses on competitive advantage and strategies to develop

uncontested markets where competition is irrelevant. It links the concept of

competitive strategy to innovation through "value innovation". The book is supported

by a thorough bibliography and the authors are professors for strategy and management

at INSEAD.

Koulopoloulos, T. M. (2009). *The innovation zone: How great companies re-innovate for*

amazing success. Mountain View, CA. Nicholas Brealey Publishing

Abstract: Innovation has become a mantra for organizations facing unprecedented

market pressures and worldwide competition. But can it be taught or developed as a

core competency? Are there rules for turning great ideas into breakthrough innovations

that alter behavior and culture, change the company-customer relationship, and carve

out a path to global business success? Profiling dozens of today's most innovative

organizations, The Innovation Zone delivers a new play-book for creating a structured

business model of innovation that focuses on process, not products, to generate

sustainable value and competitive dominance.

Comments: This book establishes the link between innovation and competitive

dominance. This book provides information relevant to the foundation of this

literature review. The author is the founder and president of the Boston based Delphi Group. He was previously the executive director for the Center for Innovation at Babson College and managing director at Perot Systems Innovation laboratory.

Libert, B. and Spector, J. (2007). *We are smarter than me: How to unleash the power of crowds in your business*. Upper Saddle River, NJ. Wharton School Publishing.

Abstract: Emerging social networks will rewrite the rules of business. You've heard that in leading-edge books like Wikinomics and Naked Conversations. Now, discover exactly how to use social networking and community in your business, driving better decision-making and greater profitability. We Are Smarter Than Me is itself the product of an extraordinary collaboration of Wharton, MIT and thousands of business innovators, worldwide. Drawing on their collective "in the trenches" experience, the wearesmarter.org community reveals what works, and what doesn't, when you are building community into your decision making and business processes. They share powerful insights and new case studies from product development, manufacturing, marketing, customer service, finance, management, and beyond, along with rules for effective community building. You'll learn which business functions can best be accomplished or supported by communities; how to provide effective moderation, balance structure with independence, manage risk, define success, implement effective metrics, and much more. From tools and processes to culture and leadership, We Are Smarter Than Me will help you transform the promise of social networking into profitable reality.

Comments: This book establishes the concept of crowdsourcing by implementing the theory into practice. This book was entirely written by collective intelligence using the wisdom of crowds to contribute to the writing. The main authors are Barry Libert, who is recognized as an industry leader and visionary within the social technology space. He has published four books on the value of social networks and human interaction. He is a regularly featured keynote speaker and has delivered speeches to audiences of 20,000+ globally. Jon Spector who is President and CEO of The Conference Board, the world's preeminent business membership and research organization. Prior to joining the Conference Board, Jon was the Vice Dean and Director of Wharton's Aresty Institute of Executive Education. Previously, he was CEO of several venture-backed startup companies. Spector also enjoyed a 20-year career at McKinsey & Company, where he was named a principal in 1986 and a director in 1992. At McKinsey, he consulted on issues of strategy, organization, and operations with the senior management of leading companies in the information technology and communications industries.

Lykourentzou, I., Vergados, D. J., & Loumos, V. 2009. Collective intelligence system engineering. In *Proceedings of the international Conference on Management of Emergent Digital Ecosystems* (France, October 27 - 30, 2009). MEDES '09. ACM, New York, NY, 134-140. DOI= http://doi.acm.org/10.1145/1643823.1643848

Abstract: Collective intelligence (CI) is an emerging research field which aims at combining human and machine intelligence, to improve community processes usually performed by large groups. CI systems may be collaborative, like Wikipedia, or competitive, like a number of recently established problem-solving companies that

attempt to find solutions to difficult R&D or marketing problems drawing on the

competition among web users. The benefits that CI systems earn user communities,

combined with the fact that they share a number of basic common characteristics, open

up the prospect for the design of a general methodology that will allow the efficient

development and evaluation of CI. In the present work, an attempt is made to establish

the analytical foundations and main challenges for the design and construction of a

generic collective intelligence system. First, collective intelligence systems are

categorized into active and passive and specific examples of each category are

provided. Then, the basic modeling framework of CI systems is described. This

includes concepts such as the set of possible user actions, the CI system state and the

individual and community objectives. Additional functions, which estimate the

expected user actions, the future state of the system, as well as the level of objective

fulfillment, are also established. In addition, certain key issues that need to be

considered prior to system launch are also described. The proposed framework is

expected to promote efficient CI design, so that the benefit gained by the community

and the individuals through the use of CI systems, will be maximized.

Comments: This research article on collective intelligence is foundational to this

literature review. The information presented is current and provides the frameworks

for collective intelligence. It leads to the design of a CI system where benefits are

gained. This article is well supported by references from other well known authors of

collective intelligence and crowdsourcing. The authors have authored and co-authored

several technology based articles, published in ACM.

Malone, T. W., Laubacher, R. & Dellarocas, C. N., (2009) *Harnessing crowds: Mapping the genome of collective intelligence* (Report No. 4732-09). MIT Sloan Research available at SSRN: http://ssrn.com/abstract=1381502

Abstract. Over the past decade, the rise of the Internet has enabled the emergence of surprising new forms of collective intelligence. Examples include Google, Wikipedia, Threadless, and many others. To take advantage of the possibilities these new systems represent, it is necessary to go beyond just seeing them as a fuzzy collection of "cool" ideas. What is needed is a deeper understanding of how these systems work. This article offers a new framework to help provide that understanding. It identifies the underlying building blocks - to use a biological metaphor, the "genes" - at the heart of collective intelligence systems. These genes are defined by the answers to two pairs of key questions:

- Who is performing the task? Why are they doing it?

- What is being accomplished? How is it being done?

The paper goes on to list the genes of collective intelligence - the possible answers to these key questions - and shows how combinations of genes comprise a "genome" that characterizes each collective intelligence system. In addition, the paper describes the conditions under which each gene is useful and the possibilities for combining and re-combining these genes to harness crowds effectively. Using this framework, managers can systematically consider many possible combinations of genes as they seek to develop new collective intelligence systems.

Comments: This report focuses on collective intelligence and the underlying basis for why it exists. This research provides an understanding of crowdsourcing and looks at

ways to use it effectively. The authors have written several books and numerous peer

reviewed journals on the subjects of technology, innovation, and social networking.

Menon, T., & Pfeffer, J. (2003). Valuing internal vs. external knowledge: Explaining the

preference for outsiders. *Management Science*, *49*(4), 497-513. Retrieved from

Business Source Premier database. Link:

http://search.ebscohost.com.libproxy.uoregon.edu/login.aspx?direct=true&db=buh&A

N=9695074&loginpage=Login.asp&site=ehost-live&scope=site

Abstract. This paper compares how managers value knowledge from internal and

external sources. Although many theories account for favoritism toward insiders, we

find that preferences for knowledge obtained from outsiders are also prevalent. Two

complementary case studies and survey data from managers demonstrate the

phenomenon of valuing external knowledge more highly than internal knowledge and

reveal some mechanisms through which this process occurs. We found evidence that

the preference for outsider knowledge is the result of managerial responses to (1) the

contrasting status implications of learning from internal versus external competitors,

and (2) the availability of scarcity of knowledge--internal knowledge is more readily

available and hence subject to greater scrutiny, while external knowledge is more

scarce, which makes it appear more special and unique. We conclude by considering

some consequences of the external knowledge preference for organizational

functioning.

Comments: This paper compares how managers value knowledge from internal and

external sources. It links differing points of view and prevailing preferences for

internal versus internal knowledge. This article provides consequences to using

external knowledge. The authors have published several books on the subject of internal and external resources, management practices, and the human element in business.

O'Conner, K. & Brown, P. B. (2003). *The map of innovation, creating something out of nothing.* New York, NY. Crown Publishing Group.

Abstract. The Map of Innovation is O'Connor's step-by-step approach to devising lucrative new products and services and bringing them to market, through a process that has proven itself time and again in many different industries.

Too often, people trying to innovate focus on things that don't matter or waste their time trying to find answers to questions that can't be answered. O'Connor shows why the map of innovation centers on getting right the five make-or-break fundamentals: creating a large number of viable ideas; picking the right idea to pursue; creating a highly focused strategy to bring the idea to market; getting the money to fund the strategy; and hiring the best people.

Comments: This book establishes a framework for innovation that is repeatable. It links innovation and competitive advantage through five fundamentals. Kevin O'Conner is chairman of a company that focuses on innovation and he is on the board of several public and private companies.

Peters, T. (1997). *The circle of innovation, you can't shrink yourself to greatness*. Excel, A California Partnership.

Abstract. In 1982, business guru Tom Peters co-authored In Search of Excellence, one of the most influential business guides of all time. More recently, through 400 seminars in 47 states and 22 countries, Peters reexamined, refined and reinvented his views on innovation--the #1 survival strategy, he asserts, for businesses of the next millennium. The Circle of Innovation brings these seminars--and Peters' contagious passion--to the reader in a landmark book. Through bold graphics, astounding facts and figures, and quotes whose sources range from Émile Zola to Steve Jobs, Peters blows the lid off accepted management styles. Here is a book that will open your eyes to new ways of envisioning the challenges of today's world. Here, too, is a practical guide that will teach you how to:

- reverse the rising tide of product and service "commoditization" and foster uniqueness

- capitalize on the skyrocketing purchasing power of women

- convert sluggish staff into vital centers of intellectual capital accumulation

- build systems of elegance and beauty

- liberate your creativity and individual leadership style

Comments: This book links innovation and competitive advantage. It is the culmination of the experience that Tom Peters has gained over the years and his interactions with countless executives and organizations through his seminars. This book links innovation and competitive advantage. Tom Peters is the author of many books surrounding the subjects of innovation and competitive advantage. He is also the founder of Tom Peters Group, which has more than 60 organizations throughout the world as customers.

Porter, M. E. (1985). *Competitive advantage: creating and sustaining superior performance.*
New York: Free Press.

Abstract. Michael E. Porter's Competitive Advantage explores the underpinnings of competitive advantage in the individual firm. Competitive Advantage introduces a whole new way of understanding what a firm does. Porter's groundbreaking concept of the value chain disaggregates a company into "activities," or the discrete functions or processes that represent the elemental building blocks of competitive advantage. Competitive Advantage takes strategy from broad vision to an internally consistent configuration of activities. Its powerful framework provides the tools to understand the drivers of cost and a company's relative cost position. Porter's value chain enables managers to isolate the underlying sources of buyer value that will command a premium price, and the reasons why one producer service substitutes for another. He shows how competitive advantage lies not only in activities themselves but in the way activities relate to each other, to supplier activities, and to customer activities. Competitive Advantage also provides for the first time the tools to strategically segment an industry and rigorously assess the competitive logic of diversification. That the phrases "competitive advantage" and "sustainable competitive advantage" have become commonplace is testimony to the power of Porter's ideas. Competitive Advantage has guided countless companies, business school students, and scholars in understanding the roots of competition. Porter's work captures the extraordinary complexity of competition in a way that makes strategy both concrete and actionable.

Comments: This book is foundation to the research for this literature review. It provides the underlying factors of a competitive advantage. While this book is older in

comparison to the majority of literature in this review, it is often the basis and

reference point for books and journals on the subject of competitive advantage.

Michael Porter is a leading authority on the subject of competition and international

competitiveness. He was also the C. Roland Chirstensen Professor of Business

Administration at Harvard Business School.

Schrage, M. (2000). *Serious play, how the worlds best companies simulate to innovate.*

Boston, MA. Harvard Business School Press.

Abstract. Recall the old saying about all work and no play making Jack a dull boy

World-class companies today need play--serious play--if they want to make truly

innovative products, argues Michael Schrage, an MIT Media Lab fellow and Fortune

magazine columnist. In Serious Play he writes, "When talented innovators innovate,

you don't listen to the specs they quote. You look at the models they've created."

Whether it's a spreadsheet that tests a new financial model or a foam prototype of a

calculator, what interests Schrage is not the model itself, but the behavior that play--be

it modeling, prototyping, or simulation--inspires. Schrage examines the approaches to

successful prototyping at companies such as AT&T, Boeing, Microsoft, and

DaimlerChrysler and describes the kind of culture that's needed for encouraging

innovation. In the last chapter, he lays out the 10 rules of serious play, including: Be

willing to fail early and often; know when the costs outweigh the benefits; know who

wins and who loses from an innovation; build a prototype that engages customers,

vendors, and colleagues; create markets around prototypes; and simulate the customer

experience. Well-written and inspiring, Serious Play, is a first-rate user's guide for

managers, project leaders, and other innovators. He examines prototyping failures as

rigorously as he explains prototyping successes. The essential message of Serious Play

is that tomorrow's innovations will increasingly be the byproduct of how companies

and their customers behave-and misbehave-around this new generation of models,

prototypes, and simulations. The distinction between serious play and serious work

dissolves as technology gives innovators ever-increasing opportunities to simulate and

prototype their ideas.

Comments: This book establishes a method for creating innovation. It does not

directly link to collective intelligence, but does link innovation to competitive

advantage. The author is a research associate at the MIT Media Lab, a Merrill Lynch

Forum Innovation Fellow, and a columnist for Fortune Magazine.

Staff, n.d. (2008). Following the crowd. *Economist*, *388*(8596), 10-11. Retrieved from

Religion and Philosophy Collection database. Link:

http://search.ebscohost.com.libproxy.uoregon.edu/login.aspx?direct=true&db=rlh&AN

=34226685&loginpage=Login.asp&site=ehost-live&scope=site

Abstract. The article discusses the increase in the use of crowdsourcing through the

Internet. Details about crowdsourcing, which is the act of having a large, undefined

group of people contribute ideas, by political groups or technology companies are

provided. The use of the crowdsourcing by web sites such as Wikipedia and Google is

also explored.

Comments: This article focuses on crowdsourcing and supports the findings of other

books in this literature review. The author is listed only as "staff", as is the case in

many of the articles in the Economist. The source is aligned with other works in this

field and provides supporting detail. The Economist is a well known publication and has published many articles on the subject of innovation, and collective intelligence.

von Hippel, E. (2005). *Democratizing innovation*. The MIT Press. Retrieved from:

http://web.mit.edu/evhippel/www/democ1.htm

Abstract: Innovation is rapidly becoming democratized. Users, aided by improvements in computer and communications technology, increasingly can develop their own new products and services. These innovating users -- both individuals and firms -- often freely share their innovations with others, creating user-innovation communities and a rich intellectual commons. In Democratizing Innovation, Eric von Hippel looks closely at this emerging system of user-centered innovation. He explains why and when users find it profitable to develop new products and services for themselves, and why it often pays users to reveal their innovations freely for the use of all. The trend toward democratized innovation can be seen in software and information products -- most notably in the free and open-source software movement -- but also in physical products. Von Hippel's many examples of user innovation in action range from surgical equipment to surfboards to software security features. He shows that product and service development is concentrated among "lead users," who are ahead on marketplace trends and whose innovations are often commercially attractive. Von Hippel argues that manufacturers should redesign their innovation processes and that they should systematically seek out innovations developed by users. He points to businesses -- the custom semiconductor industry is one example -- that have learned to assist user-innovators by providing them with toolkits for developing new products.

User innovation has a positive impact on social welfare, and von Hippel proposes that government policies, including R&D subsidies and tax credits, should be realigned to eliminate biases against it. The goal of a democratized user-centered innovation system, says von Hippel, is well worth striving for. An electronic version of this book is available under a Creative Commons license.

Comments: This e-book establishes a common denominator for communities of intellectual commons to learn and profit from open innovation. It also links innovation with collective intelligence and user-centered innovation. The author is the head of the Innovation and Entrepreneurship Group at the MIT Sloan School of Management. He is also the author of The Sources of Innovation.

Review of Literature

Introduction

The internet has created a space where nearly a billion people and their 10 billion neurons can connect and collaborate (Libert & Spector, 2007). As a result, two types of collective intelligence have emerged to leverage the collaborative communications capability the internet has established: 1) open innovation (Chesbrough, 2003) and 2) crowdsourcing (Howe, 2008).

The primary research question in this study is, *How can an organization apply collective intelligence through open innovation (Chesbrough, 2003) and crowdsourcing (Howe, 2008) to create a competitive advantage*? Winners are starting to emerge, including Wikipedia with its crowd of passionate volunteers who are creating the world's largest encyclopedia and Mozilla Firefox with the open source web browser, used by nearly 80 million users (Libert & Spector, 2007). These are just two product-centric examples in a burgeoning world of connected online collaboration.

To present the factors leading to a successful approach to using collective intelligence to create a competitive advantage, this literature review is organized around the following themes:

- Emergence of collective intelligence and its application to a competitive advantage (Malone, T. W., Laubacher, R. & Dellarocas, C. N., 2009)

- Factors an organization should consider when using the concepts of Open Innovation (Chesbrough, 2003)

- Leveraging Crowdsourcing to create a competitive advantage (Howe, 2008)

- Solutions to innovation problems by using collective knowledge (Johansson, 2006)

- Innovation strategies an organization should consider when creating a competitive advantage (Drucker, 1985; Kim & Mauborgne, 2005).

The Collective Intelligence System

In early 2007, Forrester Research conducted a survey and found that 89% of the 119 people surveyed were using one of six different types of collective intelligence (Libert & Spector, 2007), including social networking, wikis, blogs, podcasts, videos and other media. Today, as noted by Libert and Spector (2007), companies all over the world are starting to invest in technologies that support collective intelligence through internet collaboration. Of those countries, North America ranks third, with India and Asia Pacific ranking first and second, respectively (p. 5).

Malone et al. (2009) describe the elements of collective intelligence as a set of building blocks (see Figure 1), or genes, that create the unique DNA of every system. For managers and executives to unlock the potential that exists within crowdsourcing communities, they need to understand the CI system. The main elements include: (a) goals, referring to the desired outcome; (b) incentives, referring to the motivational factors; (c) structure/process, referring to the business model and organizational structure; and (d) staffing, referring to the people required to support the business model and sustainability of CI within the organization.
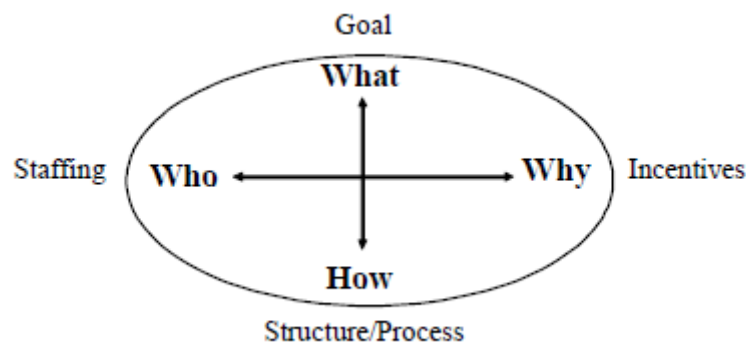

Figure 1: Elements of collective intelligence building blocks or "genes"

Malone et al. (2009) organize these building blocks around four primary questions: *Who* is performing the task? *Why* are they doing it? *What* is being accomplished? *How* is it being done? Answering these questions provides the core parts that make up the collective intelligence system, and provides a structure for the development of a collective intelligence (CI) business model.

Creating a classification for the *who* question enables development of the first component needed in a CI model. Crowds are central to the core of Internet based collective intelligence. The web has enabled the crowd to act on behalf of the group without central control. The crowd has the ability to self govern, with little supervision (Malone, et al., 2009). So, for example, managers need to ask who will establish the operating model, and will it be hierarchical? Will there be a clearinghouse for ideas? Creating a classification for the *why* question enables development of the second component needed in the collective intelligence model. Managers need to ask what are the motivating factors? A recent study on collective intelligence systems reveals that the incorrect identification of motivating factors is one of the most important launch failure causes of a new CI system (Malone, et al., 2009). According to Malone et al., a prominent factor in motivation for contributing to the community is related to love and glory. This is unlike the traditional approach of monetary incentives (Malone, et al., 2009, p. 6). Individuals within the community participate because they have passion for the task. When individuals communicate via the Internet, as part of either crowdsourcing or open innovation, they tend to participate for the opportunity to be seen and acknowledged by the larger community. Some communities have active doers, while others only want to participate in the identification of a solution to the problem (Libert & Spector, 2007). By understanding

the motivational factors within the community that will employ the business model, managers

will gain insight into the collective system and the type of business model deployed.

Creating a classification for *what* and *how* questions enables development of the third

and fourth components needed in the collective intelligence system. There are two factors to

consider; *what* is being accomplished and h*ow* is it being done. Some communities create,

where individuals in the community are responsible for creating something new. The second

factor is for the community to decide – where the individuals are responsible for comparing,

understanding, and selecting from different options. In answering *how* crowds create and

decide, there are a limited number of variations. When the crowd is creating something new

there two variations: (a) independent, meaning information is collected without reliance on

others in the system, or they are (b) dependent meaning collaboration with others in the system

is required. When the crowd is making decisions they can be individual decisions where the

members of the system act independently without reliance on others. However in this case

they may be influenced by other individual decisions, or the decisions are group based where

the group's decision drives the outcome. The combinations of answers to the four questions,

creates the CI system (Malone, et al., 2009).

Forms of Collective Intelligence

Collective intelligence systems fall into two larger categories (Lykourentzou,

Vergados, & Loumos, 2009). One category is defined as ***Passive***, in which the crowd acts as

they would normally without the existence of the system. In this type of system, the

individuals within the crowd already exhibit like minded results or behaviors based on

governance or common goals. A second category is defined *as **Active**,* in which the crowd

behaviors are directed and manufactured by the components in the system. There are three

types of active systems: collaborative, competitive, and hybrid. This literature review focuses

on collaborative approaches to collective intelligence, in an Active system, through

examination of open innovation (Chesbrough, 2003) and crowdsourcing (Howe, 2008).

Open innovation. It isn't just employees who should be responsible for developing a

marketing system; participants outside the organization can provide significant value, and

internal Research and Development is needed to capitalize on external knowledge. Good

ideas don't have to originate from within the organization; competitive advantage comes from

a mix of internal and external resources (Chesbrough, 2003). Working within the right

business model is an important, if not the most important factor to the success of open

innovation. With the right business model, value is aligned to the organization and most

importantly, the customer (p. xxix and p. 63). The concept of knowledge has been diffused to

the extent that the old views of knowledge monopolies no longer exist (p. xxix). Innovation

has been democratized along with the diffusion of knowledge from communities enabled by

technology (von Hippel, 2005).

Crowd Sourcing. Crowdsourcing has been in existence for hundreds of years. For

example, in the 1800's amateurs took to the field of botany for the love of plants. Many

amateurs were doing what professionals had done prior, finding several new species of plants

(Howe, 2008). The root meaning of Amatuer is Amore, meaning to love, which is one

motivational factor in the genome of collective intelligence (Howe, 2008 and Malone, et al.,

2009). With the rise of education and the working class, amateurs are now on a level to

compete with professionals in many fields (Howe, 2008). This has impacted the significance

and rise in crowdsourcing as one aspect of a viable business model. Other factors, such as the

democratization of information and the internet have also added to the enablement of

crowdsourcing (p. 40). Collective intelligence also incorporates the dynamics of diversity. It

is the central element to "solving problems by finding solutions, predicting future outcomes,

and directing corporate strategies" (p. 133). Harnessing the power of a diverse community

improves the chances of success. Diverse groups are more likely to come at a problem in

different ways, not likely thought of by a homogeneous group (p. 132). As new companies

emerge in the world of crowdsourcing, they take different forms. For example, Innocentive is

a crowdsourcing organization that deploys crowd casting, where a problem is presented by one

of their clients. Innocentive casts the problem out into the vast problem solving community of

amateurs and professionals to find a solution (Koulopoulos, 2009). Crowdsourcing is

grounded in the concept that every person has knowledge that some other person will find to

be valuable. Link that knowledge with unique and different perspectives derived from a

diverse community and very powerful problem solving machine will exist (Howe, 2008).

Crowdsourcing can create an environment of addictive collaboration, where each individual

adds to the previous making exponential improvements. However, as noted by Howe (2008),

it is important to recognize that usually the last person to make the modification is the one

who gets the credit (p. 138).

An Open Innovation Business Model, Based on Collective Intelligence

The concept of collective intelligence has emerged within the environment of the

Internet over the past decade, and has been framed into what is termed "an open innovation

business model" for innovation and problem solving (Libert & Spector, 2007). The open

innovation business model is a form of collective intelligence, and is similar in structure to

other business models. Open innovation and crowdsourcing can utilize the same business

model, in that they both apply the collective intelligence system for innovation and problem

solving.

The primary consideration pertains to the organization in which the business model is

being implemented. When going outside the organization for input from others, Libert and

Spector (2007) believe it is necessary for managers of companies to make sure the internal

organization understands the goals to collect knowledge of the crowd community. It is also

just as important to attend to the internal knowledge, and include internal staff in the effort.

Understanding the internal organization and identification of where there are gaps is critical

when deploying an open innovation business model (Chesbrough, 2003).

As noted by Chesbrough (2003), the primary tenets of the generic business model

include (a) value proposition, (b) market segmentation, (c) value chain, (d) revenue

generation, and (e) competitive strategy. As with any business model, the open innovation

business model impacts the way organizations do business and as a result, according to

Chesbrough (2003), those that don't deploy it in some form or another will suffer from a loss

of market share and related competitive advantage.

However, as with most business models, the open innovation business model is being

met with resistance from organizations that are averse to taking risk (Koulopoulos, 2009).

Therefore, managers and executives employing open innovation within a risk adverse

organization need to be prepared for resisters (Libert & Spector, 2007; Chesbrough, 2003).

For innovation to occur, leadership is critical in altering the perception of risk (Koulopoulos,

2009), otherwise the adversity to risk will trigger the organization to act conservatively and

lose out on opportunities (p. 109).

It is imperative that managers prepare for an open innovation business model, which

requires attention to the tenets of the model. The first tenet to understand is the value

proposition. For example, it is important to know what the customers' main problems are and

the potential impact of those problems on organizational products or service offerings. It is

often best to focus on the problems, or pain points, that the customers are experiencing. By

focusing on solving larger problems, value is created through greater benefits realized by those

who are most impacted (Koulopoulos, 2009, p. 65). Customers will pay more for solutions that address their primary concerns, since those solutions present the most visible value to the customer (Chesbrough, 2003).

The second tenet addresses the market segmentation; which customer groups are being targeted and the make up of each group. Value is determined through the customers' lens; therefore it is important to know which customer to target. The customer that is being targeted is the base for the community that will participate in the collective intelligence system (Malone, et al., 2009). The market segment defines competitive scope and addresses the strategic question of *where does the product compete*? (p. 231). Market segmentation focuses on the division of the markets customer base to create a competitive advantage (Porter, 1985). Understanding the market segmentation is critical to both the business model, and ultimately competitive advantage (Porter, 1985). By focusing on the specific customer base, the organizational teams will have a better understanding of the buyer needs and their purchasing behaviors and the differences between the segments (p. 231). Noting the differences between segments also helps to define the value chain for a competitive advantage. For example, the affluence of the community may require special services that cost more, but also provide greater value for that segment versus another. Market segments also have variables such as product variety, buyer type, channel, and geographic locations. Each variable impacts the breakdown of segments by creating the differentiating factors of the segment (Porter, 1985).

The next tenet requires that managers understand which parts of the value chain best support the delivery of the offering (Chesbrough, 2003), and to reach differentiation in the open innovation business model over other business models. The value network connects the internal components of the value chain with the external components (p. 68) and is at the core of the business model. Connecting the components requires support from marketing, sales,

support, and finance. Most importantly it requires an understanding of the customer and their

needs (Chesbrough, 2003, p. 65). All of these factors lead to the development of a competitive

advantage. Technology is connected to this principle, as stated by Porter (1985) who believes

"that understanding the role of technology in competitive advantage is the value chain. A firm,

as a collection of activities, is a collection of technologies" (p. 166). This concept does not

ignore the importance of process, but rather it focuses on the importance of technology as the

supporting element in the value chain. Technology supports every aspect of the value chain

from primary activities to support activities. Knowing where technology supports these

activities in the value chain is important, as the CI system requires technology to connect with

the community and harvest the information it produces bridging the internal and external

knowledge (Chesbrough, 2003; Howe, 2008).

The fourth tenet is revenue generation where the primary focus is on the cost structure

and the margins associated to a product of service (Chesbrough, 2003). Managers should ask

questions such as how much will a customer pay?; How much will the product or service cost

to create?; and How is value created and delivered?. There are several things to consider

when looking at cost structure and margins, including (a) price, (b) costs, and (c) margins,

which drive the value proposition. Understanding the cost structure is important in the open

innovation business model as it also drives sustainability.

The final tenet in the open innovation business model is competitive strategy.

Competitive strategy focuses on creating differentiating factors in the value chain in ways that

make them difficult for competitors to replicate. This requires internal focus on key processes

and the use of resources to support and sustain the business model (Chesbrough, 2003).

Creating Competitive Advantage Through Innovation

According to Porter (1985) the way an organization designs, develops, commercializes, markets, and sells its product determines its cost structure and differentiation from competitors (p. 36). Porter (1985) states that value is based on the amount that the consumers will pay for a given product of service and it is measured by the total revenue generated by the consumer.

As noted by Porter (1985), the value chain is the structural base for an organization's competitive advantage. Understanding an organization's competitive advantage requires a closer look at all the activities that make up the firm's value chain (see Figure 4) (Porter, 1985).
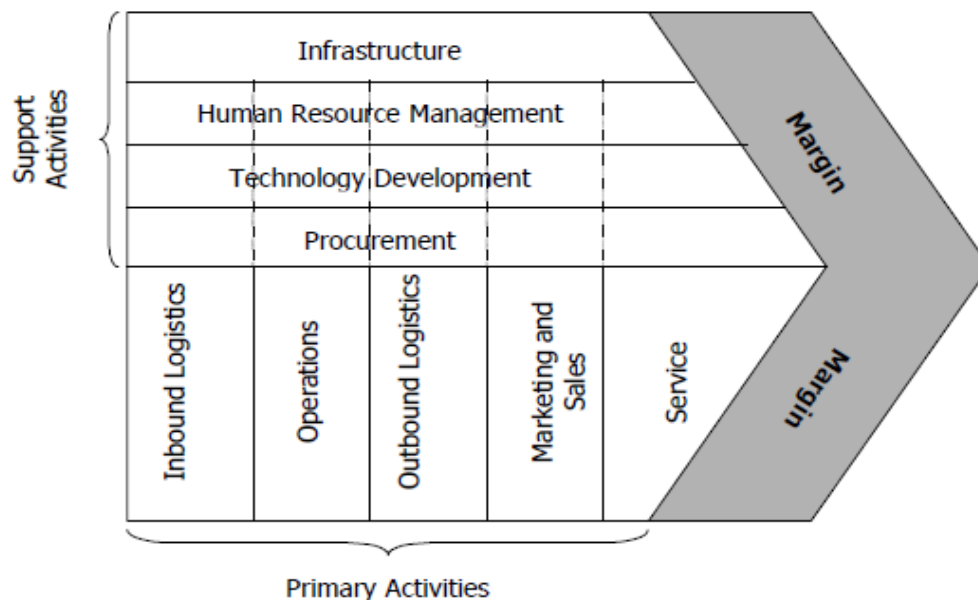

Figure 4: The Generic Value Chain

The collective intelligence system and the open innovation business model need to connect with the value chain (Chesbrough, 2003). The value chain is made up of activities that create the foundation for competitive advantage (see Figure 4). The interdependencies are

important to understand, as the value chain is a set of interdependent activities. Understanding

the interdependencies leads to competitive advantage through optimization and coordination

(Chesbrough, 2003, p. 48).

The CI system also requires coordination and optimization as a part of the value chain.

The CI system must be incorporated into the value chain as a distinct aspect of the open

innovation business model that supports the consumer (Chesbrough, 2003). Creating a

competitive strategy, as stated by Porter (1985) focuses on the cost and differentiation and the

coordination and optimization of the value chain. Chesbrough (2003) relates this to the value

chain in the form of a cognitive map (see Figure 5), as it pertains to the open innovation

business model. The link between technology and cost in the form of inputs and outputs to the

business model are the determining factor in the model's success and ultimately, economic

value (p. 69).

Technical Inputs
- Feasibility
- Performance
- Other Measures

Business Model
- Target Market
- Value Chain
- Costs/Margins
- Value Network
- Comp. Strategy

Economic Outputs
- Value
- Price
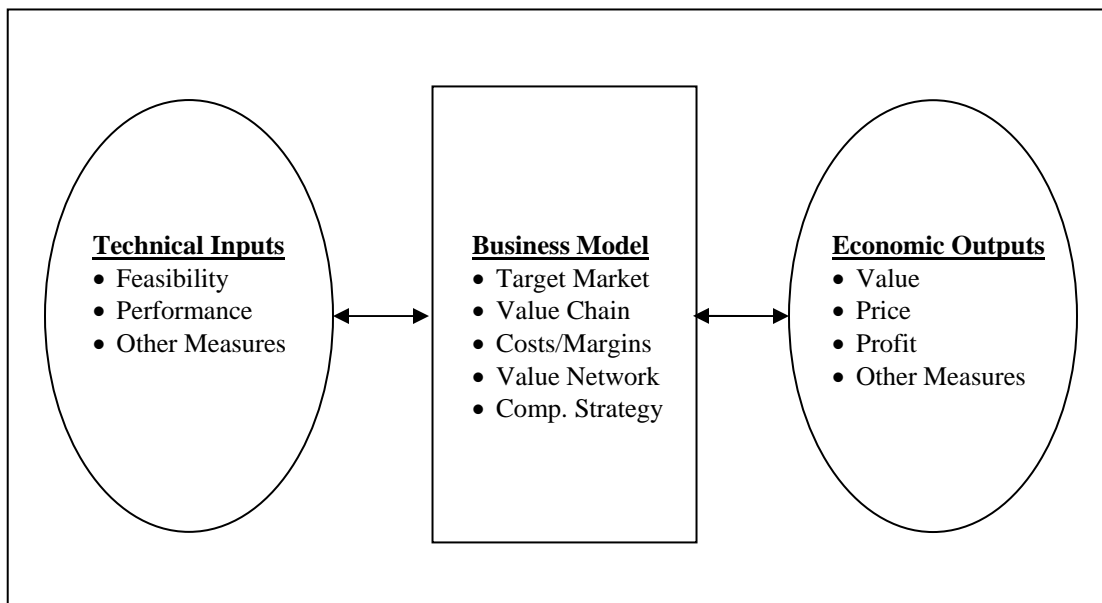- Profit
- Other Measures

Figure 5: The Business Model as a Cognitive Map (Chesbrough, 2003)

The cognitive map provides another view of the business model, which should not differ greatly from the current organizational business models (p. 71). However, the key process in the open innovation business model is the incorporation of external knowledge and resources. The gap is bridged by employing the CI system, as previously discussed.

Diversity of ideas is another prevailing concept in the collective intelligence system and creating a competitive advantage. The open innovation business model does not directly address this, however, innovation which leads to competitive advantage is closely tied to the diversity of ideas (Johansson, 2006). Homogenous groups with similar educational backgrounds and experience have difficulty removing associative barriers, stifling innovative thinking (Johansson, 2006, p. 54). Combining diverse educational backgrounds with different fields provides an opportunity for different ways to look at solving a problem. However, diversity needs to be attended to and visited regularly in the CI system (Howe, 2008). The effectiveness of crowds in CI is reduced when the crowd is too alike in any way (p. 143). Diversity is most effective when the problem needing to be solved is complex. Thus, the open innovation business model should encourage diversity, as it results in a higher rate of accuracy and increased ability to solve problems with a larger variety of approaches (p. 144-5). In relation to competitive advantage, the CI system provides a direct connection with consumers. It focuses on solving important issues the consumers of the product or service is dealing with, by involving them in the process (Libert & Spector, 2008; Chesbrough, 2003). This type of access to such a large numbers of consumers at any given moment was unheard of prior to the Internet (Howe, 2008).

However, the open innovation business model needs to create an environment that supports and encourages the crowd to participate and leverage the knowledge of the crowd.

Figure 6 illustrates the business model and market conditions that lead to innovation and ultimately competitive advantage.
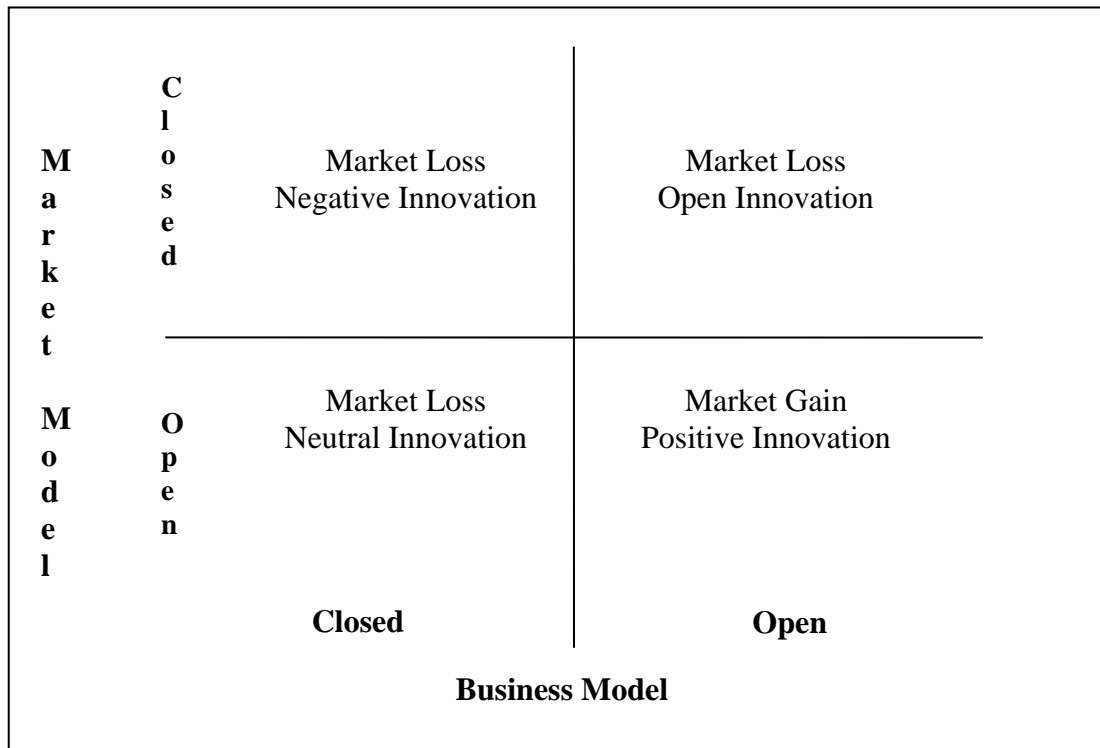
<table>
<tr><td rowspan="4">M a r k e t</td><td rowspan="2">C l o s e d</td><td>Market Loss
Negative Innovation</td><td>Market Loss
Open Innovation</td></tr>
</table>

		Market Loss Negative Innovation	Market Loss Open Innovation

M a r k e t **C l o s e d**

Market Loss / Negative Innovation   Market Loss / Open Innovation

M o d e l **O p e n**

Market Loss / Neutral Innovation   Market Gain / Positive Innovation

Closed   **Open**

Business Model

Figure 6: Open and Closed Business Model (Koulopoulos, 2009)

The focus is on four types of innovation: 1) Neutral – where the focus is on long term payoffs, impacting momentum, 2) Positive – where an organization can focus on minimal innovation or changes to efficiency of the product or service to gain market share, 3) Negative – where innovation in an existing product that is becoming obsolete loses market share to innovative products, and 4) Open – where shared insights and collaborative innovation drive the capacity to innovate. An organization should operate in all 4 quadrants, but for market leadership the upper right hand corner, with open innovation is critical (Koulopoulos, 2009). Maintaining market leadership and sustaining innovation requires that certain conditions exist and that the organization is focused on them. An open market must exist in conjunction with the

organization maintaining an open business model (p. 102). The business model will be debilitated if executed in a market that is not open and a closed business model will not take advantage of an open market. As noted by Koulopoulos (2009), they have to work together to create successful innovation and increased competitive advantage or market leadership (p.101-2).

Innovation is at the cornerstone of creating a competitive advantage in the marketplace. There are seven lessons of innovation that will help guide the process of innovation and re-innovation over time. And while sustainability is not often tied to innovation, it is required to continually build and maintain market share (Koulopoulos, 2009). The seven lessons of innovation are designed to develop behaviors that support an innovative culture in an organization, ultimately creating a competitive advantage. They are:

1) *Build for the unknown* - Innovation is a journey and each journey presents a set of unknown barriers (Koulopoulos, 2009). It is important that management plan for uncertainty in order to evolve, whereby creating a continuous learning environment for innovation successes (p. 108).

2) *Fail fast* - Organizations that innovate encourage experimentation. For example employees at Google are required to spend twenty percent of their time experimenting. With experimentation, comes failure (Koulopoulos, 2009). Tolerating failure creates an environment for innovation (p. 108).

3) *Abandon the success of the past* – Typically, the past defines the way an organization does business (p. 114). The external environment and the needs of consumers constantly evolve. As other companies innovate, creating competition for an organization's products and services, letting go of the past will ensure the organization is viewing the world around them.

4) Separate the seeds from the weeds - Separating the seeds from the weeds is particularly important in an open innovation business model. New ideas will be presented in unprecedented fashion in an open innovation business model and it is critical for an organization to maintain the current product offerings while tending to the new ideas that are being generated.

5) Focus on process over product - Leadership within an organization has to create a work environment in which innovation can occur. For example, 3M has a fifteen percent rule whereby employees in the organization spend up to fifteen percent of their time working on their own projects (p. 120). Leadership in the organization needs to be committed to cultivating innovation and new ideas (p. 117).

6) Create an innovation experience – In an innovative organization, the focus is not on the products the organization offers, but rather on the experience related to the innovation (p. 124). For example, Apple created an experience by offering music on the iPod through the purchase of individual songs in the iStore. This created an innovative experience for the consumers, not just an innovative product. (p. 106).

7) Challenge the conventional wisdom – Innovative organizations take associations that consumers have and alter those associations. This is done by looking at the task at hand versus the product that accomplishes the task (p. 132). By doing this the problem shifts from how to create an innovative product, to how to create an innovative solution to completing a task, and then build the product around that solution.

Conclusions

This literature review is designed to examine the use of collective intelligence (Chesbrough, 2003; Howe, 2008) in relation to creating a competitive advantage in the marketplace within the context of for-profit corporations. In this study, collective intelligence is broadly defined as a group of individuals doing things collectively that seem intelligent (Malone, et al., 2009). Collective intelligence involves groups of individuals collaborating to create synergy, something greater than each individual part (Castelluccio, 2006). This review is focused on two specific types of collective intelligence: (a) crowdsourcing (Howe, 2008) and (b) open innovation (Chesbrough, 2003).

This study reviews literature published between 1985 and 2009. The years represent a time beginning when innovation became a topic of inquiry (Drucker, 1985), through the years in which innovation has become integral to creating a competitive advantage (Chesbrough, 2003). The synthesis of literature in the two focus areas examines (a) definitions and applications of collective intelligence through crowdsourcing and open innovation, and (b) creation of competitive advantage. This approach provides a foundation used to answer the main research question "How can an organization apply collective intelligence through open innovation (Chesbrough, 2003) and crowdsourcing (Howe, 2008) to create a competitive advantage?"

The Importance of Collective Intelligence

As stated in the Purpose section of this paper, "companies that don't innovate, die" (Chesbrough, 2003, p. xxvi).   Industries are on the verge of a significant change in the way they innovate (Malone, et al., 2009). Over the past decade the Internet has enabled communities to connect and collaborate, creating a virtual world of collective intelligence

(Malone et al., p. 2). Innovative organizations no longer rely solely on knowledge among their internal employees to innovate (Chesbrough, 2003). While they use different types of collective intelligence today, the emergence of open innovation and crowdsourcing are in the forefront of innovation and problem solving.

Open innovation is defined in this study as valuable ideas that can come from inside or outside the organization and can go to market from inside or outside the organization (Chesbrough, 2003). General themes throughout the literature indicate that companies are turning to external knowledge, through various forms of collective intelligence methods, to solve complex problems (Howe, 2008). Howe (2008) notes that as technologies advance and become more accessible, collective intelligence and specifically crowdsourcing will evolve and have greater importance in creating a competitive advantage. The literature illustrates that innovation is commercially attractive when the product and service developments involve "lead users" that freely share their knowledge and innovations. This lead user idea is at the core of crowdsourcing and is the direct link to the consumers that use the products and services. Companies that leverage "lead users" are most often ahead on industry trends (von Hippel, 2005). Democratizing innovation is further described through examination of the concept of crowdsourcing (Howe, 2008), which refers to leveraging the collective intelligence of crowds, where groups of people outperform individual experts (p. 132).   When combined with the crowdsourcing concept, open innovation (Chesbrough, 2003) enables diverse crowds to solve organizational problems, thus leveraging the development of innovative products, which often leads to competitive advantage (Porter, 1985).

The Role of Collective Intelligence in Competitive Advantage

The literature also describes the use of technology as a key component of innovation in an organization, as it impacts its competitive advantage and the overall structure of its

industry. Johansson (2006) posits that innovation is the essential element in maintaining and creating a competitive advantage.

The seven lessons of innovation as stated by Koulopoulos (2009) are the behaviors that an organization needs to exhibit to create a truly innovatative culture, which will help guide the process of innovation and re-innovation over time. Sustaining innovation requires a process of creating, failing, and evolving in a continuous cycle over time (Koulopoulos, 2009). These seven lessons are described in detail in the Review of the Literature section of this paper. Organizations that follow the seven lessons of how to create an innovative culture, while deploying an open innovation business model, will create a competitive advantage by utilizing aspects of collective intelligence. By building a direct link to the consumers, they will take advantage of the millions of diverse problem solvers to create a better value proposition than their competitors (Porter, 1985; Libert & Spector, 2008).

Howe (2008) states that the world of innovation is changing and being seized by those amateurs and professionals that now have access to the tools of collective intelligence and a means for production. This improved access has enabled development of a virtual shadow workforce on a global scale (Howe, 2008), where barriers to groups of people with passion and knowledge in various areas are being removed. This opens up a new opportunity for organizations to tap into the power of collective intelligence, through millions of people that have access to the Internet (Libert & Spector, 2008), in which virtual. Networks of amateurs and professionals are now connected through technology. Consumers of goods and services and producers of goods and services are becoming one and the same (Howe, p. 71).

Recommendations for Implementing CI in an Organization

The goal of this study is to provide executive leadership and their teams with information about how to use collective intelligence, specifically crowdsourcing and open innovation, to support innovation as a way to create a competitive advantage. The final outcome of the study is presented in the form of a set of five recommendations for how these two types of external knowledge should be implemented to support innovation.

Recommendation # 1 - Focus on creating an innovative organizational culture, in which experimentation and failure are supported and encouraged. Use the seven lessons of innovation by Koulopoulos (2009) as the guide.

Recommendation # 2 - Create a collective intelligence (CI) system by answering the four primary questions: *Who* is performing the task? *Why* are they doing it? *What* is being accomplished? *How* is it being done?

Recommendation # 3 - Focus on the utilization of an open innovation business model by developing a plan for and defining the primary tenets of the model, to include (a) value proposition, (b) market segmentation, (c) value chain, (d) revenue generation, and (e) competitive strategy.

Recommendation # 4 - Map out the four types of innovation: 1) Neutral, 2) Positive, 3) Negative, and 4) Open. An organization should operate in all 4 quadrants, but for market leadership open innovation is the most critical (Koulopoulos, 2009).

Recommendation # 5 - Understand how the CI system can be deployed into the value chain where internal and external knowledge is leveraged. Define how the CI system will integrate with the current value chain and which parts exist to support the system and which elements need to be developed.

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Appendix A

Coding Report

Annotated Bibliography References	Key Words	Word Count	Core Themes	Theme Count
Anthony, S. D., Johnson, M. W., Sinfield, J. V., & Altman, E. J. (2008). *Innovator's guide to growth: Putting disruptive innovation to work.* Boston, MA: Harvard Business School Press.	Competitive Advantage	65	Emergence of Collective Intelligence	2
	Innnovation	434	Forms of Collective Intelligence	
	Collective Intelligence	7	Creating a Competitive Advantage	23
	- Crowdsourcing		Importance of innovation	136
	- Open Innovation			
Brown, J. S., Duguid, P., & Duguid, P. (2000). The social life of information. Harvard Business School Press.	Competitive Advantage		Emergence of Collective Intelligence	
	Innnovation		Forms of Collective Intelligence	
	Collective Intelligence		Creating a Competitive Advantage	
	- Crowdsourcing		Importance of innovation	
	- Open Innovation			
Chesbrough, H. (2003). *Open innovation, the new imperative for creating and profiting from technology.* Harvard Business School Press.	Competitive Advantage	190	Emergence of Collective Intelligence	7
	Innnovation	590	Forms of Collective Intelligence	11
	Collective Intelligence		Creating a Competitive Advantage	48
	- Crowdsourcing		Importance of innovation	240
	- Open Innovation	312		
Drucker, P. F. (1985). *Innovation and entrepreneurship: Practice and principles.* New York: Harper and Row.	Competitive Advantage		Emergence of Collective Intelligence	
	Innnovation		Forms of Collective Intelligence	
	Collective Intelligence		Creating a Competitive Advantage	

	- Crowdsourcing		Importance of innovation	
	- Open Innovation			
Howe, J. (2008). *Crowdsourcing: Why the power of the crowd is driving the future of business.* New York, NY: Crown Business.	Competitive Advantage		Emergence of Collective Intelligence	15
	Innnovation	83	Forms of Collective Intelligence	3
	Collective Intelligence	103	Creating a Competitive Advantage	39
	- Crowdsourcing	212	Importance of innovation	22
	- Open Innovation	18		
Jenkins, H. (2004). The cultural logic of media convergence. *International Journal of Cultural Studies, 7*(1):33-43.	Competitive Advantage		Emergence of Collective Intelligence	
	Innnovation		Forms of Collective Intelligence	
	Collective Intelligence		Creating a Competitive Advantage	
	- Crowdsourcing		Importance of innovation	
	- Open Innovation			
Johansson, F. (2006). *The Medici effect, what elephants & epidemics can teach us about innovation.* Harvard Business School Press.	Competitive Advantage		Emergence of Collective Intelligence	
	Innnovation		Forms of Collective Intelligence	
	Collective Intelligence		Creating a Competitive Advantage	
	- Crowdsourcing		Importance of innovation	
	- Open Innovation			
Johnson, S. (2006). *The ghost map.* New York, NY. Riverhead Hardcover.	Competitive Advantage		Emergence of Collective Intelligence	
	Innnovation	2	Forms of Collective Intelligence	
	Collective Intelligence		Creating a Competitive Advantage	
	- Crowdsourcing		Importance of innovation	2
	- Open Innovation			
Kaplan, R. S. & Norton, D. P. (2008), *The execution premium: Linking strategy to operations for competitive advantage.* Harvard Business School Publishing.	Competitive Advantage	280	Emergence of Collective Intelligence	
	Innnovation	129	Forms of Collective Intelligence	
	Collective Intelligence		Creating a Competitive Advantage	115

Reference	Category	#	Category	#
	- Crowdsourcing		Importance of innovation	77
	- Open Innovation			
Kim, C. W. & Mauborgne, R. (2005). *Blue ocean strategy: How to create uncontested market space and make competition irrelevant.* Boston, MA: Harvard Business School Press.	Competitive Advantage		Emergence of Collective Intelligence	
	Innnovation		Forms of Collective Intelligence	
	Collective Intelligence		Creating a Competitive Advantage	
	- Crowdsourcing		Importance of innovation	
	- Open Innovation			
Koulopoloulos, T. M. (2009). *The innovation zone: How great companies re-innovate for amazing success.* Mountain View, CA: Nicholas Brealey Publishing	Competitive Advantage		Emergence of Collective Intelligence	
	Innnovation		Forms of Collective Intelligence	12
	Collective Intelligence	22	Creating a Competitive Advantage	28
	- Crowdsourcing		Importance of innovation	83
	- Open Innovation			
Libert, B. & Spector, J. (2007). *We are smarter than me: How to unleash the power of crowds in your business.* Upper Saddle River, NJ. Wharton School Publishing.	Competitive Advantage	5	Emergence of Collective Intelligence	35
	Innnovation	20	Forms of Collective Intelligence	2
	Collective Intelligence	42	Creating a Competitive Advantage	30
	- Crowdsourcing	42	Importance of innovation	35
	- Open Innovation			
Lykourentzou, I., Vergados, D. J., & Loumos, V. 2009. *Collective intelligence system engineering.* In Proceedings of the international Conference on Management of Emergent Digital Ecosystems (France, October 27 - 30, 2009). MEDES '09. ACM	Competitive Advantage	6	Emergence of Collective Intelligence	16
	Innnovation	1	Forms of Collective Intelligence	3
	Collective Intelligence	51	Creating a Competitive Advantage	2
	- Crowdsourcing	6	Importance of innovation	1
	- Open Innovation			

Malone, T. W., Laubacher, R. & Dellarocas, C. N., (2009) *Harnessing crowds: Mapping the genome of collective intelligence* (Report No. 4732-09). MIT Sloan Research	Competitive Advantage	1	Emergence of Collective Intelligence	
	Innnovation	2	Forms of Collective Intelligence	
	Collective Intelligence	45	Creating a Competitive Advantage	
	- Crowdsourcing	2	Importance of innovation	
	- Open Innovation			
Menon, T., & Pfeffer, J. (2003). Valuing internal vs. external knowledge: Explaining the preference for outsiders. *Management Science, 49*(4), 497-513.	Competitive Advantage		Emergence of Collective Intelligence	
	Innnovation		Forms of Collective Intelligence	
	Collective Intelligence		Creating a Competitive Advantage	
	- Crowdsourcing		Importance of innovation	
	- Open Innovation			
O'Conner, K. & Brown, P. B. (2003). *The map of innovation, creating something out of nothing.* New York, NY: Crown Publishing Group.	Competitive Advantage		Emergence of Collective Intelligence	
	Innnovation		Forms of Collective Intelligence	
	Collective Intelligence		Creating a Competitive Advantage	
	- Crowdsourcing		Importance of innovation	
	- Open Innovation			
Peters, T. (1997). *The circle of innovation, you can't shrink yourself to greatness.* Excel, A California Partnership.	Competitive Advantage		Emergence of Collective Intelligence	
	Innnovation		Forms of Collective Intelligence	
	Collective Intelligence		Creating a Competitive Advantage	
	- Crowdsourcing		Importance of innovation	
	- Open Innovation			
Porter, M. E. (1985). *Competitive advantage: creating and sustaining superior performance.* New York: Free Press.	Competitive Advantage	1429	Emergence of Collective Intelligence	
	Innnovation	876	Forms of Collective Intelligence	
	Collective Intelligence		Creating a Competitive Advantage	697

	- Crowdsourcing		Importance of innovation	271
	- Open Innovation			
Schrage, M. (2000). *Serious play, how the worlds best companies simulate to innovate.* Boston, MA: Harvard Business School Press.	Competitive Advantage		Emergence of Collective Intelligence	
	Innnovation		Forms of Collective Intelligence	
	Collective Intelligence		Creating a Competitive Advantage	
	- Crowdsourcing		Importance of innovation	
	- Open Innovation			
Staff, n.d. (2008). Following the crowd. *Economist, 388*(8596), 10-11.	Competitive Advantage		Emergence of Collective Intelligence	
	Innnovation		Forms of Collective Intelligence	
	Collective Intelligence		Creating a Competitive Advantage	
	- Crowdsourcing		Importance of innovation	
	- Open Innovation			
von Hippel, E. (2005). *Democratizing innovation.* The MIT Press.	Competitive Advantage	21	Emergence of Collective Intelligence	
	Innnovation	839	Forms of Collective Intelligence	
	Collective Intelligence		Creating a Competitive Advantage	9
	- Crowdsourcing		Importance of innovation	27
	- Open Innovation			