

HOW THE INFORMATION EXPLOSION IS DISRUPTING TRADITIONAL BUSINESS STRATEGY

A Thought Paper by Erik Hannell

Pratt Institute

601-02: Foundations of Information

Assignment 4: Thought Paper

Spring, 2019

INTRODUCTION

Ignited in the 18th century, the industrial revolution (White, 2009) came to fundamentally change our society following its impact on the manufacturing industries around the world. The great innovations of this era, such as the steam engine, contributed with significantly improved productivity. The information explosion (Robertson, 1990) has been coined as the modern time equivalent of the industrial revolution. The emergence of computers formed an exponential growth in the development of information technology, consequently revolutionizing our society in many ways.

Arriving from a background consisting of education and work experience in business and economics, I have been taught about, as well as witnessed organizations' practical use, of business models and strategies, such as the value chain and its components (Porter, 1985). Considering the broad utilization of classic business strategies, there is no denying the fact that the value chain and similar theories have generated success for many organizations. However, one could reflect on whether these business strategies serve as well in today's society as they have done historically. How has the value chain been affected by the emergence of information technology and the ever-growing importance of data, and in which direction do the business strategies and models of tomorrow tend to move?

Throughout this semester, the Foundations of Information course have provided several intriguing philosophical ideas and interesting theories within the area of information. Learning about theories such as Shannon and Weaver's (1949) mathematical model of communication, as well as becoming informed of emerging professional roles, such as the growing importance of chief knowledge officers (Harper, 2013), have elevated my desire to investigate how the developments of information technology have affected business

administration. Therefore, in this Thought Paper, I will explore how the “information explosion”, i.e. information technology and data, disrupt the fundamentals of business strategies and models of today. Focusing on the well-known and highly adapted value chain theory and its components, I strive to discuss, reflect and provide conclusions to the questions expressed in the above paragraph.

METHODOLOGY

This Thought Paper is largely based on a Ted-talk by Philip Evans, the founder of the media and internet division of the global firm Boston Consulting Group (BCG). In his presentation, “How data will transform business”, Evans provides reflections very much aligned with the topic of this paper. In addition to Evans’s Ted-talk, I will use scholarly articles, historical financial data, and statements from experts in order to yield support for my ideas.

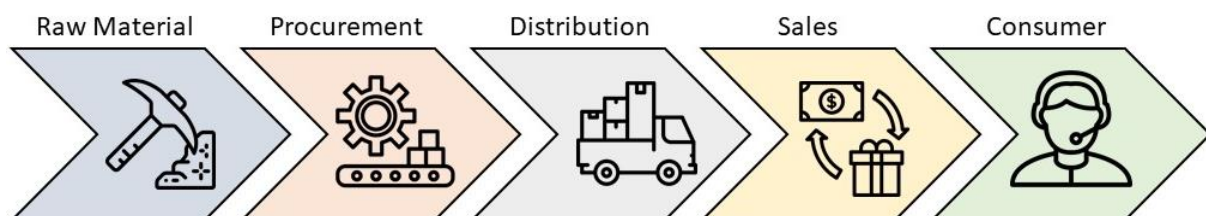
INFORMATION EXPLOSION DEFINED

To begin with, we have to understand how the “information explosion”, a concept that was coined following a process which was initiated over 30 years ago, relates to data and information technology (IT). Briefly explained, data and IT is a result of the information explosion. The information explosion is constituted by many events which, over several decades, have transformed our society into the tech-heavy environment that surrounds us today. The events involve the birth of computers and the emergence of the Internet, to name a few. As technology is continuously implemented in everything we do, the importance of data and IT increases, in all sectors ranging from education to construction, and beyond. It has become such a major part of our society that it saturates practically everything. McChesney (2013) reflects on whether the Internet may alter the way our species develop. This reasoning could very well be applied to how the information explosion, i.e. data and IT, alter the way organizations develop. I am going to show evidence for that information technologies and

data transforms traditional business models, both by providing prior research within the area, as well as a couple of real-world events.

THE VALUE CHAIN MODEL

The value chain (Porter, 1985) plays a major part in the strategic decision making of most organizations, regardless of which industry that organization operates in. It can be described as an analysis of each step within the value generating process of a business. From commodity, which could be a raw material, an idea, or a technology, to the finished product. A company can have an advantage in one or more stages of the value chain while being at a disadvantage at one or more stages. The competitive advantage is a company's superiority within one or more stages of the value chain. For example, a shipping company would possess a competitive advantage in the distribution stage, while a retail business would be superior in the later stages of the chain, closer to the consumer. The theory is broad and customizable, hence its cross-industry applicability and widespread utilization.



Visual example of Porter's (1985) value chain

VALUE CHAIN DISRUPTED

Evans (2014) argues for that the value chain theory and its associated components have been fundamentally changed, for he means that the model is kept valid due to transaction costs, which have been substantially reduced following the information explosion. The birth of the Internet gave the ability to communicate and perform business activities in real time, without requiring physical presence. Information travels so fast that it has caused

transaction costs to drop below the point of where it is holding the value chain glued together. From a Weaver and Shannon (1949) perspective, the process of communication between the sender and receiver of information has been optimized, as the communication channels have become powerful, while noise interference has been heavily reduced. The improved communication tools and the possibility of high-density data travel at low costs, allows for transactions between companies which historically have been theoretically impossible (Boudreau, Dunford, Ramstad, 2000). The same theory is discussed in a context of big data by Brock, Dreischmeier, Platt & Souza (2013), where they define the big data disruption on business models as “blurring the boundaries between industries and changing competitive dynamics”. Besides the supportive findings above, Evans’s arguments are backed by Sousa and Valvo (2001), whom also emphasized the fact that transaction cost savings will be the result of successfully integrating information technology into business models. Despite being an article from 2001, i.e. the point in time where Internet started to become intensively commercialized, Sousa and Valvo stated that “tremendous savings are promised to organizations implementing Internet-related technologies” (2001). They further discussed how virtual places defined as “E-hubs” and “E-marketplaces” would unite buyers and sellers. This proved to be an accurate prediction, considering the vast amount and great importance of current online meeting places. Many companies, not only consumer based, would simply not survive the modern business environment without implementing Internet-related technologies, such as those discussed by Sousa and Valvo (2001).

In his talk, Evans (2014) provides a real-world example of value chain disruption within the encyclopedia industry. Historically, the revenue within the encyclopedia business was collected by its distributors. However, with the birth of the Internet, the cost for gathering information decreased significantly, hence, disrupting the entire encyclopedia industry

(Boudreau, Dunford & Ramstad, 2000). Instead, the encyclopedia business transformed into Wikipedia, and its new model of user-generated content. Evans goes on to explain how the value chain was disrupted, as professional information contributors were replaced by Internet users who could perform the same task to a considerably lower price. The competitive advantage of the encyclopedia distributors simply vanished as a result of information technology.

Another example, also discussed by Evans (2014), is the human genome project¹, and how the access and use of data have impacted the business models within the health industry. The cost of mapping genomes dropped significantly following the emergence of new technology and data mining. When the price tag of genome mapping was high, it made up an entire industry. However, this industry vanished due to the value chain becoming disrupted. Instead, it transformed into a retail industry and became yet another example of how competitive advantage can turn void. Furthermore, by combining genome data from one individual, with other sorts of data and information collections about the same individual, it is likely that this could debouch in a more comprehensive revolution within the health industry. Companies with a present competitive advantage of providing health insights could simply lose that comparative advantage because of information technology lowering the cost of providing insights through combining data. This does not only apply to the health industry but other sectors as well. The information technology business model disruptions could happen much faster than we expect, for “we think in linear terms, while technology moves at an exponential pace” (Satell, 2013). Evans (2014) means that we tend to move from vertical competition, meaning that similar companies compete at similar stages of the value chain,

¹ <https://sparcopen.org/impact-story/human-genome-project/>

toward horizontal competition, where practically every company could compete with one another, i.e. blurring the value chain boundaries (Brock, et al. 2013).

Prior to the information explosion, giant corporations could sustain stability simply because of the fact that they were *giant corporations*. However, with the Internet and extended access to information and data, the new semantic economy (Satell, 2012) gave birth to a whole new business environment. In this new environment, traditional giants like General Motors would stagger, while companies such as Facebook could achieve billion figure valuations overnight. Resources which historically have been the exclusive property of the giant corporations have become accessible to the smallest of startup organizations. This diminishing scale advantage disrupts the traditional business models, such as the value chain, of which the theory of scale is an important part. For example, the human genome companies were superior when they were sole bearers of human genome data, until the cost of retrieving that data went from thousands of dollars to three digit expenses, consequently removing the scale advantage.

Evidence of a high-level information explosion impact on the business environment can be found by observing lists of the highest valued companies. Studying the table below, the advantage and success of information technology corporations become clear. The top five of the highest valued companies in the US in 2018 are high-technology, data-driven, information-heavy organizations. All of these companies have revolutionized industries and invalidated the business models of former giants.

Largest US companies in 2018 vs 2008

2018				2008			
Rank	Company	Founded	USbn	Rank	Company	Founded	USbn
1.	Apple	1976	890	1.	Exxon	1870	492
2.	Google	1998	768	2.	General Electric	1892	358
3.	Microsoft	1975	680	3.	Microsoft	1975	313
4.	Amazon	1994	592	4.	AT&T	1885	238
5.	Facebook	2004	545	5.	Proctor & Gamble	1837	226
6.	Berkshire	1955	496	6.	Berkshire	1955	206
7.	J&J	1886	380	7.	Google	1998	198
8.	JP Morgan	1871	375	8.	Chevron	1879	192
9.	Exxon	1870	367	9.	J&J	1886	192
10.	Bank of America	1909	316	10.	Walmart	1962	184

Source: Bloomberg, Google

As retrieved from <https://milfordasset.com/insights/largest-companies-2008-vs-2018-lot-changed>

DISCUSSION

During the decades of the industrial revolution era, the business environment was kept rather static. Companies with the capability of procuring a commodity for one dollar, and sell it for two dollars, would be very successful and were likely to remain so for a substantial period of time (Satell, 2013). However, this is not the situation in the present era formed by the information explosion. Due to the great development of information technology, and the exponential growth of data and information access that it generates, no organization should recognize themselves as immortal, regardless of its size. It has been proven that even the smallest company can disrupt entire industries, and completely alter the business environment, in less than a decade.

Furthermore, another aspect of how the information explosion generates an impact on businesses is the way which the Internet have yielded new ways of employing people. "E-lance" workers (Boudreau, et al. 2000) was coined in the year of 2000 as a future form of

employment, where workers would extensively be able to work as consultants, thanks to improved communication methods and information access. This could affect businesses, e.g. by making human resource departments less efficient. Furthermore, this employment method would convey in extended use and reliance on information technology. This discussion could be further delved into and directed toward how this will affect labor markets. As discussed by Neilson (2018), labor unions might face challenges because of the growing number of consultants who are not allocated to a specific industry, which leads to reduced strength of the unions, causing potential disruptions in the labor market. Despite being directly related to the topic of this Thought Paper, it would be an interesting prolonged study of how information technology affects not only business strategy, but labor markets as a whole.

To further delve into ways which connect the information explosion to business, one could study the actual Internet environment, such as that of the world's most visited website, Google.² Companies who are operating mainly in the latter parts of the value chain, close to the consumer, have realized the importance of appearing on top of a Google search. As emphasized by Downey (2014), if a company does not appear on the first page of a Google search, it could result in revenue loss for that company. Hence, it is of high priority to make sure that online visibility is realized. However, this Internet capitalism may cause interference when it comes to net neutrality and the openness of the Internet environment. McChesney (2013) discusses "how capitalism is turning the Internet against democracy" with a focus on media studies and political economy. Engaging in the discussion conducted by McChesney would also be moving away from the relevancy of this Thought Paper. However, I believe that it could be an interesting extended study in regard to the relationship between the

² <https://www.alexa.com/topsites>

information explosion and business. Largely due to the fact that the topic of McChesney's publication could be seen as a contrariwise discussion in relation to the topic of this Thought Paper since it is questioning how the capitalist business atmosphere generates an impact on the Internet.

CONCLUSION

Traditional companies which are stuck with old business models run the risk of seeing themselves surpassed by modern companies, such as Amazon, which have successfully been able to combine technology and traditional business strategy in order to optimize their operations. Not only in terms of monetary measures, but also in regards to human resources, information handling, and so forth. However, being "stuck with old business models" does not mean that traditional value chain models or comparative advantage strategies are entirely irrational. These companies have to reinterpret their models and strategies to fit into the modern day tech-heavy business environment. For example, by lowering the transactions costs. Brock, et al. (2013) concludes,

"Big data isn't just changing the competitive environment—it is transforming it.

Businesses need to change along with it. Seeing where the opportunities lie and creating strategies to seize them will help companies turn big data's promise into reality—and gain new customers, new revenue, and even new markets along the way."

Although this conclusion is made in a big data context, it can be applied to how information technology, in general, affects business models, and it supports the conclusion above regarding the importance of adapting to the everchanging high technology and informative society which we live in.

REFERENCES

Boudreau, J. W., Dunford, B. & Ramstad, P. M. (2000). The human capital “impact” on E-Business: The case of Encyclopedia Britannica (CAHRS Working Paper #00-05). Ithaca, NY: Cornell University, School of Industrial and Labor Relations, Center for Advanced Human Resource Studies. Retrieved: <http://digitalcommons.ilr.cornell.edu/cahrswp/84>

Brock, J., Dreischmeier, R., Platt, J. & Souza, R. (2013, September 26). Big Data’s Five Routes to Value. BCG. Retrieved: <https://www.bcg.com/publications/2013/information-technology-strategy-digital-economy-opportunity-unlocked-big-data-five-routes-value.aspx>

Downey, G. J. (2014). Making media work: time, space, identity, and labor in the analysis of information and communication infrastructures. In *Media Technologies: Essays on Communication, Materiality, and Society*, T. Gillespie, P. Boczkowski, and K. Foot (Eds.) Cambridge: MIT Press, 141-165. Available at: <https://gdowney.files.wordpress.com/2013/11/downey-g-2014-in-gillespie-t-et-al-eds-2014-making-media-work.pdf>

Evans, P. (2014, April 18). Philip Evans: How Data Will Transform Business. Retrieved from: https://www.ted.com/talks/philip_evans_how_data_will_transform_business

Harper, R. (2013). Knowledge management through the lens of library and information science: a study of job advertisements. *Library Trends*, 61(3), 703-734.

Johnston, S. (2018). Largest companies 2008 vs. 2018, a lot has changed. Insights, Milford Asset Management. Retrieved: <https://milfordasset.com/insights/largest-companies-2008-vs-2018-lot-changed>

Shannon, C. E. & Weaver, W. (1949). *A Mathematical Theory of Communication*. The University of Illinois Press.

Sparc, Human Genome Project (2018), <https://sparcopen.org/impact-story/human-genome-project/>

McChesney, R.W. (2013) *Digital Disconnect: How capitalism is turning Internet against democracy*. New York, New York: The New Press.

Neilson, T. (2018). "Unions In Digital Labour Studies: A Review of Information Society and Marxist Autonomist Approaches" *tripeC* 16(2): 882-900. Retrieved: <https://www.triple-c.at/index.php/tripleC/article/view/1065>

Porter, M.E. (1985) *Competitive Advantage: Creating and Sustaining Superior Performance*. New York, New York: The Free Press.

Satell, G. (2012, March 11). The Semantic Economy. Digital Tonto. Retrieved from: <https://www.digitaltonto.com/2012/the-semantic-economy/>

Satell, G. (2013, September 21). 4 Ways In Which Technology Is Transforming Business. Forbes. Retrieved from: <https://www.forbes.com/sites/gregsatell/2013/04/02/4-ways-in-which-technology-is-transforming-business/#494d15fad9c7>

Sousa, K and Valvo, R. (2001). The Impact of information technology on value chain management. Small Business Environment National Center. P.4 Available at: <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.412.957&rep=rep1&type=pdf>

Robertson, D. S. (1990). The Information Revolution. *Communication Research*, 17(2), 235–254. Retrieved from: <https://doi.org/10.1177/009365090017002005>

White, M. (2009, October 14). The Industrial Revolution. British Library. Retrieved from: <https://www.bl.uk/georgian-britain/articles/the-industrial-revolution>