

**LEVERAGING BIG DATA FOR SUSTAINED COMPETITIVE ADVANTAGE;  
A STRATEGIC ANALYSIS OF A FINANCIAL SOFTWARE COMPANY**

by

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PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF  
THE REQUIREMENTS FOR THE DEGREE OF  
MASTER OF BUSINESS ADMINISTRATION

In the Management of Technology Program  
of the  
Faculty  
of  
Business Administration

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SIMON FRASER UNIVERSITY

Summer 2014

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## **Abstract**

This paper is a strategic analysis of Dataphile, a financial software company located in Vancouver, British Columbia. The purpose of this paper is to investigate Dataphile and present strategic options on how it can leverage new trends for sustained competitive advantage. It conducts an external and internal analysis of the company and describes its current strategic positioning. The analysis then provides Dataphile with various strategic alternatives it could pursue and proposes a recommendation for senior management.

**Keywords:** strategic analysis; financial software; competitive advantage

## **Executive Summary**

Dataphile is a leading cloud-based data processing vendor that operates in the financial sector. It has enjoyed above average rents for many years, thanks to its superior offering and high product stickiness. However, new trends called Big Data and Big Data Analytics are now emerging and represent both a great business opportunity and an important threat that could disrupt the way the industry operates.

This paper recommends Dataphile to create new cloud-based services that will use predictive and prescriptive analytics on a Big Data infrastructure in order to provide enhanced user value for small to medium broker-dealers. The main purpose of the new services will be to help investment firms achieve above-average net rates of return for their retail and institutional investors.

In order to succeed, Dataphile should create a new subsidiary company responsible for capturing publicly available data not stored in Dataphile's current infrastructure such as mobile and unstructured data. The subsidiary company could obtain this information from multiple online sources such as Twitter and financial blogs, newspapers, and websites. This new data would then complement the private client data Dataphile already stores on its servers and would be leveraged by a new internal Analytics team responsible for product research and development. This team, composed of experienced data scientists, would develop the products by performing rapid, iterative and inexpensive experiments with Dataphile's new Big Data infrastructure. They should focus on predictive and prescriptive analytics and their desired target should initially include all small to medium-size investment firms operating in Canada, not only Dataphile's current clients. Then, if the new products are successful, Dataphile could adapt them to different securities markets in order to target investment firms operating in other countries.

## **Dedication**

*To Glorissa, for your support and encouragement in helping me reach this milestone.*

*To 'ma chouette' Kaia; thank you for your support and understanding as papa spent long  
hours studying and writing.*

## **Acknowledgements**

Thank you to my supervisor Dr Paul Terry for his guidance, suggestions and insights, which were instrumental in developing ideas for this paper.

Thank you to John Tam and Dataphile for their time, support and participation in this project.

Thank you to my SFU professors and classmates; the two years we shared have been a great learning experience.

Last but not least, thank you to my friends and family for their understanding and encouragement as I went through this educational journey.

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## **Glossary**

<b>ADP</b>	Automatic Data Processing
<b>BFS</b>	Broadridge Financial Solutions
<b>BD</b>	Big Data
<b>IA</b>	Investment Advisors
<b>MFDA</b>	Mutual Funds Dealer Association
<b>ODP</b>	Outsourced Data Processing
<b>B2B</b>	Business-to-Business
<b>B2C</b>	Business-to-Consumer
<b>OFA</b>	Online Financial Advisors
<b>PUV</b>	Perceived User Value
<b>ETF</b>	Exchange-Traded Fund

# 1 Introduction

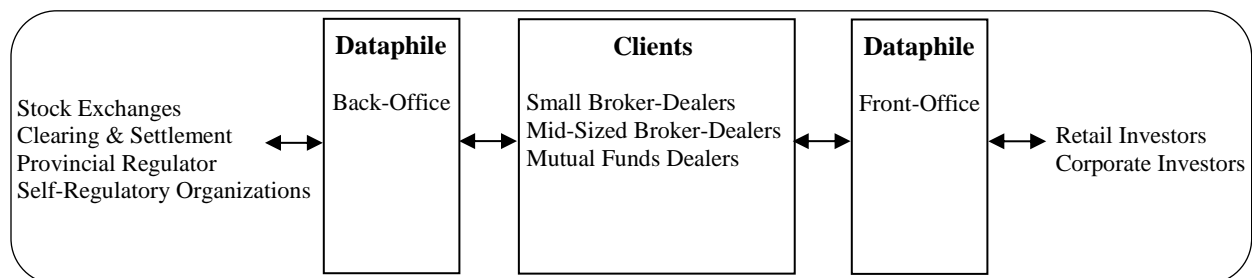
## 1.1 Company Description

Dataphile Inc., founded in 1991 and headquartered in Toronto, Ontario, is a leading cloud-based vendor providing real-time, IT-driven solutions for Canadian independent securities and mutual fund dealers. It offers a flexible end-to-end product suite including a processing, recordkeeping and reporting system, as well as an Internet-based application for instant access to securities holdings and cash balances. The Dataphile platform is divided into a front-office and back-office components:

- The front-office applications act as an intermediary layer between broker-dealers and retail or institutional investors.
- The back-office modules are a channel enabling broker-dealers to exchange information electronically with the regulatory bodies of Canada. These include provincial regulatory bodies as well as self-regulatory organizations such as stock exchanges.

Given this information, Dataphile’s business model is represented in figure 1.1 and shows that the front-office and back-office components serve different purposes and clientele.

Figure 1.1 Business model of Dataphile



Dataphile’s 120 employees are located in two offices; 70 people work from the Vancouver downtown office while the remaining 50 employees work at the firm’s headquarters in Toronto. Since inception, Dataphile has had great success in converting small to mid-tier broker-dealers to their platform. It landed its first contract in 1992 with a Vancouver-based firm and has since

converted over 25 clients. Of all these clients, none converted off Dataphile to use a competitor's system, pointing out to the stickiness and lock-in effect resulting from the Dataphile suite<sup>1</sup>.

In May 2003, a division of Automatic Data Processing (ADP) called Broadridge Financial Solutions (BFS) signed an agreement to acquire Dataphile. As BFS was previously only operating in the United States financial industry, it viewed in Dataphile an ideal opportunity to become an active player in the Canadian securities market. Even though Dataphile was from then on operating within the BFS family, it kept a great deal of control over how it ran its internal processes. One thing that did change, however, was in regards to budgetary items like headcounts and product pricing, where Broadridge has the final say.

In the past decade, Dataphile released a handful of new products, which were all merged onto its main platform. However, none resulted in considerable commercial success, which explains why Dataphile today still generates most of its revenues from its initial core product; trade and order processing. Dataphile's operations and internal processes have remained relatively unchanged throughout this period. This is true even though new entrants, important regulatory changes and a severe downturn rocked the financial industry.

Now, a substitute product termed 'online financial advisor' (OFA) is picking up steam on the U.S. securities market and, in time, could steal market shares from Dataphile. By the same token, a new trend called Big Data (BD) is emerging and could help Dataphile further differentiate itself from competitors and create additional user value, leading to sustained competitive advantage. BD is a term used to describe a "massive volume of both structured and unstructured data that is so large that it is difficult to process using traditional databases."<sup>2</sup> Structured data includes information in fixed fields within a record or file, whereas unstructured data includes videos, audios, books, GPS data and e-mail messages. The opportunity resides in the fact that Dataphile could produce new insight from this wealth of data, to help broker-dealers be more efficient and make better investment decisions. However, BD can also become a liability should Dataphile employ the wrong strategy and allow competitors to capitalize on the new trend. In light of the above, Dataphile's response has been to undertake a new corporate strategy aiming to reap some benefits from the emerging BD movement.

The purpose of this paper is to present a strategic analysis for Dataphile. First, it will analyse Dataphile's external environment and provide an assessment of its current situation. Then, it will

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<sup>1</sup> The only clients that moved off of Dataphile either went out of business or were acquired by another firm

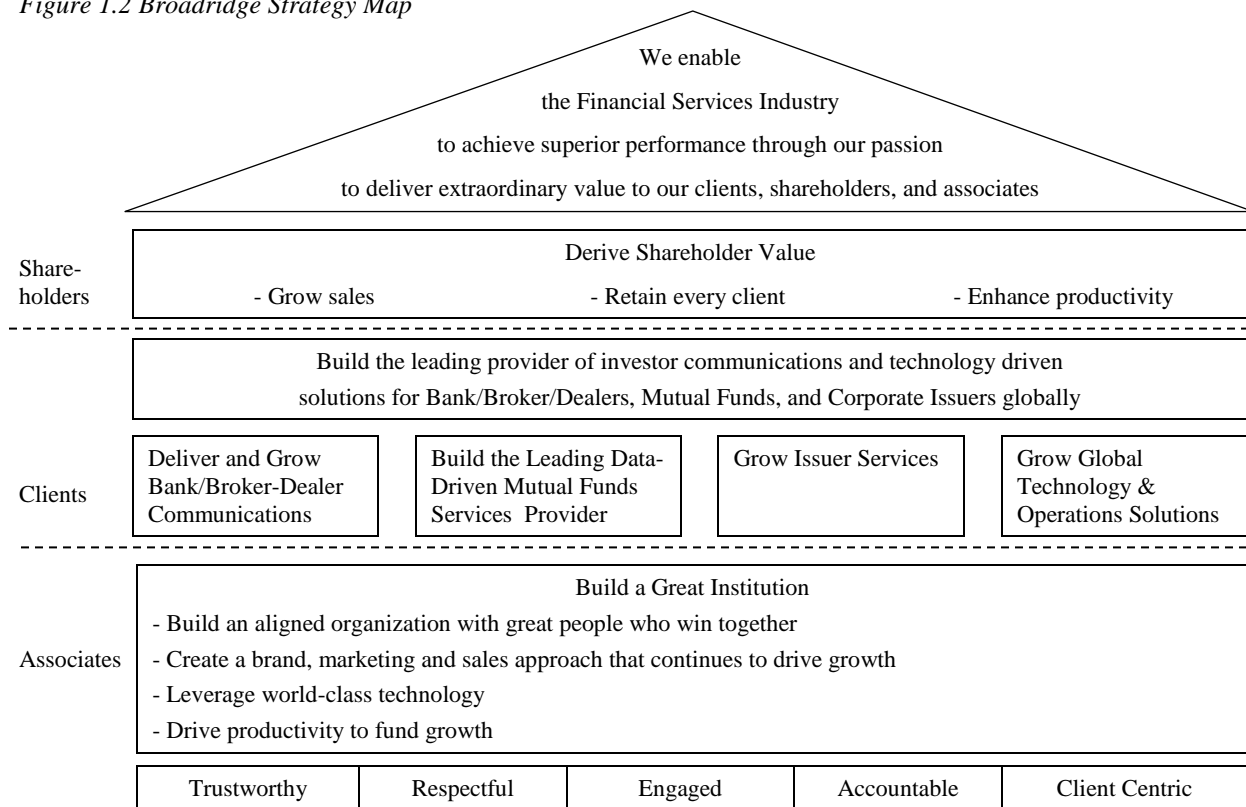
<sup>2</sup> Wikipedia. (2014). *Big Data* from [http://www.wikipedia.com/TERM/B/big\\_data.html](http://www.wikipedia.com/TERM/B/big_data.html)

discuss the tactic employed by a new threat that could potentially compete with Dataphile and suggest a new strategy it could employ to increase its market shares and maintain its position as leader. A few implementations will be presented and the paper will conclude by providing a recommendation on how to best pursue the BD opportunity.

## 1.2 Ownership and Vision of Broadridge Financial Solutions

Four years after the purchase of Dataphile, BFS spun off from ADP to become an independent, publicly traded company on the New York Stock Exchange. Dataphile’s parent company is governed by a board that is made up of seven independent directors, one chairman and the current chief executive officer. The company’s vision is to “[...]enable the Financial Services Industry to achieve superior performance through our passion to deliver extraordinary value to our clients, shareholders, and associates<sup>3</sup>”, and its strategy map is depicted in figure 1.2:

Figure 1.2 Broadridge Strategy Map



Source: *Broadridge Financial Solutions*

<sup>3</sup> Broadridge Financial Solutions. (2013). *Broadridge Strategy Map*

Broadridge's services and products are extensive and span multiple continents. Given the limited scope of this analysis, the remainder of this paper will focus exclusively on BFS' wholly owned subsidiary Dataphile and its cloud-based platform.

### 1.3 Overview of Dataphile's Services

Dataphile's services are grouped into four central products, which can be further divided into several modules that perform highly specialized functions<sup>4</sup>. Below is a high-level description of these four products:

- **ExeClear:** This product is the backbone of the Dataphile suite and comprises over 10 modules. It is a real-time processing, multi-currency recordkeeping and reporting system designed to meet Canada's regulatory requirements. It enables users to process cash deposits, corporate actions and income transactions. It includes all functions required to generate the tax slips required by Canada Revenue Agency and Revenue Québec. Given its nature, it is mainly used by back-office people.
- **RapidPhire:** This five-module order processing system enables firms to enter buy or sell trades for stocks, bonds and mutual funds. Once these trades are validated by the system, RapidPhire automatically sends them to stock exchanges where they can be executed. Shortly after, RapidPhire receives a confirmation of the order and updates the client holdings via the ProPhile product, described below. Since this product communicates with exchanges, it is mainly used by investment advisors who will execute trades while talking with their clients.
- **ProPhile:** This product contains eight modules, all revolving around account information. It serves many functions including account openings and customer relationship management. ProPhile also contains portfolio-reporting tools and query tools, which can be used to create custom reports. Just like RapidPhire, its main clientele is front-office people.
- **ExeNet:** This product gives end investors instant access to their security holdings, cash balances, pending trades, and account history from computers and mobile devices. It offers similar functionalities as other online investment sites and uses a login page and encryption protocols for secured access. ExeNet differs from the previous products in that its primary audience is not Dataphile's clients, but rather the clients of Dataphile's clients.

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<sup>4</sup> See table 1.1 for a list of the groups and corresponding modules



## **1.4 Overview of Dataphile’s Customer Segments**

Dataphile’s clientele is limited to small and medium-sized broker-dealer firms, as well as mutual fund dealers. Below is an explanation of these three customer segments.

- Small brokerage firms; on a typical month, these firms process less than 5,000 trades. They are fully licenced and accredited under Canada’s regulatory bodies and offer their services to both institutional and retail investors. Some of these firms specialize in a limited number of areas, for example investments related to energy companies. They use fewer Dataphile modules than bigger clients. Currently, ten clients fall into this category and generate less than 20% of Dataphile’s revenues.
- Mid-size brokerage firms; these firms process over 5,000 trades per month and usually offer investors a greater variety of services and investment opportunities. Although they usually operate in many countries, only their Canadian business units use the Dataphile platform. As with their smaller counterparts, mid-sized broker-dealers are licensed and accredited under the various Canadian regulatory bodies. In total, 13 clients fall in this category and generate over 80% of Dataphile’s revenues.
- Mutual fund dealers: currently, all mutual fund dealers using the Dataphile platform are affiliated with broker-dealers already using this product. They are discussed separately from their parent company simply because they use a module in the Dataphile platform no other firms use. Mutual fund dealers must be registered under the Mutual Funds Dealer Association (MFDA), the national self-regulatory organization for the distribution side of the Canadian mutual fund industry.

## **1.5 Summary of Dataphile’s Product and Customers**

Although most of the services offered by Dataphile are available for all three customer segments, some do target one segment over the others. For example, only mid-sized firms use a highly customizable module facilitating new account openings. As these modules require big upfront costs, smaller dealer-broker opening up a limited number of accounts each year would be hard pressed to justify such an investment. Another module used by only one customer segment is the mutual funds module. Table 1.1 summarizes Dataphile’s current services and the client segments that use them.

Table 1.1 Product-Customer Matrix for Dataphile

Products / Modules	Small Brokerage Firms	Mid-Size Brokerage Firms	Mutual Funds Dealers
<b>ExeClear</b>			
Cash Receipt	•	•	•
Journal Entry	•	•	•
Recurring Events	•	•	•
Trade Input	•	•	•
Mutual Funds			•
Entitlements	•	•	•
Elections		•	
Security Master	•	•	•
Account Fees		•	
Year End	•	•	•
<b>RapidPhire</b>			
Order Book	•	•	•
Trader Control	•	•	•
Trade Approval	•	•	•
Post Execution	•	•	•
<b>ProPhile</b>			
Account Inquiry	•	•	•
General Inquiry	•	•	•
Client Master	•	•	•
OpenView	•	•	•
Bridge		•	
Bridge Workflow		•	
Custom KYC		•	
Portfolio Management		•	
<b>ExeNet</b>			
Online Interface	•	•	•

Developed by author. Adapted from Boardman and Vining, 1996

## **2 External Analysis of Dataphile**

This chapter will begin by providing a high-level introduction of the Canadian securities industry, since Dataphile's clients operate within this overarching market segment. This will be followed by a review of the specific market niche in which Dataphile operates, called the 'data processing' sector. Finally, an external analysis of the competitive forces within the outsourced data processing market will be presented in order to assess the level of attractiveness of Dataphile's industry.

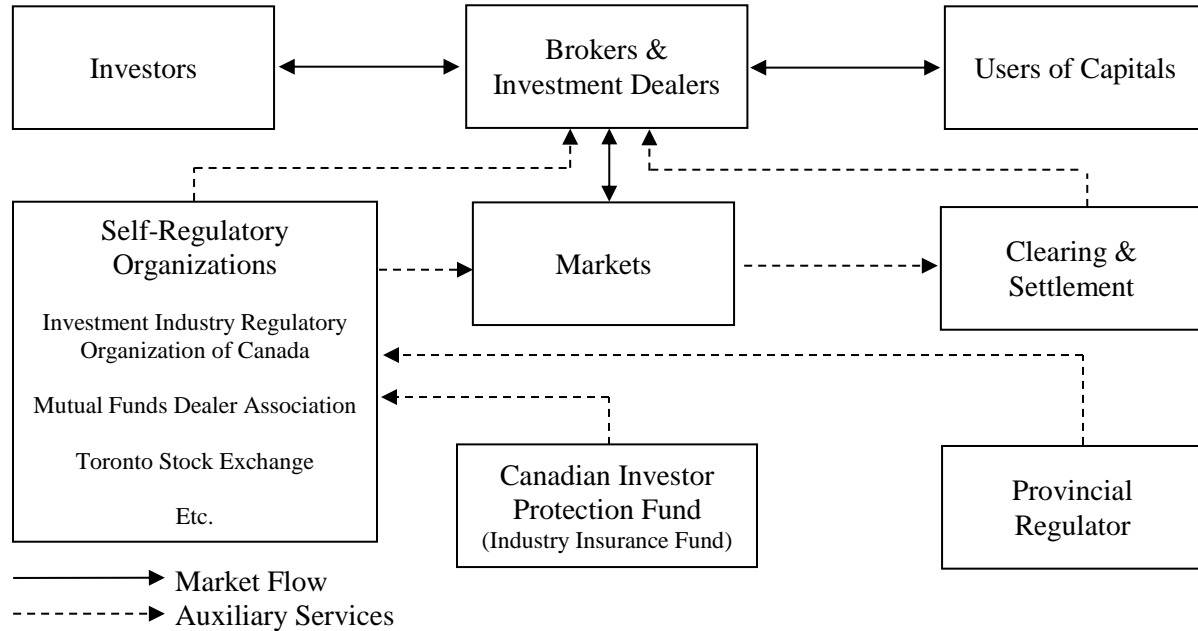
### **2.1 Introduction to the Canadian Securities Industry**

#### **2.1.1 The Canadian Securities Industry**

The financial services industry of Canada comprises three main segments; the banking, the insurance and the securities/investment services. Although the securities services segment is the smallest of the three, it is still an important contributor to Canada's economy. As of 2007, 203 firms were active members of the Investment Dealers Associations of Canada, resulting in the employment of 42,300 people. The capital engaged in this industry amounted to \$17.48 billion in 2007, representing a 65% increase since the turn of the millennium.

The securities industry includes many participants to ensure that an efficient capital market continues to drive Canada's growth. The relationship amongst these major players is illustrated in figure 2.1. The key purpose of the securities industry is based upon a simple notion; transform savings into investments and make this capital available to those who need it. Since Dataphile focuses exclusively on transforming savings into investments, the act of 'making capital available to those who need it' is not discussed in this paper.

Figure 2.1 Major Participants of the Securities Industry and their Relationship



Source: CSI Global Education Inc. (2010). *The Canadian Securities Course, Volume 1*, p. 2-6

### 2.1.2 Regulations Within Canada's Securities Industry

The securities industry is heavily regulated. Overall, there are nine types of regulatory bodies, each serving a specific role and enforcing distinct rules. This section briefly introduces some of these organizations and concludes by explaining why this matters for Dataphile.

A first group of regulatory bodies is the provincial regulators. Contrary to most other developed nations, Canada does not have a countrywide securities regulator. Rather, the regulation of the securities business is done at the province or territory level by separate agencies, which are then coordinated through the Canadian Securities Administrators bureau. The objective of the provincial and territorial securities regulators is to manage and harmonize the regulations of the Canadian capital markets.

Another group is the self-regulatory organizations, which includes stock exchanges, the Investment Dealers Association and the Mutual Fund Dealers Association. Their objective is to exercise some degree of regulatory authority over the industry by setting rules regarding the business and financial conduct of dealer firms as well as to enforce members' conformity with securities legislation.

Lastly, the industry includes regulatory bodies such as the Canadian Investor Protection Fund, the Mutual Fund Dealers Association Investor Protection and the Canada Deposit Insurance Corporation. They act as a security net by providing investors with last-resort protection in the case of investment dealers, mutual fund dealers or financial institution insolvency.

In order to continue to do business, Dataphile must meet the requirements set forth by all regulatory bodies; success cannot happen otherwise. An important consideration is that such regulatory requirements add significant complexity and costs, while at the same time provide little opportunities for differentiation, since all firms must abide by the same rules.

## **2.2 Solutions Within the ‘Data Processing’ Sector**

This section discusses the subset of the securities industry that more precisely describes the market that Dataphile operates in: the ‘data processing’ sector. Although the various solutions within this sector perform a broad range of activities, they all revolve around two key operations:

1. They enable the trading of securities, and
2. They assist investors in managing their wealth.

Since users of data processing solutions have very different needs from one another, it is useful to group them into three niche markets: big investment firms, small to mid-size investment firms and retail investors. The following sub-sections will describe these three customer segments and discuss some attributes of the data processing platforms they tend to use.

### **2.2.1 Data Processing Solutions for Big Investment Firms**

Big brokerage houses, most of which were bought by Canada’s big banks in the 1980s and 1990s, use an amalgamation of systems in order to provide investors with an increasing variety of services. Firms operating in this market niche usually have their own IT department. Some of their systems are built in-house while others are bought from external vendors. The entire IT infrastructure must be set up in a way that can support a very high volume of transactions in a very efficient way. As such, these systems are usually very expensive to build, use and maintain.

### **2.2.2 Data Processing Solutions for Small to Mid-Size Investment Firms**

In Canada, the majority of broker-dealers fall in the small to medium-size investment firm category. Although these firms may specialize in different financial services from one another, they

are grouped in the same market segment since their data processing needs are similar. Their overall IT infrastructure is simpler than that of big investment firms and they serve fewer investors, resulting in lower revenue streams. As such, these firms will usually employ relatively small IT departments, opting instead to outsource much of their data processing needs to external vendors.

In Canada, two outsourced data processing (ODP) firms dominate this niche: Dataphile and IBM. These companies quickly adopted cloud solutions – years before the term became mainstream – as they realized early on that this is what these smaller broker firms needed. These ODP platforms store clients’ data onto their own data warehouse and have users access both data and programs over the Internet. All the required hardware is located in Dataphile and IBM’s offices.

### **2.2.3 Data Processing Solutions for Retail Investors**

Data processing solutions used by retail investors are mainly intended to do-it-yourself type of investors. These solutions aim to replace costly intermediaries between investors and exchanges by offering simpler ODP platforms at a fraction of the cost. Instead of following a business-to-business (B2B) model like the previous two segments, they engage in a business-to-consumer (B2C) model. This is the most competitive segment of all three niches and is characterized by monopolistic competition. Since these products do not generate the same level of consumer lock-in than solutions for investment firms, consumers more easily switch to competitors. This explains why these firms will spend more money advertising their products in order to convince consumers that their product is the better one.

### **2.2.4 Data Processing Solutions – Conclusion**

Although these three types of data processing solutions target different consumers, they all indirectly compete for trades. Indeed, all data processing firms want their system to be used to process trades, as more trades equals higher revenues. Since a trade occurs when an investor places a buy or sell order, these data processing systems essentially compete for a slice of the overall securities trading pie. If Dataphile wants to increase its revenues and capture a greater share of the securities trading market, it must provide broker-dealers with innovative solutions that will allow them to attract new investors, which in turn will generate more trades.

## **2.3 Competitive Forces in Canada's ODP Sector**

Porter's five forces analysis is a framework used to determine the competitive intensity and potential attractiveness within a specific market. In this context, the term attractiveness refers to the overall profitability of the industry. Since each of the three niche markets mentioned above requires data processing systems with very different attributes, we will limit the analysis of the competitive forces to the segment Dataphile pursues. As such, the industry is defined as the ODP solutions for the small to mid-sized broker dealers. This section will review the competitive intensity within this industry, while the next section will provide a summary of its attractiveness.

### **2.3.1 Threat of New Entrants**

Entry in any given industry increases competition and reduces the market share of incumbents. As such, the ability of existing firms to sustain high profit margins depends on how easily new firms can enter the industry. In the case of the ODP sector, three barriers to entry exist: capital requirements, economies of scale and switching costs.

#### **2.3.1.1 Capital Requirements**

Capital requirements have a direct impact on the level of difficulty required to enter a given industry. All other things being equal, the higher the capital requirements, the harder it is for a firm to enter a given industry. In the ODP segment, very high costs are required to create a new solution that can rival with Dataphile or IBM. In addition, these costs are made in intangible assets, such as intellectual property and lines of codes, which are mostly irretrievable in the case of failure. This increases the risks for new entrants.

#### **2.3.1.2 Economies of Scale**

Economies of scale exist when long-run average costs decline as output increases. Just as with high capital requirements, economies of scale are significant within the ODP industry. An attempt by a third firm to enter this industry would be difficult, as it would be unable to generate the volume necessary to enjoy the reduced average costs Dataphile and IBM currently experience.

### **2.3.1.3 Switching Costs**

Switching costs can be defined as “the negative costs that a consumer incurs as a result of changing products. Although most prevalent switching costs are monetary in nature, there are also psychological, effort- and time-based switching costs.<sup>5</sup>” In Canada’s securities industry, a number of factors explain why consumers are vulnerable to high switching costs.

A first factor is the inherent complexity of ODP systems and the fact that staff must receive extensive training. Going through this learning process will be expensive and lengthy, can be frustrating and will require a major effort from staff and management, as people generally resist change.

A second factor is the costs related to switching ODP platforms. Companies usually sign long-term contracts and are heavily penalized for cancelling them. Even if a firm waits until their contract expires, the costs incurred to switch ODP platform will still be considerable. Also, the time required to complete such a change are substantial.

Finally, not all decisions to move to a new system are appropriate. A decision to switch to a system that does not meet a firm’s needs could have devastating effects and may even lead to insolvency. Such negative outcomes are a major deterrent for firms contemplating a platform switch, especially if the new ODP system is from a new and unproven entrant. For the above reasons, we can see that product stickiness is extremely high in the ODP industry.

## **2.3.2 Bargaining Power of Suppliers**

The bargaining power of suppliers is important when determining the industry attractiveness and may result in a hold-up scenario that will decrease the profitability of ODP companies. Three types of suppliers exist in this industry: labour, programming language companies and hardware.

### **2.3.2.1 Labour**

Given the fact that ODP firms operate in the knowledge sector and do not really require raw material, internal labour is perhaps their most important supplier. However, these knowledge workers are rarely unionized and they tend to have limited power to negotiate more favourable terms for their services. As such, they have little power in appropriating returns from ODP firms.

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<sup>5</sup> Investopedia. (2013). *Switching Costs* from <http://www.investopedia.com/terms/s/switchingcosts.asp>



### **2.3.2.2 Programming Language Companies**

In some cases, ODP firms built their system using a proprietary programming language. In this case, they are potentially vulnerable to supplier hold-up by the company that owns the programming language. For example, Dataphile built its system using the programming language Progress. The company that owns this language could attempt to appropriate some returns from Dataphile by taking advantage of its sunk investment and high switching cost. Faced with a cost increase, Dataphile would have little choice but to absorb the increase.

### **2.3.2.3 Hardware Suppliers**

In some industries, hardware suppliers can have considerable power when negotiating with their buyers. This is not the case in the ODP industry, as the hardware used is mainly viewed as a commodity. Additionally, hardware suppliers are highly fragmented, which result in low bargaining power over ODP companies.

### **2.3.3 Threat of Substitutes**

Currently, there are no direct substitute products to the ODP solutions serving small to medium size broker dealers. In other words, these broker dealers can choose IBM or Dataphile. However, indirect competitors do exist; instead of competing for the broker dealers' business, they compete against them for a slice of the securities trading pie and do so by directly targeting end investors. The vision of these B2C products is simple: make the current business model of investment firms, along with their ODP platforms, obsolete. They wish to become the preferred intermediary between investors and stock exchanges by offering services at a fraction of the incumbents' fees. There are currently two types of such substitute products: discount brokers and online financial advisors.

#### **2.3.3.1 Discount Brokers**

Discount brokerage, also referred to as online brokerage, is a business that charges clients significantly lower fees than traditional brokerage firms, but do not provide investment advice. They allow investors to buy and sell securities on-line and offer fewer services and support than traditional brokers. Due to their inherent nature, their main clients are self-directed investors and their success with average investors is limited.

### **2.3.3.2 Online Financial Advisor**

Online financial advisors (OFA) are a type of substitute product currently emerging in the U.S. securities industry. Even though this category of product is not currently available in Canada, it will be discussed in this paper given the probability it will enter this market in the future. Like discount brokers, they rely on online technologies to keep their fees low. However, unlike discount brokers, OFA's provide a wealth of services that were previously only available to rich investors via traditional brokerage firms. First, these products will determine the investor's risk profile based on a series of questions presented during account opening. Based on this information, OFA's will create a customized portfolio and provide the investor with automatic rebalancing and management. OFA's also offer numerous levels of tax minimization services to ensure investors achieve the highest possible return on their investment. The two leading OFA companies currently have \$1.5 billion of assets under management, even if they have been in operations for only about five years each. What makes these products appealing is that they target all types of investors, not only the do-it-yourself type.

### **2.3.4 Bargaining Power of Buyers**

Industry profits tend to be lower when customers have the power to negotiate favourable terms for the services provided by the industry. In the ODP industry, the bargaining power of a buyer partly correlates with how much revenues it brings to the ODP firm. In addition, there are several other factors that limit the ability from buyers to negotiate more favourable terms. Table 2.1 lists the main reasons why the overall bargaining power of buyers in the ODP industry is low to medium:

Table 2.1 Reasons why the Bargaining Power of Buyers is Low to Medium

	Small Broker-Dealer	Mid-Size Broker-Dealer
Purchase small volumes relative to the ODP's sales	•	
High switching costs	•	•
Cannot easily backward integrate or produce the seller's product themselves	•	•
Cannot easily use a substitute product	•	•

### 2.3.5 Rivalry amongst Existing Competitors

In the Canadian ODP industry, IBM and Dataphile own nearly all the market shares and they compete against each other by emphasizing differentiation over price. This said, the actual rivalry between these two firms is low given the high platform stickiness and high switching costs characterizing the industry. Once a firm has selected a platform, it will remain with it for a long time regardless of the effort put forward by the rival company. This consumer loyalty helps explain why both ODP companies have achieved sustained profitability – but little growth – over the past two decades. It also explains why the firms are not aggressive at trying to expand their market share at their rival's expense.

### 2.3.6 A Sixth Force: Government Regulations

Governments do not dictate how many firms can enter the industry, but they write the rules that ODP companies must abide by. This adds an important complexity factor that can deter new entrants. In addition, regulations may negatively affect a company's profitability based on contract arrangements. For example, Dataphile is currently legally obligated to perform regulatory system changes at no charge. A new entrant wishing to charge the development costs required to comply with these regulations would have a hard time selling its product to clients. Finally, although regulations will result in cash outflow, they will not provide differentiation from competitors, since all ODP must comply with them.

### 2.3.7 A Seventh Force: Technology

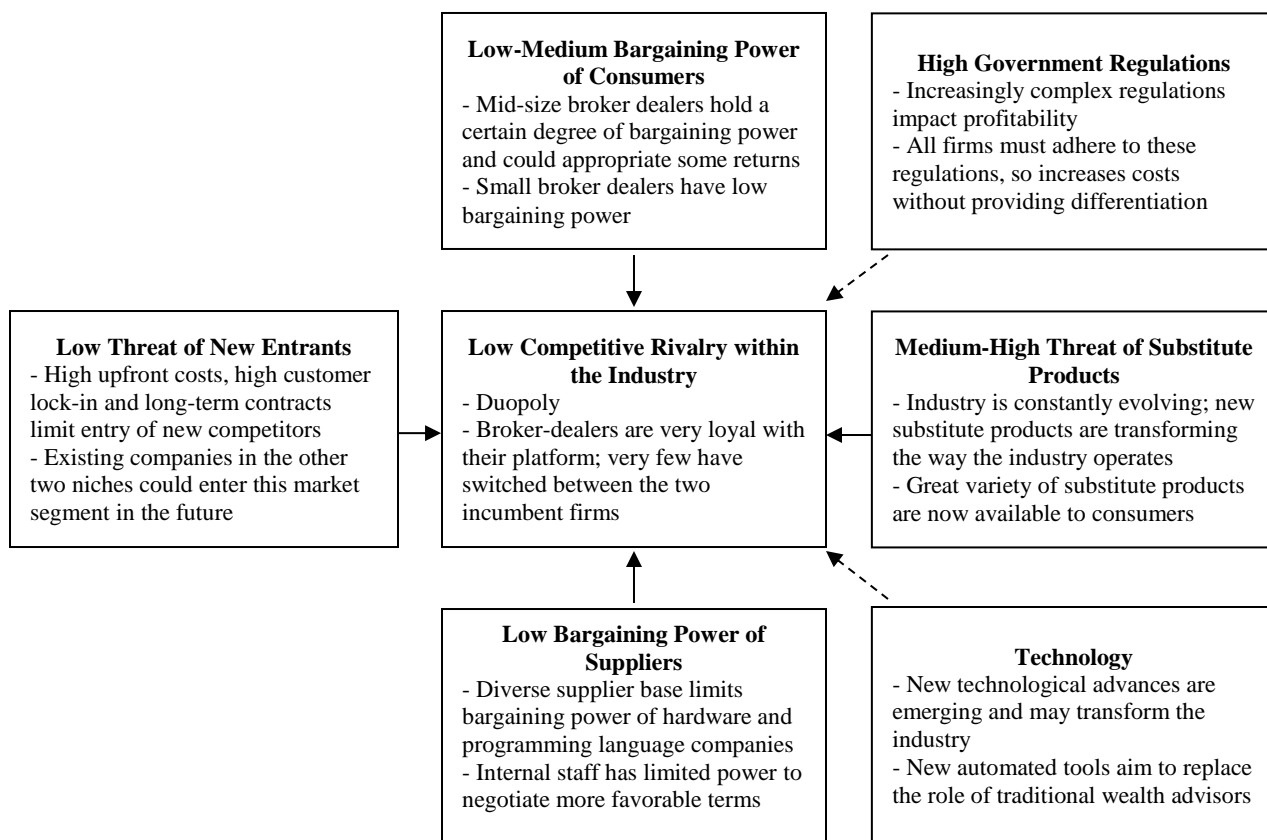
Since the introduction of mainframe computers, technological innovations have played an important role in the evolution of the securities industry. Today, we are witnessing an outburst of new technological trends that can significantly disrupt how the industry operates. The potential for

change is remarkable and ODP companies that fail to embrace these new trends could struggle to preserve their user base. One promising trend in the securities industry is BD. As this paper will suggest in later chapters, BD and BD Analytics have the potential to increase brokerage firms' gross rates of return and lower their costs, an appealing combination for any company wishing to increase their bottom lines.

## 2.4 Level of Industry Attractiveness

Given the many barriers to entry discussed above, the overall level of the industry attractiveness is low. Figure 2.2 depicts the competitive forces within the ODP industry servicing the small to medium size broker-dealer niche in Canada.

Figure 2.2 Competitive Forces in the outsourced data processing industry



Developed by author. Adapted from Porter, 1979

In summary, there is a low threat of new entrants, low bargaining power of suppliers, low competitive rivalry within the industry and a low to medium bargaining power of consumers. These forces are therefore not a significant concern for the incumbent firms, as they are not able to capture significant rents from the ODP companies.

The force that affects the attractiveness in this market the most is the threat of substitute products. This should be central to the incumbent firms' future strategies. Discount brokers have had moderate success at appropriating revenues from ODP firms by directly targeting do-it-yourself end-investors. Also, OFAs could eventually enter the Canadian securities industry and capture even more business from ODP's clients. Competition from substitute products will likely increase in the future, as technological innovations makes it possible to exploit new avenues that were unthinkable in the past.

As discussed in the remaining chapters, Dataphile should act now to prevent future entry from substitute products and invest in new products to create new markets and increase its revenues. The option favoured in this paper is to use BD and BD analytics to create new tools that will help broker-dealers increase the net rates of return they realize for investors.

## **3 Assessment of Dataphile’s Current Situation**

This section will first analyse Dataphile’s various sources of competitive advantage. It will then perform a scan of the external macro-environment in which Dataphile operates, followed by a review of how new societal trends are currently shaping the securities industry. The chapter will conclude by describing OFA’s strategy and discuss how it could disrupt the way investing is currently done.

### **3.1 Dataphile’s Sources of Competitive Advantage**

Competitive advantage is the ability for a firm to earn above average rents in a given industry for an extended period of time. Even though the financial industry has experienced important changes driven by regulatory reforms, economic crises and industry consolidations, Dataphile succeeded to maintain profitable margins since inception. This section will review the five characteristics that helped Dataphile maintain its position as leader in the ODP market: superior product, differentiation, first-mover advantage, reputation and strong customer relationships.

#### **3.1.1 Superior Product**

One of Dataphile’s main advantages is the quality of its product; overall, more than 93% of its code changes capture the clients’ requirements successfully and do not contain any ‘bug’. This is a good rate, given that “code wants to be wrong.”<sup>6</sup> Some of the key concepts that made it possible to design a superior product include the fact that Dataphile:

- fosters a culture where continuous improvement is encouraged and rewarded
- regularly assesses internal procedures to make sure they provide added value
- incorporates the industry’s best-practices whenever possible
- spends considerable time testing new code before deploying it to clients

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<sup>6</sup> Wikipedia. (2014). *Information Wants to be Free* from [http://en.wikipedia.org/wiki/Information\\_wants\\_to\\_be\\_free](http://en.wikipedia.org/wiki/Information_wants_to_be_free)

### **3.1.2 Differentiation**

Dataphile is the only Canadian ODP platform that offers both a back-office and a front-office component. Its main competitor, IBM, focuses exclusively on back-office processing. This means that Dataphile's clients do not need to buy a separate front-office component, resulting in lower costs and a simpler IT infrastructure. This has been a key selling point for Dataphile.

Another central characteristic of the Dataphile platform lies in its flexibility. Since clients go about their business in different ways, it was imperative for Dataphile to build a platform that was flexible enough to satisfy each client's unique processes. This increases maintenance costs and complicates coding, but it has been central to Dataphile's success and is relatively difficult to replicate by competitors.

### **3.1.3 First-Mover Advantage**

A key reason why Dataphile succeeded is that it benefitted from the first mover advantage. It was one of the very first few firms to provide broker-dealers with a solution they truly needed, at a time where technological solutions were scarce. Since clients have now fulfilled this specific need, new companies trying to enter this industry have to address a different requirement in order to be successful. As such, first-mover advantage does constitute a source of competitive advantage for Dataphile.

### **3.1.4 Corporate Reputation**

Since Dataphile is a business unit of BFS, the reputation of both entities is important in helping achieve sustained competitive advantage. At the business unit level, Dataphile has built a reputation as a high-quality provider of ODP solutions on the Canadian securities market. At the corporate level, BFS has put forth considerable effort to strengthen its reputation standing. It is now recognized as being an ethical and trustworthy organization. It treats its employees with respect and spends considerable time and resources addressing their concerns and implementing their suggestions.

Also, BFS is financially strong with great growth prospects, engages in social responsibility by supporting various causes and is strongly committed to its customers' success. Interestingly, many of the above components can be found in BFS's strategic map, illustrated in figure 1.2. The good reputation of Dataphile and BFS will generally translate into competitive advantage for one of the following reasons:

- High-performing employees are more likely to join BFS thanks to their reputation of how well they treat their staff.
- Customers may prefer to deal with BFS instead of competitors and may persuade others potential consumers by word of mouth.
- Suppliers could be more inclined to trust BFS's ability to pay and thus provide them with better trading terms.
- Government regulators may trust BFS better than other companies and be less inclined to penalize them if mistakes are made along the way.

### **3.1.5 Customer Relationships**

The foundation of Dataphile's success is great customer relationships, which was achieved over the years through a series of key initiatives. Here are some of these initiatives:

- Fast and reliable support: when clients have a question, they enter an electronic 'ticket' which is to be answered within 24 hours.
- BR on Site: this program sees a delegation of six Dataphile employees spend an entire day at a customer site to talk about the system, elicit feedback and address complains.
- BR Star: this program aims to recognize end-users' assistance when they work with Dataphile employees and consists in a \$10 gift card.

The full list of Dataphile's initiatives is more exhaustive than what is discussed above. However, the central purpose is the same: show clients that Dataphile appreciates their business and wants to be a partner in helping them achieve superior performance.

### **3.1.6 Summary of Dataphile's Sources of Competitive Advantage**

The above five attributes help explain how Dataphile has achieved and maintained a competitive advantage up to this date. However, as we will see in section 3.3, the securities industry is currently experiencing new trends that can bring about significant changes; the question then becomes whether these five attributes will remain a source of competitive advantage for Dataphile.

The sources of Dataphile's competitive advantage alone were insufficient to achieve success; they needed to be supported by a well-articulated strategy to help guide employees. The next section will review Dataphile's current strategy and discuss the various parameters that helped shape Dataphile into the company it is today.



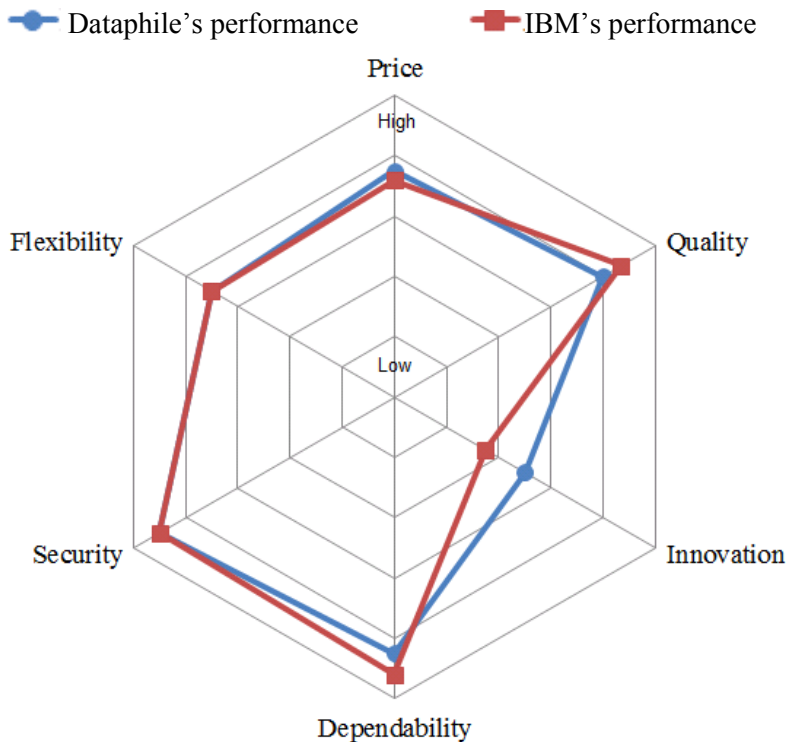
## 3.2 Dataphile’s Current Strategy

Dataphile’s current strategy is to enable the financial services industry to achieve superior performance by delivering extraordinary value to their clients. It does so by offering cloud-based automated solutions that aim to increase clients’ productivity and operational effectiveness. This section will list the business parameters that matter the most to Dataphile and will conclude with an assessment of Dataphile’s current strategy.

### 3.2.1 Parameters that Matter to Dataphile

The following polar chart pictorially represents Dataphile’s most valued business parameters and ranks them using a scale of low in the middle versus high on the outside. IBM is also plotted in the chart to better understand how the rival firms rank against one another. The definition of each parameter is located at the bottom of the chart.

Figure 3.1 Dataphile’s Key Parameters



- **Price:** Price tag that clients pay to use the ODP platform
- **Quality:** On-target specification solutions with little or no defects
- **Innovation:** Ability to deliver new and inventive solutions that generate additional revenues
- **Dependability:** Aptitude at delivering new solutions on time
- **Security:** Safeguards to help protect sensitive information from unlawful use
- **Flexibility:** Ability to build solutions that can be adapted to client's individual business needs

The price clients pay for the Dataphile ODP platform is moderate to high. In return for its price tag, Dataphile provides clients with a highly flexible product of high quality and that offers great security features. Although Dataphile is good at respecting its delivery commitment, it rates poorly on innovation. A low rating on this parameter may be problematic for Dataphile due to the changes currently rocking the industry.

IBM ranks slightly lower than Dataphile on the price, security and flexibility components. It performs slightly better on quality and dependability, thanks to the fact that its ODP platform offers less functionality and only specializes in back-office processing, making it simpler to release code on time and without defect. This narrower area of focus also explains why IBM ranks quite lower than Dataphile on the innovation parameter; most of its platform has remained unchanged over the years, as the firm concentrates mainly on maintenance and regulatory requirements.

Dataphile should seize this opportunity and further widen the gap with IBM on the innovation ranking. This would be a great way to increase differentiation between the two rival ODP solutions and augment user value for Dataphile's products. The remaining chapters will provide a recommendation on how Dataphile could go about improving its innovation score.

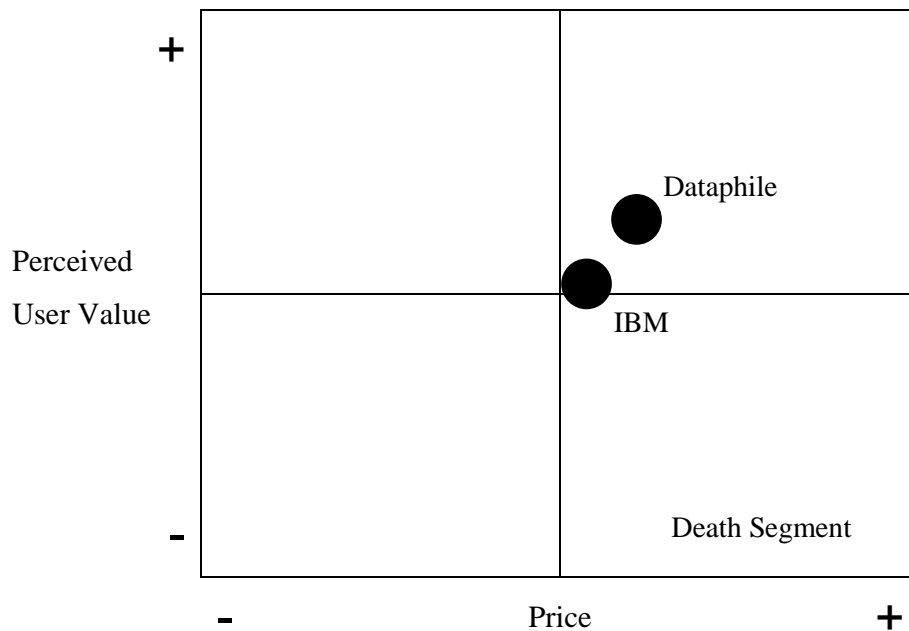
### 3.2.2 Dataphile's Current Strategy

In order to analyse Dataphile's current strategy, we will group the parameters quality, innovation, dependability, security and flexibility into an overarching attribute called 'perceived user value' (PUV). According to Businessdictionary.com, PUV is defined as "a customer's opinion of a product's value to him or her. It may have little or nothing to do with the product's market price, and depends on the product's ability to satisfy his or her needs or requirements."<sup>7</sup> Dataphile's current strategy can be represented in a graph with PUV on the 'Y' axis and Price on the 'X' axis, as shown in figure 3.2.

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<sup>7</sup> Business Dictionary. (2014). *Perceived User Value* from [www.businessdictionary.com/.../perceived-value.html](http://www.businessdictionary.com/.../perceived-value.html)

Figure 3.2 Graph of Dataphile's Current Strategy



Currently, Dataphile is in the top right quadrant of high perceived user value and high price. The net value the platform has in the mind of consumers is relatively high and so is its price tag. This strategy graph is particularly useful for two things:

1. Compare Dataphile's strategy with that of its main competitor, and
2. Evaluate different strategies it could employ in the future.

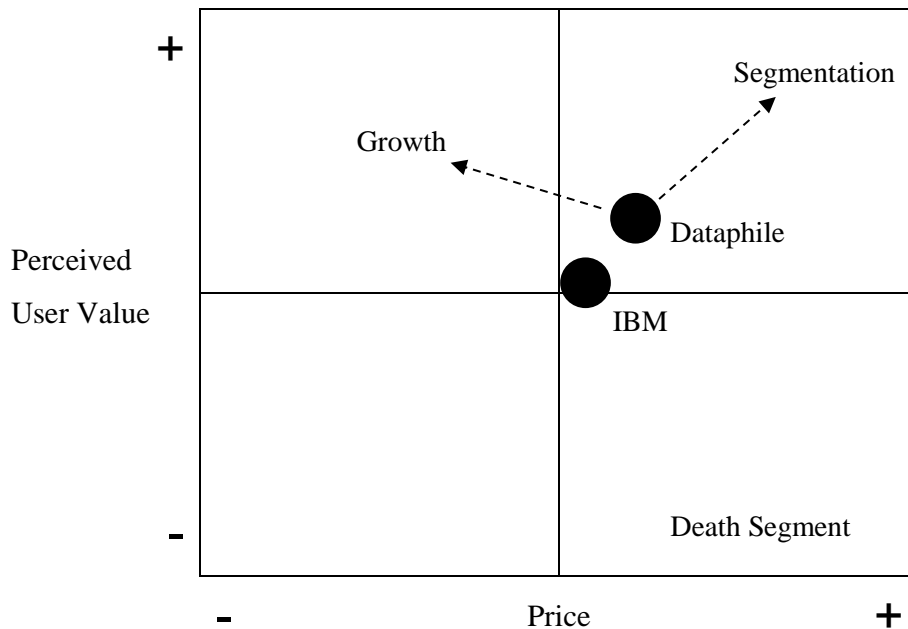
When comparing the current strategy of both incumbent firms, the important thing to notice is that Dataphile ranks above its main rival IBM in terms of PUV. There are several aspects that explain this higher rating, but the main one is that Dataphile is the only platform that offers a solution with both a back- and a front-office component. This central feature also explains why Dataphile's price is higher than IBM.

The above strategy map can also be used to analyse the different options Dataphile could use going forward. Two options seem to be available for Dataphile:

1. Segmentation strategy: Dataphile could move up in the second quadrant by increasing both PUV and price
2. Growth strategy: Dataphile could move to first quadrant by increasing PUV and lowering price

Both strategies are represented in figure 3.3 and entail an increase in perceived user value. Indeed, a company that praises itself on the high quality of its product would be ill-advised to decrease its PUV. Also, these two strategies imply that Dataphile will need to be better at innovating, as it can only increase PUV by developing new products or features that currently do not exist.

Figure 3.3 Graph of Dataphile's Possible Strategies



Strategy number one, segmentation, would help Dataphile increase its rents by targeting existing clients. It would see Dataphile create new products to be added to the current platform for an extra fee. This strategy has actually been used in the past by senior management with the creation of new modules such as Corporate Actions and Bridge. Although a few firms have purchased these new services, it has not been a resounding success in terms of increase in revenues.

The second strategy, growth, entails the delivery of completely new products that will create new markets, much like Apple did with its iPad. Dataphile would increase its PUV, while at the same time offer its new products at a lower price than its current platform. A big advantage of this strategy is that Dataphile could promote the new products to both current and new clients:

- it could offer them to current clients as add-on products;
- it could offer them to new clients as stand-alone products.

### **3.2.3 Summary of Dataphile's Current Strategy**

Dataphile's strategy has proved successful so far and has enabled it to capture a commendable slice of the small to mid-size broker dealer pie. Looking forward, there are at least three scenarios that could jeopardize Dataphile's success:

1. OFAs or different substitute products enter the securities market and make the current advisor-investor relationships outdated;
2. IBM beats Dataphile in creating new products that significantly increase perceived user value;
3. Big investment firms improve their offerings and capture the market shares owned by Dataphile's clients.

If Dataphile wants to prevent the above scenarios, it needs to be proactive and adapt its strategy based on the industry's new reality and trends. Section 3.3 will discuss those new trends and, based on this information, chapter 4 will recommend the one strategy that will best work for Dataphile.

## **3.3 Emerging Trends in the Financial Software Industry**

A key part of Dataphile's success ultimately depends on the advisor-investor relationship. This is arguably the most important and vulnerable link in Dataphile's entire business model, yet it is one over which Dataphile has little influence. If investors no longer see a benefit in maintaining a relationship with their advisors, the link will break and Dataphile's revenues will be directly impacted.

Such a change in the investors' mind-set – if it ever occurs – will not happen overnight. Rather, it will slowly evolve in the form of various interrelated societal changes. Section 3.3 will look at the various trends currently shaping tomorrow's society. The PEST framework, which stands for Political, Economic, Sociocultural and Technological, will be used to look at how these external factors can affect Dataphile's performance.

### **3.3.1 Political Factors**

In the aftermath of the financial crisis of 2008, important regulations to promote transparency were forced upon the industry. For Dataphile, this resulted in an importance increase in complexity and costs. Ultimately, some of these costs are passed down to broker-dealers, which in turn indirectly transfer them down to investors in the form of higher fees. If investment fees keep on increasing,

more investors will turn to alternative modes of investments that offer similar services at a fraction of the price, for example passive investing and discount brokers.

A second consideration is that some regulations are different between Canada and the U.S. These differences partly explain why few industry players south of the border have entered the Canadian securities market. This is not expected to change in the short term and is a good thing for Dataphile, as it limits entry from potential competitors.

### **3.3.2 Economic Factors**

Dataphile is highly vulnerable to the business cycle of the finance industry and is directly impacted by the world's economic cycle as a whole. As many people look for ways to save money, an emerging trend for investors is to choose investment vehicles with lower management fees. Interestingly, some people claim that these options actually generate higher returns over the long run. Several entities have caught up on this and have started to offer a great variety of investment options for the cost-conscious investors. One of these options is called exchange-traded funds (ETF) and has exploded in popularity over the past few years, much to the detriment of mutual funds.

This is not a positive trend for Dataphile given the nature of this newer type of investment. ETF are a passive form of investment, meaning that they involve limited buying and selling. This is in stark contrast to mutual funds, which promotes active trading and has considerable management fees. This current trend away from mutual funds and towards ETF, and the lower number of resulting trades, will likely lower revenues for Dataphile in the long run unless they do something to reverse this trend.

### **3.3.3 Sociocultural Factors**

Three important sociocultural factors have an impact on the financial services industry.

1. Canada's aging population; baby boomers have started to retire and have become less active in the financial market. As these investors pull their wealth out of the markets, they generate less trades – or revenues – for Dataphile.
2. Younger generations are now an important contributor to the financial industry; these new consumers are generally comfortable doing their financial transactions online. This is an important change to the way baby boomers were investing, who sought the human interaction provided by their advisor. As per section 3.4, some companies have understood this trend and

now offer products that are fully automated. If younger investors start investing on-line and reject the traditional advisor-investors business model, Dataphile could see its revenues drop.

3. Distrust of the securities industry: some people have become sceptical of IA's given the slew of scandals that emerged in recent years. Due to their limited understanding of this industry, some people fear they will become victims to unethical professionals. If investors lose their trust in advisors, both investment firms and their ODP platforms will have much to lose.

### **3.3.4 Technological Factors**

Technology, and the innovation it has helped to bring about, have played an important role in the evolution of the financial services industry. Today, perhaps more than ever before, the potential of technology continues to grow and will likely bring about fundamental changes to the way the industry operates. Better processing power means technology can do things that were not possible before. The amount of information that can be stored cheaply and accessed quickly has improved drastically over the past few years. Continuing advances in technology will also allow the industry to deploy increasingly sophisticated predictive analytics that will help clients make more informed investing decisions. In addition, Big Data technologies will likely become a major asset in helping financial institutions increase customer engagement, compliance, and core management.

The new technological trends at play will disrupt the industry; the question is how it will do so. For a company such as Dataphile, which is all about technology, it can result in new opportunities for growth or significant disturbance and market share loss.

### **3.3.5 PEST Analysis - Summary**

A summary of the PEST analysis is provided in table 3.1. In summary, the financial industry is currently experiencing important changes and organizations that are best prepared to face these uncertainties will be in a good position to succeed. A few trends of particular importance to Dataphile are as follow:

- Baby boomers, once the drivers of the economy, are retiring and taking their wealth out of the securities industry.
- Young investors are comfortable doing some or all of their financial operations online.
- Some investors are distrustful of advisors and look at ways to reduce their management fees.
- BD and predictive analytics will likely have an important impact on the securities industry.

Table 3.1 PEST Framework

<p><b>Political</b></p> <ul style="list-style-type: none"> <li>• The number of regulations are increasing,</li> <li>• These regulations are expensive to build and maintain and provide little opportunities for differentiation</li> <li>• U.S. and Canada have different regulations, which helps prevents entry of American ODP systems on the Canadian soil</li> </ul>	<p><b>Economic</b></p> <ul style="list-style-type: none"> <li>• Dataphile is vulnerable to downturns in the financial world and the overall economy</li> <li>• Investors are looking at ways to reduce investment fees, yet still maintain good returns</li> <li>• A great variety of low-fee investment options are becoming available, putting downward pressure on fees advisors can charge</li> </ul>
<p><b>Sociocultural</b></p> <ul style="list-style-type: none"> <li>• Retiring baby boomers are withdrawing their investments</li> <li>• Younger generations, accustomed to technology, are becoming important contributors to the securities industry</li> <li>• There is a general trend to see the financial services industry as greedy and unethical</li> </ul>	<p><b>Technological</b></p> <ul style="list-style-type: none"> <li>• Innovation in technology will continue to shape the financial industry</li> <li>• Sophisticated, predictive analytics will help clients make more informed investing decisions</li> <li>• Big Data has the potential to serious disrupt the industry; companies should embrace this new trend in order to remain competitive</li> </ul>

### 3.4 Industry Changes Since Dataphile’s Inception

All industries, at any given time, are going through some type of transformations. Several models exist to help business leaders identify which type of change is impacting their industry. One of such model is the Trajectories of Industry Change matrix illustrated in table 3.2. In this model, core activities relate to the advisor-investor relationship, whereas core assets relate to the products available to investors.



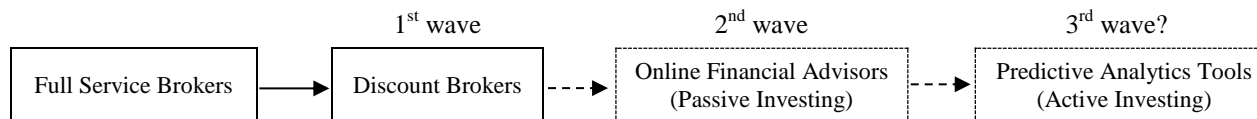
Table 3.2 Trajectories of Industry Change

		Core Activities	
		Threatened	Not Threatened
Core Assets	Threatened	<p><b>Radical Change</b></p> <p><i>Everything is up in the air</i></p> <p>Example: makers of landline telephone handsets and travel agencies</p>	<p><b>Creative Change</b></p> <p><i>The industry is constantly redeveloping assets and resources</i></p> <p>Examples: the motion picture industry, investment banking</p>
	Not Threatened	<p><b>Intermediating Change</b></p> <p><i>Relationships are fragile</i></p> <p>Examples: automobile dealerships, investment brokerages and auction houses</p>	<p><b>Progressive Change</b></p> <p><i>Companies implement incremental testing and adapt to feedback</i></p> <p>Examples: online auctions, commercial airlines and long-haul trucking</p>

Source: McGahan, A. (October 2004). Harvard Business Review – *How industries Change*, p. 90

Looking back in time, the first trajectory change that rocked the industry was the arrival of discount brokers. More than a decade later, a new change appeared in the U.S. with the OFAs. This paper argues that a third wave is on its way and will consist of predictive analytics tools using BD. These trajectory changes are graphically represented in figure 3.4 and are discussed below.

Figure 3.4 Trajectory Changes in the Securities Industry



### 3.4.1 First Trajectory Change

The entrance of discount brokers has had transformational effect on the securities industry. Based on McGrahan’s trajectories of industry change model, this was an intermediating change; the core activities of traditional broker-dealers were threatened. From that point on, investors no longer needed to talk with an advisor in order to trade securities. Also, the internet gave investors access to information previously only available to advisors. In contrast, the core assets did not change in that the same investment options remained available to investors. Although this type of substitute product offered a new option to investors, it mainly targeted a small niche within the market: the do-it-yourself type of investors.

### **3.4.2 Second Trajectory Change**

The securities industry is now experiencing a second transformational change with the entry of OFAs. Although these products are currently only available in the U.S., it is reasonable to assume that they will eventually penetrate the Canadian securities market. These products, which have now been in operation for a little more than five years, seek to “automate the role of traditional wealth advisors by offering investors cloud-based software to guide their savings plans and optimize investment gains.<sup>8</sup>” This is also an intermediating change, in that the advisor-investor relationship loses some of its appeal. In other words, advisors may become less important to investors since their automated substitutes bring similar benefits at a fraction of the price. Here are OFA’s main selling points:

- They automatically rebalance the portfolio on the investors’ behalf;
- They have a very low price tag;
- They invest in the most tax-efficient manner to maximize the investor’s net returns;
- They offer limited products by focusing exclusively on passively managed index funds.

### **3.4.3 Possible Third Trajectory Change**

Finally, the next transformational change that may impact the securities industry relates to the Big Data opportunity and will provide advisors with sophisticated predictive analytics tools. The purpose of these new tools would be twofold; help advisors achieve higher rates of returns thanks to better predictions and decrease the cost per investor by cutting research time. This will be the focus of chapter 4. This possible third trajectory change is where the future of Dataphile lies, and indeed where the future of the securities industry as a whole may lie.

## **3.5 Dataphile's Possible New Threat**

### **3.5.1 Online Financial Advisors**

Although the assets under management of OFAs are still small compared to incumbent broker-dealer firms, their success cannot go unnoticed. The online financial advisor firm Wealthfront, for example, reached \$1 billion in assets under management in only two and a half years of operation. The philosophy of these substitute products evolve around the Modern Portfolio

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<sup>8</sup> Colao, J. J. (2014). Forbes – *With a Fresh New Funding , Betterment Hopes To Manage \$100B By 2020* from <http://www.forbes.com/jjcolao/.../betterment-with-32-million-in-series-c-hopes-to-manage-100-billion-by-2020/>

Theory. In a nutshell, this model attempts to maximize a portfolio’s expected return for a given amount of risk by carefully choosing the proportions of various assets.

A key feature of these tools is that they provide investment management services which were previously available only to wealthy investors. Typically, these wealthy investors used to pay an annual management fee of over 2% and needed an account balance of at least \$1 million. Now, online financial advisors offer very similar services to all investors for a fraction of the price. Some of these companies do not require a minimum account size and will even manage the first \$10,000 for free and the rest for a low 0.25% advisory fee per year. Since these tools are completely automated, investors must perform all their operations online. This full automation eliminates the need for an advisor, which in turn prevents human bias and fraud. Lastly, they claim to achieve above average returns thanks to their investment philosophy, the selection of EFT and their very low management fees. Table 3.3 summarizes the possible advantages and disadvantages of OFAs.

*Table 3.3 Advantages and Disadvantages of Online Financial Advisors:*

<b>Advantages</b>	<b>Disadvantages</b>
<ul style="list-style-type: none"> <li>• May achieve above-average returns thanks to low management fees</li> <li>• Eliminate human biases and help prevent fraud</li> <li>• Provide services that were only available to wealthy investors</li> <li>• Easy, convenient and quick</li> </ul>	<ul style="list-style-type: none"> <li>• Limited or no human interaction</li> <li>• Investment options mainly limited to ETFs</li> <li>• MPT has its limitations, especially during significant downside scenarios</li> <li>• May not be ideal for the short-term</li> <li>• Necessitate high scale to be profitable</li> </ul>

### **3.5.2 Strategy of Online Financial Advisor Firms**

It is clear that OFA firms have understood the current societal trends rocking the industry. Although they cannot do much in regards to the political dimension other than comply with the regulations, they seem to address the changes occurring on the economical, sociocultural and technological dimensions in a better fashion than incumbent firms.

OFAs do not directly compete with ODP companies that cater to broker-dealers. Indeed, their goal is to steal market shares from Dataphile indirectly and they aim to do so via:

1. Differentiation: through fully automated services, they seek to replace the existing intermediaries (investment firms/ODP systems) by offering services previously only available to wealthy investors
2. Low costs: charge very low management fees to undermine the models of incumbent investment firms

If we dig further into their strategy, OFA firms appear to be doing for the Millennial generation what discount-broker Charles Schwab did for the Baby Boomers some 30 years ago; they target younger generations. Because of the high-tech nature of their product, it is fitting for these products to target youth. As of today, their client base tends to be tech-heavy and young, with over 55% of the users being under 35. Since Millennials currently have a liquid net worth of \$1 trillion, predicted to grow to \$7 trillion by 2025, this strategic positioning seems sound.

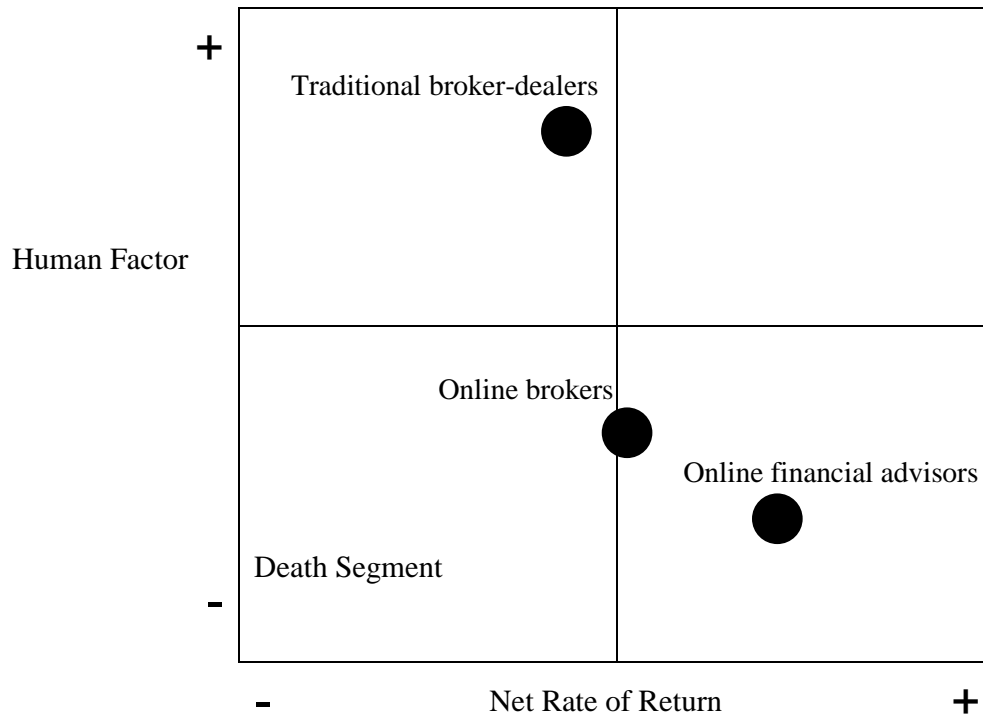
For some people, the fact that online financial advisors provide investors with little or no human interaction is an important drawback. However, this is an inherent part of their strategy; in order to provide highly valued services at low costs, automation is required. Although it may take time for the average investor to entrust these firms with their investment, they may still make the switch if OFAs repeatedly beat the market. This is based on the assumption that the investor's main objective is to earn the highest rate of return based on their risk tolerance. They likely value the relationship with their advisor, but if they had to choose between a higher rate of return over or a relationship with an advisor, most would choose the former option.

A strategic map of traditional OFAs, broker-dealers and online brokers can be created using the parameters human factor and rate of return net of management fees. This map is represented in figure 3.5:

- Online financial advisors rate fairly high on the net rate of return axis but low in terms of human interactions. The assumption regarding higher rates of return is based on studies which suggest that passive investing provides higher returns than active investing over the long-run.
- Traditional broker-dealers rate high on the human factor axis, given how vital the advisor-investor relationship is to their business. Their rate of return tends to be lower than that of passive investment, due to higher management fees and human biases.
- The rate of return for online brokers is debatable; it currently ranks higher than that of traditional broker-dealers but this is subjective and does not really matter. What does matter

is that both traditional broker-dealers and online brokers rank lower than OFAs on the parameter that matters the most to investors.

Figure 3.5 Strategy Map of OFAs, Traditional Broker-Dealers and Online Brokers



Based on the above strategy map and the assumption that investors prefer higher rates of return over higher human interactions, traditional broker-dealers are no longer in a position of power. If they don't do anything to prevent entry from OFAs, they may enter the Canadian securities market and seize some of their market shares. This is an important trend for Dataphile, as lower market shares for its clients will mean lower revenues for Dataphile, too.

As explained in chapter 4, Dataphile is in a great position to act on this possible trend by offering new tools that ensure investors still see value in their advisors. Also, since OFAs have not yet entered the Canadian market, a successful move from Dataphile could act as a proactive strategy to prevent the entry of such competitors. Finally, it may also help Dataphile increase its own market share of broker-dealers through differentiation.

## **4 Strategy for Sustained Competitive Advantage**

Dataphile has not innovated in a big way over the years. Most of the changes it made to its ODP platform were incremental and added limited value to consumers; therefore, they did not make a tangible impact to Dataphile's revenues. If Dataphile wishes to add more value to its customers and increase its market shares, it must do something fundamentally different. This chapter will explore the strategic opportunity that Dataphile should seize in order to improve its current position, discuss how Dataphile should go about to successfully achieve this new strategy and provide an assessment of this strategy.

### **4.1 Strategic Opportunity Available to Dataphile**

#### **4.1.1 Where Should Dataphile Go?**

Dataphile's current situation can be described as standstill; it cannot easily increase its market shares due to platform stickiness and may soon face a new threat with appealing features. Market growth under the current strategy is elusive and mainly depends on its clients' growth. If Dataphile wants to change this, it needs to move away from its incremental mind-set and invests in entirely new products with high return potential. This will require a more experimental approach which, combined with a deep understanding of the investment firms' primary need, will help set Dataphile apart from competitors.

This paper recommends using the money generated from its cash cow products to create new standalone products that will provide value as individual self-contained programs, but that can also seamlessly integrate into the ODP platform. The purpose of these new products is threefold:

1. Increase the number of products Dataphile offers to its existing consumers
2. Offer new products to firms currently using the IBM platform
3. Provide further differentiation and a higher PUV than IBM

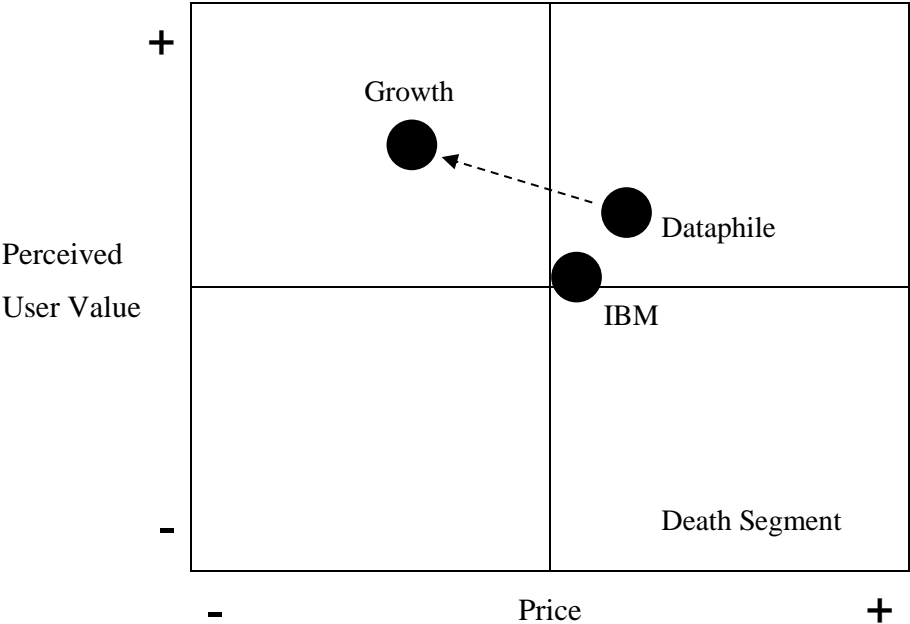
Ideally, Dataphile would have as many firms as possible use these standalone products. The reason is simple; the more clients buy the new products, the more it will increase Dataphile's revenues over the long run and further contribute to platform stickiness. If firms currently using the IBM platform

start using Dataphile’s new standalone products and like them, they may one day decide to switch their entire business to Dataphile. Although chances of this happening are slim, it is one of the few options Dataphile has to help alleviate the strong platform stickiness currently characterizing the industry.

Dataphile will essentially create a new market by offering new products not currently available, much like Apple did when it launched its iPad. This represents the growth strategy discussed in chapter 3. The price of these new products would be lower than Dataphile’s current products, as they will offer fewer functionalities. This will also facilitate consumer buy-in, especially at the beginning. Once clients have experienced the added value of the new products and adapted their processes around them, Dataphile could more easily increase its prices if desired. The recommended strategy is presented in figure 4.1 and shows that Dataphile’s overall PUV will go up while the cost of the new products will be lower than the current products.

Initially, the focus should be on Canadian broker-dealers, as this would represent a milder learning curve for Dataphile and thus would increase its chance to succeed. This will be the emphasis of the remainder of this paper. This said, if the new standalone products prove successful, Dataphile could consider adapting them to different markets and target investment firms operating in countries such as the United States and Japan, where Broadridge already operates one or more offices.

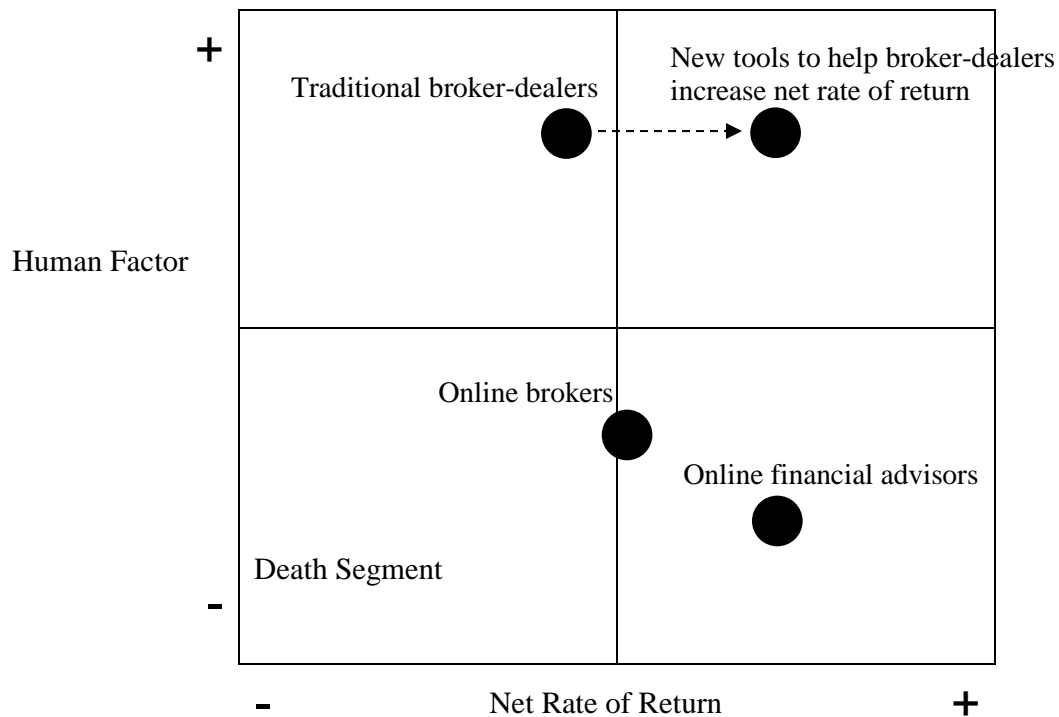
Figure 4.1 Strategic Opportunity Available to Dataphile



#### 4.1.2 Broker-Dealers' Primary Need

In order for the new products to succeed, Dataphile must understand what broker-dealers really need. As explained in figure 3.5, broker-dealers' primary strategy is to offer high human interactions with medium rates of return. However, the parameter most prized amongst investors is arguably net rate of return, not human interactions. This is problematic for investment firms, since OFAs claim to achieve these higher returns. Broker-dealers' primary need, therefore, is new tools that will help them provide higher rates of return while maintaining high human interactions. The result is depicted in figure 4.2.

Figure 4.2 How Dataphile's New Strategy Will Help Broker-Dealers



If investment firms are successful in implementing this new strategy, they will convert more investors to their services, lured by both higher rates of return and high human interactions. These firms will thus seize a bigger slice of the investor market pie, which will positively impact their bottom line.



### 4.1.3 How Can New Products Increase Net Rates of Return?

In order to create standalone products that help broker-dealers provide investors with higher net rates of return, it is important to understand how this value is calculated. Consider the following formula:

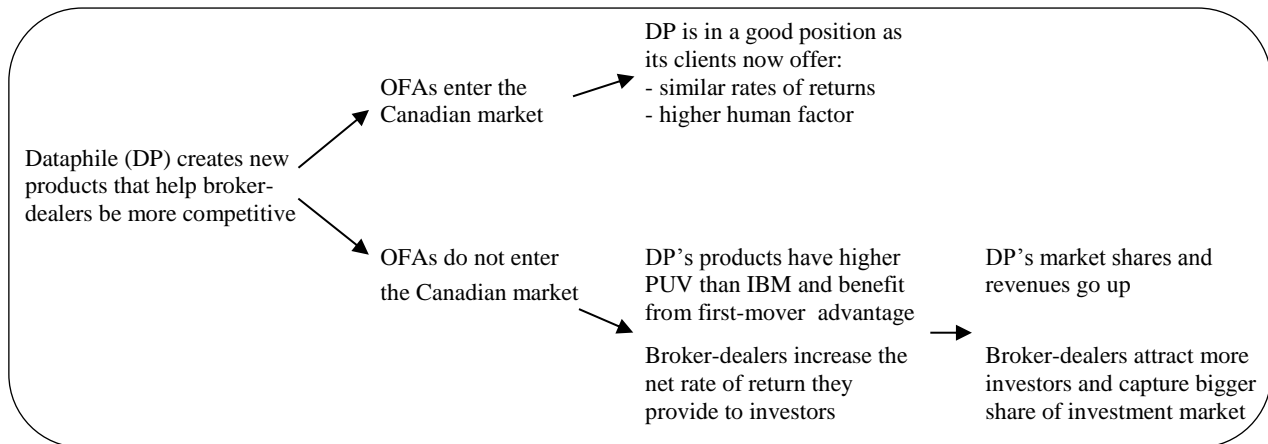
$$\text{Net rates of return} = \text{Gross rates of return} - \text{Investment management fees}$$

Based on the above, an investment firm could increase its net rates of return in two ways:

- (1) Increase gross rates of return: if a brokerage firm can consistently outperform the market and can better ‘time’ it, it will generate higher gross rates of return.
- (2) Lower management fees: investment fees exist in part to cover the costs IAs incur to select securities and rebalance portfolios. If new products can accelerate decision-making, IAs would select securities faster. They will then serve more investors during the same amount of time, thus spreading their fees across more users.

The creation of this new market will help break the stalemate situation currently characterising the industry. The end goal is for Dataphile to create products that can be used by all broker-dealers to help them make better investment decisions in a more timely manner. Figure 4.3 summarizes the reasons why this new strategy will help both Dataphile and traditional broker-dealers seize a bigger share of the investment market.

Figure 4.3 Dataphile’s New Strategy Will Generate Positive Results under our Two Scenarios



## 4.2 How Dataphile can Achieve Its New Strategy

The above strategy will be complex to implement and will necessitate new talent, new ways of thinking and a lot of experiments. It will also require Dataphile to leverage new interrelated trends currently making important headways in many industries: BD and BD Analytics. This section will explain what they are, discuss the BD strategy that Dataphile currently pursues and propose different avenues Dataphile can use to ensure its BD initiative is successful.

### 4.2.1 Big Data

BD has been gathering a lot of momentum in the past decade. Peter Sondergaard of the Gartner Group, one of the world's leading information technology research companies, made the following comment about BD: “Information is the oil of the 21st century, and analytics is the combustion engine.”<sup>9</sup> He actually went on to explain that in his view, BD will be as revolutionary as the automotive’s use of the newly discovered oil of the early 1900s.

BD refers to “any collection of data sets so large and complex that it is beyond the ability of typical database software tools to capture, store, manage and analyse.”<sup>10</sup> A popular way for describing BD is the “3Vs” model and is represented in figure 4.4. This model states that BD has three characteristics:

1. High velocity: Data is now streaming into servers in real time, from all directions. This means data is coming in much faster than previously, where it had to be analysed via a batch process.
2. High variety: Data formats are increasingly varied and now include sounds, pictures, videos, GPS data, sensor data and other information from social media sites.
3. High volume: The vast amount of available data is growing at an increasing rate.

Some people have attempted to augment Gartner’s original 3Vs model with additional “V”s such as veracity, validity, value, and variability. Although there might be some value in one or more of these attributes, this paper focuses on the original three Vs since only them are a measure of magnitude. As Doug Laney explains, the original 3Vs model was “intended to define the proportional dimensions and challenges specific to big data, whereas the additional Vs tend to be more aspirational qualities of *all* data, not definitional qualities of big data.”<sup>11</sup>

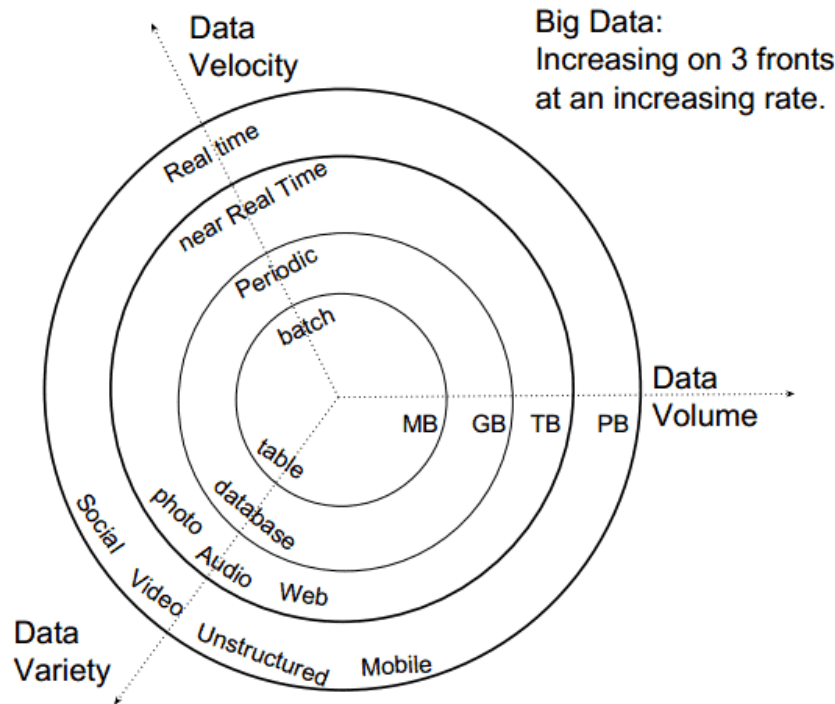
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<sup>9</sup> Sondergaard, P. (2011). Gartner – *Worldwide Enterprise IT Spending to Reach \$2.7 Trillion in 2012* from <http://www.gartner.com/newsroom/id/1824919>

<sup>10</sup> Wikipedia. (2014). *Big Data* from [http://en.wikipedia.org/wiki/Big\\_data](http://en.wikipedia.org/wiki/Big_data)

<sup>11</sup> Laney, D. (2013). Gartner – *Batman on Big Data* from <http://blogs.gartner.com/doug-laney/batman-on-big-data/>

Figure 4.4 The 3 V's of Big Data



Source: Rouse, M. (2014). TechTarget – 3Vs from <http://whatis.techtarget.com/definition/3Vs>

#### 4.2.2 Big Data Analytics

BD analytics is the actual “process of examining big data to uncover hidden patterns, unknown correlations and other useful information.<sup>12</sup>” This information can provide competitive advantages over rival firms and result in increased revenues and higher market shares. As PricewaterhouseCoopers puts it, “trying to unlock the power of BD without data analytics is like trying to harness the power of the Internet without a search engine.<sup>13</sup>” As per Gartner’s Analytics Ascendancy Model in figure 4.5, four types of BD analytics exist:

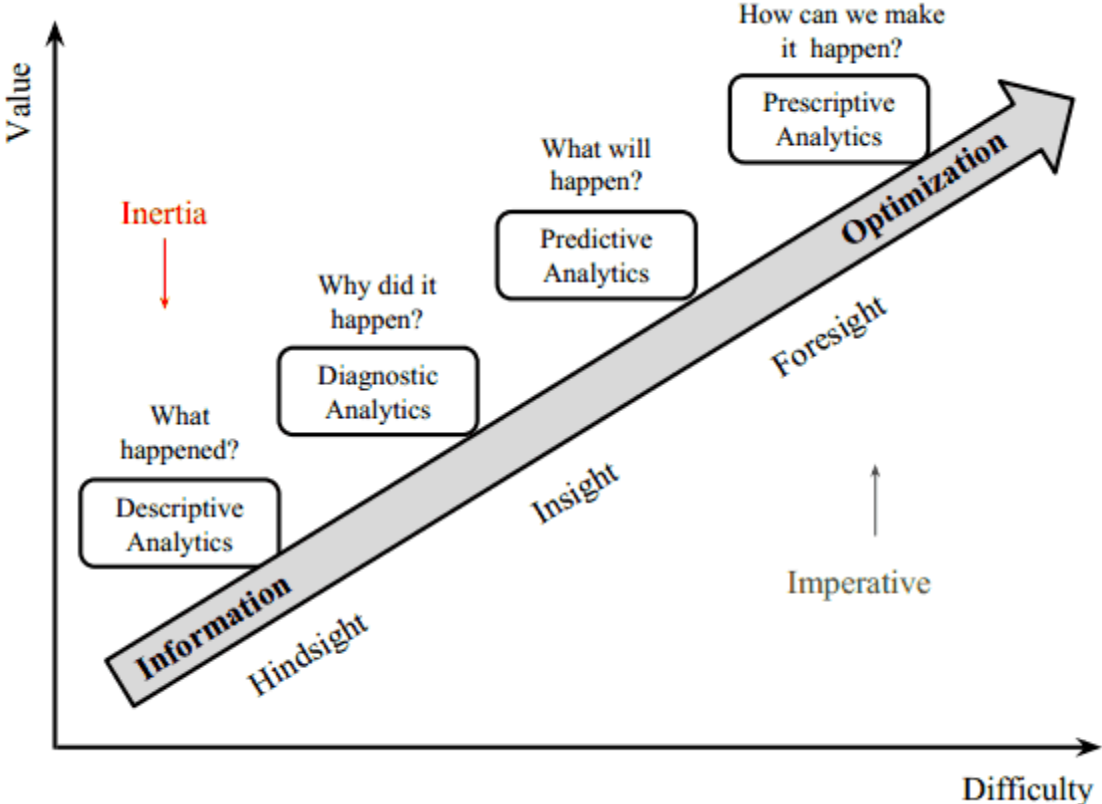
1. Descriptive Analytics
2. Diagnostic Analytics
3. Predictive Analytics
4. Prescriptive Analytics

<sup>12</sup> Rouse, M. (2012). TechTarget – *Big Data Analytics* from <http://searchbusinessanalytics.techtarget.com/definition/big-data-analytics>

<sup>13</sup> Connors S. et al. (2013). PWC – *How the financial services industry can unlock the value of Big Data* from [www.pwc.com/en\\_US/us/financial-services/publications/viewpoints/assets/pwc-unlocking-big-data-value.pdf](http://www.pwc.com/en_US/us/financial-services/publications/viewpoints/assets/pwc-unlocking-big-data-value.pdf), p. 4

The BD analytics that should matter the most for Dataphile’s new products are predictive and prescriptive analytics, as they will help predict stock movements more accurately and provide assistance to broker-dealers to make their investment goals a reality.

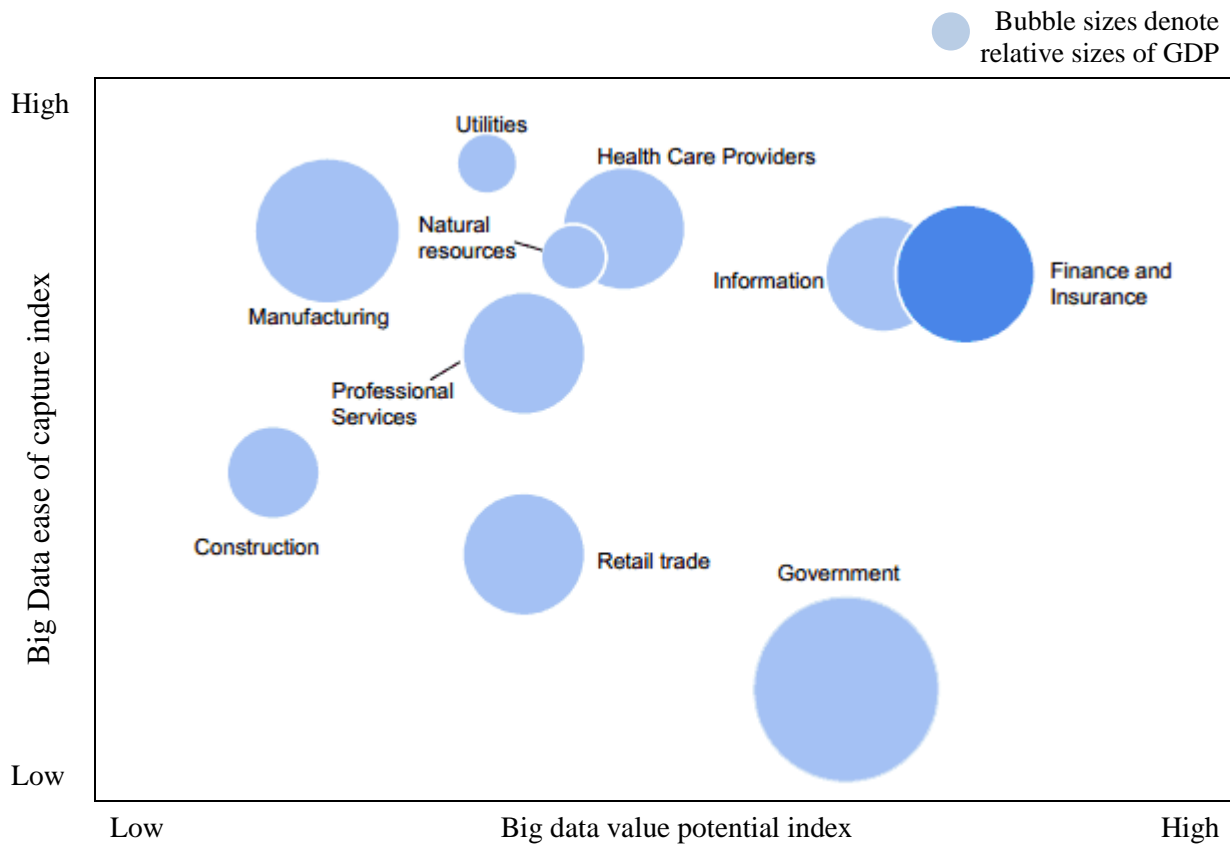
Figure 4.5 Gartner Analytic Ascendancy Model



Source: Laney, D. (2012). Gartner – *Getting value from Big Data*, p. 18

The potential resulting from BD is widespread and will benefit most industries. A research published by McKinsey Quarterly suggests that the BD value potential differs greatly from one industry to another. As represented in figure 4.6, the financial industry is very well positioned to maximize the value potential of BD with relative ease – this is very encouraging news for Dataphile.

Figure 4.6 Big Data Potential by Industry



Source: Manyika, J. (2011). McKinsey Global Institute – *Big Data: The next frontier for innovation, competition and productivity*, p. 9

Examples of companies that have used BD in order to gain competitive advantage already abound. Some of the benefits that resulted from these initiatives include cost reduction, better prediction, process automation, and quality improvement. Table 4.1 presents successful BD initiatives undertaken by companies from a variety of industries. This clearly shows that imagination and creativity go a long way when trying to unlock the potential value of BD.

Table 4.1 Successful BD initiatives in various industries

Industry	Company Name	Opportunity	How it Used Big Data	Results
Insurance	Infinity	<ul style="list-style-type: none"> <li>• Save money by reducing fraudulent claims</li> </ul>	<ul style="list-style-type: none"> <li>• Mined their history of adjuster reports and correlated these clues with known claim fraud incidence</li> <li>• Used predictive Analytics against years of historical claims</li> </ul>	<ul style="list-style-type: none"> <li>• Identified patterns for fraud</li> <li>• Increased success rate in pursuing fraudulent claims by 50% to 88%</li> <li>• Now market to individuals with low propensity for claim fraud<sup>14</sup></li> </ul>
Finance	RapidRatings	<ul style="list-style-type: none"> <li>• Predict future financial performance of companies better than standard methods</li> </ul>	<ul style="list-style-type: none"> <li>• Analytical method for analysing hundreds of data points continuously</li> <li>• Tapped publicly available data to sense changes in a company's financial health</li> </ul>	<ul style="list-style-type: none"> <li>• Differentiated its business from competitors</li> <li>• Only firm to predict downfall of a major corporation</li> </ul>
Energy	Vestas	<ul style="list-style-type: none"> <li>• Find better placement for future wind turbines</li> </ul>	<ul style="list-style-type: none"> <li>• Look at 178 parameters</li> <li>• Collect 20 TB of data on weather, temperature, humidity, rainfalls, etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced time to do wind forecast modelling from 3 weeks to 15 minutes</li> <li>• Can develop turbine sites 30 days faster</li> </ul>
Health	Express Scripts	<ul style="list-style-type: none"> <li>• Help increase compliance for medications intake</li> </ul>	<ul style="list-style-type: none"> <li>• Analysed 400 variables including prescription history, neighbourhood of patient, blood pressure and cholesterol</li> <li>• Identify and intervene with patients less likely to take their medications</li> </ul>	<ul style="list-style-type: none"> <li>• 90% compliance prediction accuracy</li> <li>• Improved compliance by 16%</li> </ul>
Law enforcement	Rikspolisstyrelsen	<ul style="list-style-type: none"> <li>• Stop serial killer from terrorizing a city in Sweden</li> </ul>	<ul style="list-style-type: none"> <li>• Analysed phone calls, crime statistics, weather, day of the week, city events and half a million interrogations</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced 9 months of manual analysis to 3 minutes of automated analytics</li> <li>• Helped locate the serial killer</li> </ul>

<sup>14</sup> Source: Laney, D. (2012). Gartner – *Getting value from Big Data*, p. 20–27

### **4.2.3 Dataphile’s Current Approach to Big Data and Big Data Analytics**

Dataphile has already put forth sizeable efforts to see how they could benefit from BD. They contacted a consulting firm which came up with eight themes Dataphile could leverage. In each case, Dataphile would be responsible for both BD warehousing and BD Analytics. Dataphile reviewed these themes and selected a data analytics solution that would grow from two initial dashboards:

1. Wealth Management Analytics
2. Operational Analytics

The Wealth Management Analytics Dashboard is a “rules-based data management and enterprise reporting solution for brokers, dealers and financial intermediaries that aggregates, integrates and consolidates your firm’s data with peer and consumer data.<sup>15</sup>” It is a tool that analyses, tracks and reports sales and then compares them against anonymized and aggregated peer performance data. It will also help firms identify new market opportunities by providing them with information such as:

- assets per households
- credit, automotive, demographic and marketing profile
- estimated household-level wealth based on location and demographics

The Operational Analytics Dashboard is a “comprehensive evaluation and optimization of the trade lifecycle using an in-depth analysis model which leverages best-practices from the largest vendor community in the securities markets.” Its main purpose is to:

- monitor and manage failed trades and compare against peer performance data
- mitigate operational risk by allowing a comprehensive evaluation of the trade lifecycle
- reduce cost per trade by lowering capital tied up from failed trade processes

### **4.2.4 Review of Dataphile’s Current BD Initiative**

Dataphile’s current initiative is a step in the right direction, but it has some limitations. A first limitation is that the only data source it uses in the BD warehouse is current client data. By deciding not to adapt its infrastructure to enable the capture of new information, Dataphile essentially ignores the wealth of public information available online in finance blogs, social media sites and newspapers. It also fails to capture information on how users behave with the system; for example, mouse-clicks would provide valuable insight on which modules and functionalities are most used, how they are used, for how long, etc.

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<sup>15</sup> Broadridge Financial Solutions. (2014). *Data Analytics*.

A second limitation is that it mainly tries to answer the question “What happened?”, as in “How did an IA perform last month compared to his peers.” Descriptive analytics will provide valuable hindsight into past performances, but it will not necessarily allow broker-dealers to achieve higher gross rates of returns or enable them to lower their costs. For example, the Wealth Management Analytics Dashboard will estimate household-level wealth but will not say if the households have money available to invest. By focusing on current client data and descriptive analytics, Dataphile seems to have adopted a low-risk low-reward approach, preferring to see how the BD trend plays out before undertaking bolder and possibly more lucrative undertakings.

### **4.3 Alternative BD Strategy for Dataphile**

#### **4.3.1 How Should Dataphile Exploit BD?**

As suggested on the website Hiper Kinetic, “the most effective BD strategies need to identify business requirements first and then leverage or adapt the existing infrastructure, data sources and analytics to support the business opportunity<sup>16</sup>”. Based on the information in this chapter, the business requirement for Dataphile is to create a suite of products that will enable investment firms to make better investment decisions in a more timely manner. Now, in order to turn BD into a real competitive advantage, Dataphile should:

- adapt its infrastructure to enable the capture of social, mobile and unstructured information
- increase its data sources to include various public and user behaviour information
- replace its current descriptive analytics strategy with predictive and prescriptive analytics

Therefore, the alternative BD strategy for Dataphile is to create new cloud-based services that will use predictive and prescriptive analytics on a Big Data infrastructure in order to provide enhanced user value for small to medium broker-dealers. The main purpose of the new services will be to help investment firms achieve above-average net rates of return for their retail and institutional investors.

Table 4.2 provides further clarification to the above strategy by presenting specific use cases that can serve as a basis for exploration. These suggestions are not an end in themselves; they simply provide a direction to guide experimentation. Staff working on these initiatives will have to keep an open mind and be creative about what the end outcome may be. They will also need to guide their decisions based on results they discover from the various experimentations they undertake.

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<sup>16</sup> Hiper Kinetic. (2014). *Big Data, Big Money? How to turn insights into action.* from <http://www.hiperkinetic.com/fr/blog/2014/03/31/big-data-big-money-how-turn-insights-actions/#.U8X5BPldVzU>



Table 4.2 Possible Use Cases as Basis for Exploration

Use Case	Analytics	Opportunity	Approach	How it Works – Examples
Analyse market sentiments from online sources	<b>Predictive</b>	<ul style="list-style-type: none"> <li>• Increase Gross Rates of Return</li> <li>• Decrease Investment Management Fees</li> </ul>	<ul style="list-style-type: none"> <li>• Aggregate public data from multiple online sources</li> <li>• Forecast price movements by analysing message sentiments by stock</li> </ul>	<ul style="list-style-type: none"> <li>• Know which stock to buy/sell and when, thereby increasing gross rates of return</li> <li>• Identify market sentiment in real-time, thereby accelerating decision-making</li> </ul>
Analyse business cycle	<b>Predictive</b>	<ul style="list-style-type: none"> <li>• Increase Gross Rates of Return</li> </ul>	<ul style="list-style-type: none"> <li>• Better forecast business cycles and adjust investments accordingly</li> </ul>	<ul style="list-style-type: none"> <li>• Recognize when a new business cycle is emerging and so know when to switch from stocks, to bonds, to cash</li> </ul>
Asset allocation composition <sup>17</sup>	<b>Prescriptive</b>	<ul style="list-style-type: none"> <li>• Decrease Investment Management Fees</li> </ul>	<ul style="list-style-type: none"> <li>• Provide customized recommendations based on multi-dimensional segmentation</li> </ul>	<ul style="list-style-type: none"> <li>• Quickly evaluate recommendations of various types of assets, based on client demographics and risk tolerance</li> </ul>
Investor behaviour analytics	<b>Prescriptive</b>	<ul style="list-style-type: none"> <li>• Increase Gross Rates of Return</li> <li>• Decrease Investment Management Fees</li> </ul>	<ul style="list-style-type: none"> <li>• Analyse various trading behaviour based on trending patterns and external events</li> </ul>	<ul style="list-style-type: none"> <li>• Identify securities held by investors with similar risk profile and trading behaviour</li> <li>• Better asset allocation, based on client's historical target and objectives</li> </ul>
Portfolio risk	<b>Prescriptive</b>	<ul style="list-style-type: none"> <li>• Increase Gross Rates of Return</li> </ul>	<ul style="list-style-type: none"> <li>• Assess risk across portfolio by identifying overlapping investments and recommending risk mitigation strategies</li> </ul>	<ul style="list-style-type: none"> <li>• Better performance risk management of portfolio</li> </ul>
Money flow recommender	<b>Prescriptive</b>	<ul style="list-style-type: none"> <li>• Increase Gross Rates of Return</li> </ul>	<ul style="list-style-type: none"> <li>• Anticipate the potential destination of outflow/inflow to provide predictions</li> </ul>	<ul style="list-style-type: none"> <li>• Adjust IA's asset allocation, based on the prescriptive security list</li> </ul>

<sup>17</sup> Broadridge Financial Solutions. (2014). Opera Solutions – *Big Data Diagnostic; Pre-Final Meeting*.

### 4.3.2 Assessment of the New BD Strategy

An assessment of this proposed BD strategy is presented in table 4.3 by using the SWOT framework, which evaluates strategies in terms of strengths, weaknesses, opportunities and threats. Overall, the strengths and opportunities of the proposed strategy significantly outweigh the weaknesses and threats; therefore, it appears to be a viable direction for Dataphile to pursue.

*Table 4.3 SWOT Analysis of New BD Strategy Presented to Dataphile*

<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>• Great complement to Dataphile’s current offering</li> <li>• Can be purchased by existing and new clients</li> <li>• Could be a game changer in the industry</li> <li>• Likely to produce good returns if executed successfully</li> <li>• Senior management understands well the potential of BD in the financial services industry</li> </ul>	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>• Project will be very complex, novel and expensive</li> <li>• May fail to generate satisfactory results, in terms of functionalities and/or revenues</li> <li>• Outside of Dataphile’s current strength areas</li> <li>• Failed outcome may negatively impact Dataphile’s reputation</li> <li>• Workforce may not possess the required skills</li> </ul>
<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>• Could be first to market such standalone products in Canada that use private and public data</li> <li>• May provide substantial differentiation from competitors, leading to increased market share</li> <li>• Can be a viable way to circumvent platform stickiness and convert new clients to Dataphile’s main product, its ODP platform</li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>• Current competitor may create better predictive analytics tools</li> <li>• New entry into Canadian may occur before Dataphile releases its product</li> <li>• IA’s and broker-dealers may oppose this change</li> <li>• Downturn in economy could result in firms unable to afford new products</li> </ul>

## 5 Alternatives to Implement the New BD Strategy

It is one thing for Dataphile to know what the recommended BD strategy is, yet it is another to know how to best implement it. Chapter 4 suggested a new BD strategy that Dataphile could pursue in order to increase perceived user value. Chapter 5 will now present Dataphile with several alternatives that could be implemented to make sure the new BD initiative is fruitful.

Although Dataphile employs very capable people, its current processes and business models may not be appropriate to exploit the BD strategy suggested in section 4.3. At the moment, Dataphile's processes revolve around proven products that require simpler incremental changes in order to respond to evolutionary changes in the market. Dataphile must now step outside its comfort zone and deal with BD's disruptive nature. Clayton M. Christensen, Professor of Business Administration at the Harvard Business School, defines disruptive innovations as any innovation "[...] that creates an entirely new market through the introduction of a new kind of product or service, one that's actually worse, initially, as judged by the performance metrics that mainstream customers value."<sup>18</sup> Essentially, Dataphile has three options in regards to its BD strategy – it can either:

1. Do nothing
2. Make the product, or
3. Buy the product

Option one is rightly discarded by Dataphile, as it recognizes the huge potential BD has for its business and how much value it can bring to investment firms. This leaves the company with the make or buy options which, in Dataphile's case, are not mutually exclusive; indeed, Dataphile could buy a new BD infrastructure and make BD Analytics in-house, or vice versa. This chapter examines Dataphile's current implementation approach to exploiting the BD opportunity and proposes other alternatives. All strategic alternatives are then evaluated based on their estimated ability to successfully implement each use case presented in chapter four. From this analysis, a final recommendation is provided to Dataphile in chapter six.

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<sup>18</sup> Christensen, C. (April 2000). Harvard Business Review – *Meeting the Challenge of Disruptive Change*, p. 72.

## 5.1 Strategy 1: Maintain Status Quo

The status quo option would see Dataphile perform both BD warehousing and BD analytics in-house. Its data source would be limited to current client data and would thus ignore all public data. Its BD analytics strategy would focus on descriptive analytics and provide clients with information that happened in the past.

Senior management quickly recognized that Dataphile could not exploit BD's disruptive nature within its existing structure. This stems from the fact that Dataphile's current processes and values – which refers to how employees prioritize projects based on how financially attractive or unattractive they are – have developed to make staff efficient at adding features to existing products. In other words, they are good at tackling sustaining innovation, not disruptive innovation. For this reason, senior managers created the “TAP Data Analytics” team to oversee the strategy, planning and execution of their BD initiatives.

### **Advantages:**

- Dataphile retains control of the full value chain, from BD warehousing to BD Analytics, to marketing the new products.
- As the team operates under the Dataphile name, it can have access to the clients' private data.
- Dataphile could select internal staff that has proven their worth over the years.
- Quick to be operational and relatively inexpensive to set up.

### **Limitations:**

- The team was not given full flexibility in how it could conduct its BD business. For this reason, it did not adapt its infrastructure to capture new data types or increase its data sources.
- Dataphile did not hire a superstar or augment its talent pool with data scientists. This may explain why the two dashboards selected by the TAP team mainly focus on descriptive analytics and not predictive and prescriptive analytics.
- The TAP team must operate within the corporate constraints. The two main constraints are that the TAP team must focus on areas that will bring 20% profit margins and will not be easily replicated by competitors. It follows that a BD opportunity that would be exciting for the TAP team had it operated independently will never be further explored if it does not meet Dataphile's criteria.

## 5.2 Strategy 2: Create a Spinout Organization

Wikipedia defines spin-offs as “divisions of companies or organizations that then become independent businesses with assets, employees, intellectual property, technology, or existing products that are taken from the parent company.<sup>19</sup>” The goal of the spinoff organization would be to build a new BD infrastructure to capture social, mobile and other unstructured data, and to link it with Dataphile’s current client data. They would also set up a BD Analytics team responsible for experimenting with this wealth of financial data and market new products to all small to medium Canadian broker-dealers. Based on the above, Dataphile would retain control of the client data side of the BD warehousing, but outsource the public BD warehousing and BD Analytics components to the spinoff organization.

Chapter 4 recommended Dataphile to pursue a growth strategy by offering new products at a lower price, suggesting low revenue growths or even losses in the first few years. This may be a hard sell for a company used to generate 20% profit rates. However, if Dataphile creates a spinoff with low overhead costs that has access to its client data, it may well be profitable in its early years.

### **Advantages:**

- The new entity will build itself from scratch and has complete freedom when deciding which data types and public data sources it should utilize
- It will be able to hire highly specialized and experienced data scientists to experiment with BD by focusing on predictive and prescriptive analytics
- Have flexibility to implement new processes and values than thrive in a start-up setting
- It will be able to encourage a culture that fosters a test-and-learn mind-set and accepts the value of rapid, iterative and inexpensive experiments with the products
- It may be profitable after only a few years, thanks to lower overhead costs
- Have full flexibility in terms of which BD initiatives it undertakes; no constraints imposed by Dataphile

### **Limitations:**

- The motivations of a spinoff organization may change over time and no longer be in line with Dataphile’s
- They may partner up with or be bought off by a rival

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<sup>19</sup> Wikipedia. (2014). *Spin-off* from [http://en.wikipedia.org/wiki/Corporate\\_spin-off](http://en.wikipedia.org/wiki/Corporate_spin-off)

- As the spinoff would also be operating in financial software industry, it could one day compete against Dataphile
- Dataphile's clients may not want to give the spinoff organization access to their private data

### **5.3 Strategy 3: Set Up a Subsidiary and Create New In-House BD Analytics Team**

This strategy suggests that Dataphile sets up a subsidiary that would be responsible for capturing and storing public data into a separate BD infrastructure. The decision regarding which new data types to capture and from which sources would be taken jointly between the subsidiary and Dataphile. This said, it would include social, mobile and unstructured data from various online sources such as Twitter and financial blogs, online newspapers, and websites. As Dataphile would retain control of the subsidiary, it will have access to this new data and be able to complement it with its current client data.

Dataphile, not the subsidiary, would create a new internal BD Analytics team that would shift the focus away from descriptive analytics and move into predictive and prescriptive analytics. They would hire a superstar, or BD scientists, to increase the probability of success in this new undertaking and develop products to help investment firms consistently provide above-average net rate of returns to their investors.

#### **Advantages:**

- Dataphile would retain control of both BD warehousing and BD Analytics
- The new subsidiary will develop an expertise in capturing relevant public data
- It will also have some freedom in determining which data types to store and in identifying valuable data sources
- Dataphile will be able to hire highly specialized and experienced data scientists to experiment with BD and to focus on predictive and prescriptive analytics
- As the team operates within Dataphile, it will have access to the clients' private data.

#### **Limitations:**

- The Dataphile BD Analytics team may have limited flexibility in terms of which BD initiatives it undertakes; constraints will be imposed by senior management
- May take time to be profitable, given the higher overhead costs of Dataphile and its subsidiary

- May be challenging to encourage a sub-culture within Dataphile that fosters a test-and-learn mind-set and accepts the value of rapid, iterative and inexpensive experiments

#### **5.4 Strategy 4: Hire a BD Analytics Firm to Develop Prototypes**

Under this strategy, Dataphile would hire a BD Analytics firm to create several prototypes that will address the broker-dealers' primary need. Essentially, this BD firm would be responsible for the setup of a distinct BD infrastructure and the capture of public data. It would then have an internal team perform analytics on this data. Dataphile would ideally make its client data available to this organization, provided that the data remains private and confidential. Similar to strategy 2, Dataphile would therefore retain control of the client data side of the BD warehousing, but outsource the public BD warehousing and BD Analytics components to the BD Analytics organization. However, contrary to strategy 2, if the external group is successful in creating these new products, Dataphile would have the right to successfully bring them in house and market them itself to broker-dealers.

##### **Advantages:**

- Dataphile would hedge some of the risk inherent to this new undertaking and would still benefit from successful prototypes
- Dataphile would leverage the BD firm's area of expertise along with the knowledge and experience of their BD scientists, while it continues to focus on what it does best
- It may produce results faster than creating a new BD team from scratch
- Dataphile would still provide the directions in terms of which BD initiatives are explored

##### **Limitations:**

- May be expensive to hire a BD Analytics firm
- May be complex and expensive to write a legal contract that fully protects Dataphile in case of dispute
- Dataphile may overestimate the BD Analytics company's capabilities to produce successful prototypes
- Clients of Dataphile may not want their private data to be made available to this BD analytics firm
- Dataphile will not gain the expertise that would result from hands-on experimenting with predictive and prescriptive analytics

## 5.5 Evaluation of Strategic Alternatives

This section will evaluate the four implementation alternatives described above against the six use cases presented in chapter 4. An additional use case labelled ‘Other’ was also added to this assessment due to the fact that staff may find different opportunities once they start experimenting with BD.

Each of the seven use cases was assigned a certain weight; the higher the weight, the more likely it will result in products that meet the broker dealer’s primary need of increasing net rates of return. The logic for assigning these weights is as follow:

- 0.20: assigned to use cases that increase gross rates of returns and lower management fee
- 0.15: assigned to use cases that only increase gross rates of return
- 0.10: assigned to use cases that only lower management fees
- 0.05: assigned to other BD opportunities that may be discovered during experimentation

Then, every implementation alternative was assigned a rating from 0-5 for each use case. This number represents the likelihood that the BD team operating under the proposed alternative will create successful products as per the corresponding use case. A rating of 0 means that the team has no chance of creating a product that meets the needs of broker-dealers, whereas a rating of 5 means that it will very likely create such a product. These ratings were then multiplied by the use case’s weight to determine the weighted rating described in Table 5.5. Finally, these numbers were all added up to come up with a total rating per implementation alternative; the higher the score, the better the alternative.



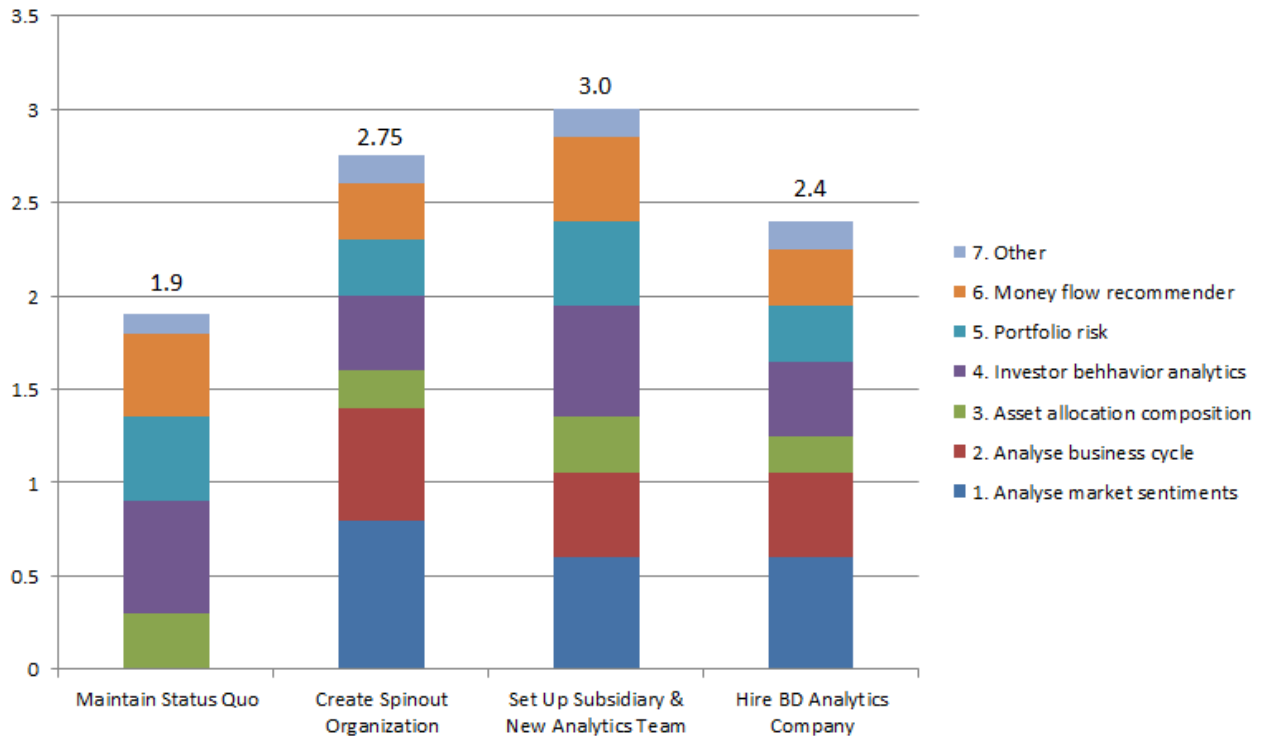
Table 5.1 Evaluation of Proposed Implementation Alternatives

		Implementation Alternatives								
		a. Maintain Status Quo		b. Create Spinout Organization		c. Set Up Subsidiary & New Analytics Team		d. Hire BD Analytics Company		
		Weight	Rating	Weighted Rating	Rating	Weighted Rating	Rating	Weighted Rating	Rating	Weighted Rating
Use Cases	1. Analyse market sentiments <sup>20</sup>	0.20	0	0	4	0.8	3	0.6	3	0.6
	2. Analyse business cycle <sup>3</sup>	0.15	0	0	4	0.6	3	0.45	3	0.45
	3. Asset allocation composition <sup>21</sup>	0.10	3	0.3	2	0.2	3	0.3	2	0.2
	4. Investor behaviour analytics <sup>4</sup>	0.20	3	0.6	2	0.4	3	0.6	2	0.4
	5. Portfolio risk <sup>4</sup>	0.15	3	0.45	2	0.3	3	0.45	2	0.3
	6. Money Flow Recommender <sup>4</sup>	0.15	3	0.45	2	0.3	3	0.45	2	0.3
	7. Other <sup>3 and 4</sup>	0.05	2	0.1	3	0.15	3	0.15	3	0.15
<b>TOTAL</b>			<b>1.9</b>		<b>2.75</b>		<b>3.0</b>		<b>2.4</b>	

<sup>20</sup> Uses publicly available data from multiple online sources, such as Twitter, Yahoo! Finance feeds and news articles

<sup>21</sup> Uses client's private data, currently stored on Dataphile's servers

Figure 5.1 Evaluation of the Proposed Implementation Alternatives



### 5.5.1 Maintain Status Quo

By proceeding with the status quo strategy, Dataphile will be able to leverage its clients' private data with relative ease. However, given the fact that it will not augment its internal expertise with BD scientists, will not adapt its infrastructure to capture new data types from various data sources and is imposed important limitations in terms of what BD opportunities it can undertake, this paper argues that the TAP team will only capture a small part of the overall BD market. This alternative received a medium score on all four uses cases that use clients' data and a score of 0 on the use cases that only use public data. Its overall score sits at 1.9, which makes this option the least likely to get a maximal value out of its BD undertaking. It does not mean that this strategy will fail, but only that it will generate lower rents than other implementation options, thus leaving money on the table for Dataphile's competitors to pursue.

### **5.5.2 Create Spinout Organization**

Since a spinout organization would be independent from Dataphile and thus able to determine what experiments it conducts, this option has considerable chances of creating successful products. Thanks to its BD scientists, its new BD infrastructure capturing online data, and its ability to encourage a culture that fosters a test-and-learn mind-set, this option received a total score of 2.75, ranking second overall. It scored 4 on the uses cases 1 and 2, as BD scientists have high chances to successfully leverage public data using predictive and prescriptive analytics. Conversely, it was given a relatively low score on all uses cases that use client private data, given the possible legal difficulty that may arise by having an external entity access Dataphile's client data. Also, two important considerations not included in table 5.1 are the potential danger that the spinoff partners up or gets bought by IBM and the fact that its motivations can change over time. For the above reasons, and because it did not get the highest score, Dataphile should not pursue this strategy.

### **5.5.3 Set Up New Subsidiary and Create New In-House BD Analytics Team**

Since the BD Analytics team will have limited flexibility in terms of which BD initiatives it undertakes and will thus be constrained by Dataphile's corporate requirements, its maximum score for any test case is limited to 3. However, since it will have full access to both private and public data, will hire BD scientists and will focus on predictive and prescriptive analytics, this paper argues it will actually be able to achieve its maximum possible score of 3 on all seven use cases. As a result, this option has the highest score and is the implementation alternative recommended for Dataphile.

### **5.5.4 Hire a BD Analytics Firm to Develop Prototypes**

An important limitation with the fourth alternative is that Dataphile will not gain any expertise that would result from experimenting with BD Analytics, as it will outsource this task. This means that even if the prototypes are successful, Dataphile will be dependent on the BD Analytics company to conduct new experiments for new products. Also, this option scored low on all use cases dealing with client private data, given that clients may choose not to have their data analysed by a third-party. Since Dataphile would instruct the BD company on what directions it should take, it scored lower than the spinoff option for the first two use cases, because Dataphile's corporate requirements would restrict the options that get pursued. Overall, this option scored third with a total score of 2.4 and should not be selected by Dataphile.

## 6 Recommendation for Dataphile

The recommended strategy for Dataphile will be to provide cloud-based products that use predictive and prescriptive analytics on a BD infrastructure and which will allow proliferation of customer-oriented services that can be developed and improved upon quickly. These products will create an advantage in consumer value by allowing them to offer better net rates of returns than their competitors.

The implementation option that can best ensure that the above strategy is successful is alternative 3: set up a subsidiary and create a new internal BD Analytics team. Based on the research conducted for this paper, this paper suggests that BD undertakings must meet the following criteria in order to be successful:

1. A culture that fosters a test-and-learn mind-set and values rapid, iterative and inexpensive experiments with the products
2. A BD Analytics team composed of highly skilled BD scientists that remain independent from the established company's normal resource allocation process
3. A BD infrastructure that captures as much data as possible, from various sources and for various data types
4. A focus on predictive and prescriptive analytics

Option 3 is in the best position to meet most of these requirements. Although Dataphile may find it challenging at first to encourage a sub-culture that fosters a test-and-learn mind-set for the new Analytics team, this paper argues it will get better with time once the new team becomes comfortable with its role that will focus on experimentation. To facilitate this process, Dataphile should evaluate the Analytics team based on criteria that take into account the disruptive nature of their work. As such, their performance should be evaluated differently than for teams working on incremental changes.

This new strategy will allow Dataphile to capture a bigger slice of the BD opportunity by creating new products that will result in a new market. Dataphile will be able to sell these new services to all small to mid-size Canadian broker-dealers, not only to its current clients. This is an interesting shift to the way business is currently being done. This increase in market shares will lead

to higher rents and allow Dataphile to further differentiate itself from IBM by providing additional user value.

## **6.1 Conclusion**

Many people agree that the BD disruption is just around the corner and that companies which remain idle will face possible obsolescence or significant market share losses. The difference between a successful and a non-successful BD implementation will ultimately depend on the company's strategy – where the company is now, where it wants to go and how it will get there. This paper analysed Dataphile's current BD strategy and, in light of the information collected via research, proposed a new strategic direction and a different implementation tactic. A proper execution of these recommended suggestions will give Dataphile all the tools it needs to leverage the BD opportunity for sustained competitive advantage.

# Bibliography

## Works Cited

Betterment. (2014). *Our portfolio of investments*. Retrieved April 16, 2014 from <https://www.betterment.com/portfolio/>

BobsGuide. (2003). *ADP acquires Dataphile Software Ltd*. Retrieved April 8, 2014 from <http://www.bobsguide.com/guide/news/2003/May/23/adp-announces-agreement-to-acquire-dataphile-software-ltd-.html>

Broadridge. (2014). *Dataphile – Canada*. Retrieved April 8, 2014 from <http://www.broadridge.com/advisor-wealth-solutions/wealth-management/technology-reporting/dataphile-canada>

Business Dictionary. (2014). *Perceived User Value*. Retrieved May 23, 2014 from <http://www.businessdictionary.com/definition/perceived-value.html>

Cappon, A. (2014). Forbes – *The Brokerage World Is Changing, Who Will Survive?* Retrieved April 20, 2014 from <http://www.forbes.com/sites/advisor/2014/04/16/the-brokerage-world-is-changing-who-will-survive/>

Carrick, R. (2013). The Globe and Mail – *Beware the sales pitch for actively managed mutual funds*. Retrieved May 10, 2014 from <http://www.theglobeandmail.com/globe-investor/investment-ideas/dont-buy-in-to-the-mutual-fund-gimmicks/article15470453/>

CSI Global Education Inc. (2010). *The Canadian Securities Course, Volume 1*.

Colao, J. J. (2014). Forbes – *With a Fresh New Funding, Betterment Hopes To Manage \$100B By 2020*. Retrieved April 16, 2014 from <http://www.forbes.com/sites/jjcolao/2014/04/15/betterment-with-32-million-in-series-c-hopes-to-manage-100-billion-by-2020/>

Connors, S. (2013). PWC – *How the financial services industry can unlock the value of Big Data*. Retrieved on June 2, 2014 from [http://www.pwc.com/en\\_US/us/financial-services/publications/viewpoints/assets/pwc-unlocking-big-data-value.pdf](http://www.pwc.com/en_US/us/financial-services/publications/viewpoints/assets/pwc-unlocking-big-data-value.pdf)

Christensen, C. (March-April 2000). Harvard Business Review – *Meeting the Challenge of Disruptive Change*.

Christensen, C. (1995). HBR – *Disruptive Technologies: Caching the Wave*.

Department of Finance Canada. (2005). *Canada's Financial Services Sector*. Retrieved April 10, 2014 from [http://www.fin.gc.ca/activty/factsheets/cansec05\\_e.pdf](http://www.fin.gc.ca/activty/factsheets/cansec05_e.pdf)

Garg, A. (2011). *Cloud computing for the financial services industry*. Retrieved April 20, 2014 from [http://www.sapient.com/content/dam/sapient/sapientglobalmarkets/pdf/thought-leadership/GM\\_Cloud\\_Computing.pdf](http://www.sapient.com/content/dam/sapient/sapientglobalmarkets/pdf/thought-leadership/GM_Cloud_Computing.pdf)

Harrison, K. (2013). *Why a good corporate reputation is important to your organization*. Retrieved May 10, 2014 from [http://www.cuttingedgepr.com/articles/corprep\\_important.asp](http://www.cuttingedgepr.com/articles/corprep_important.asp)

Hiper Kinetic. (2014). *Big Data, Big Money? How to turn insights into actions*. Retrieved on June 22, 2014 from <http://www.hiperkinetic.com/fr/blog/2014/03/31/big-data-big-money-how-turn-insights-actions/#.U8X5BPldVzU>

Investopedia. (2013). *Switching Costs*. Retrieved on May 3, 2014 <http://www.investopedia.com/terms/s/switchingcosts.asp>

Laney, D. (2013). Gartner – *Batman on Big Data*. Retrieved on August 4, 2014 from <http://blogs.gartner.com/doug-laney/batman-on-big-data/>

Laney, D. (2013). Gartner – *Big Data and Analytics Strategy Essentials*. Retrieved on June 4, 2014 from <http://my.gartner.com/portal/server.pt?open=512&objID=202&mode=2&PageID=5553&ref=webinar-rss&resId=2313116&srcId=1-2949089475>

Laney, D. (2012). Gartner – *Getting value from Big Data*. Retrieved on June 4, 2014 from <http://my.gartner.com/portal/server.pt?open=512&objID=202&mode=2&PageID=5553&ref=webinar-rss&resId=1972029>

Manyika, J. (2011). McKinsey Global Institute – *Big data: The next frontier for innovation, competition, and productivity*. Retrieved on June 16, 2014 from [http://www.mckinsey.com/insights/business\\_technology/big\\_data\\_the\\_next\\_frontier\\_for\\_innovation](http://www.mckinsey.com/insights/business_technology/big_data_the_next_frontier_for_innovation)

McCarthy Tetrault. (2012). *Canadian Regulatory Requirements*. Retrieved April 10, 2014 from [http://www.mccarthy.ca/pubs/Canadian\\_Regulatory\\_Requirements\\_Paper\\_Sept2012.pdf](http://www.mccarthy.ca/pubs/Canadian_Regulatory_Requirements_Paper_Sept2012.pdf)

McGahan, A. (October 2004). Harvard Business Review – *How Industries Change*.

McKenna, B. (2012). The Globe and Mail – *The flaws in Canada's financial adviser system*. Retrieved May 10, 2014 from <http://www.theglobeandmail.com/globe-investor/the-flaws-in-canadas-financial-adviser-system/article4171749/?page=all>

Mims, C. (2013). *This startup captured \$200 million of people's savings by turning financial advice into an algorithm*. Retrieved April 28, 2014 from <http://qz.com/87075/how-turning-financial-advice-into-an-algorithm-took-this-startup-from-zero-to-200-million/>

Porter, M. E. (1979). *How Competitive Forces Shape Strategy*, Harvard Business Review, March-April 1979.

Rao, L. (2014). TechCrunch – *Automated Investment Service Wealthfront Raises \$35M From Index, Ribbit Capital*. Retrieved April 20, 2014 from <http://techcrunch.com/2014/04/02/automated-investment-service-wealthfront-raises-35m-from-index-ribbit-capital/>

Rouse, M. (2014). TechTarget – *3Vs (volume, variety, and velocity)*. Retrieved on June 1, 2014 from <http://whatis.techtarget.com/definition/3Vs>

Rouse, M. (2012). TechTarget – *Big Data Analytics*. Retrieved on June 2, 2014 from <http://searchbusinessanalytics.techtarget.com/definition/big-data-analytics>

Sondergaard, P. (2011). Gartner – *Worldwide Enterprise IT Spending to Reach \$2.7 Trillion in 2012*. Retrieved May 20, 2014 from <http://www.gartner.com/newsroom/id/1824919>

Soubra, D. (2012). Data Science Central – *The 3Vs that define Big Data*. Retrieved on May 22, 2014 from <http://www.datasciencecentral.com/forum/topics/the-3vs-that-define-big-data>

State Street. (2011). *The evolving role of technology in financial services*. Retrieved April 20, 2014 from <http://www.statestreet.com/vision/technology/pdf/TheEvolvingRoleTech.pdf>

Stefan, N. (2011). *Predictive Analytics on public data – the case of stock markets*. Retrieved on June 26, 2014 from file:///C:/Users/JPnIssa/Downloads/ECIS2013-0615-paper.pdf

Wealthfront.(2014). *Who we are*. Retrieved April 16, 2014 from <https://www.wealthfront.com/who-we-are>

Webopedia. (2014). *Big Data* Retrieved April 19, 2014 from [http://www.webopedia.com/term/b/big\\_data.html](http://www.webopedia.com/term/b/big_data.html)

Wikipedia. (2014). *Big Data*. Retrieved on May 22, 2014 from [http://en.wikipedia.org/wiki/Big\\_data](http://en.wikipedia.org/wiki/Big_data)

Wikipedia. (2012). *Canadian Securities Regulations*. Retrieved April 10, 2014 from [http://en.wikipedia.org/wiki/Canadian\\_securities\\_regulation](http://en.wikipedia.org/wiki/Canadian_securities_regulation)

Wikipedia. (2014). *Discount Brokers*. Retrieved April 12, 2014 from [http://en.wikipedia.org/wiki/Discount\\_broker](http://en.wikipedia.org/wiki/Discount_broker)

Wikipedia. (2014). *Spin-off*. Retrieved July 4, 2014 from [http://en.wikipedia.org/wiki/Corporate\\_spin-off](http://en.wikipedia.org/wiki/Corporate_spin-off)

Wikipedia. (2014). *Information wants to be free*. Retrieved April 21, 2014 from [http://en.wikipedia.org/wiki/Information\\_wants\\_to\\_be\\_free](http://en.wikipedia.org/wiki/Information_wants_to_be_free)

Wilkinson, J. (2013). *The Strategic CFO – Buyer Bargaining Power (one of Porter’s Five Forces)*. Retrieved April 28, 2014 from <http://strategiccfo.com/wikicfo/buyer-bargaining-power-one-of-porters-five-forces/>



## **Company Documents**

Broadridge Financial Solutions. (2013). *Broadridge Strategy Map*. Retrieved on April 19, 2014 from internal documents.

Broadridge Financial Solutions. (2013). *Opera Solutions – Big Data Diagnostic; Kick-off document*. Retrieved on June 19, 2014 from internal documents.

Broadridge Financial Solutions. (2014). *Data Analytics*. Retrieved on June 17, 2014 from internal documents.

Broadridge Financial Solutions. (2014). *Opera Solutions – Big Data Diagnostic; Pre-Final Meeting*. Retrieved on June 19, 2014 from internal documents.

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