An Overview of the Demise of Nortel Networks and Key Lessons Learned:

Systemic effects in environment, resilience and black-cloud formation

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EXECUTIVE SUMMARY

Nortel's customers were clear: they did not want to switch suppliers. However, these same customers felt that Nortel had given them no choice but to switch. By 2006 customers said that Nortel was no longer the same company that they had come to trust and rely on, and they doubted that the company would survive beyond the next five or six years. As a result, they were unwilling to commit to Nortel for any longer-term related procurement. In June 2009, Nortel Networks, once Canada's largest and most successful technology company, announced that it would sell all its business units and effectively end over 100 years of operations. While other companies in this industry, including Ericsson, Nokia, Siemens, Alcatel, Lucent and Cisco, had run into difficulties because of the massive changes sweeping across the competitive environment, each has found a way to survive to this day.

So why did Nortel fail?

A diverse research team composed of both academics and former telecommunication practitioners set out to understand Canada's most spectacular organizational failure. The following study is the result of a comprehensive effort by the University of Ottawa's Telfer School of Management, School of Electrical Engineering and Computer Science, and Faculty of Law. It provides a rich account of the events related to probing for systemic causes for Nortel's failure.

In 2000, as Nortel's environment shifted from benign to ultra-competitive, the company's low resilience combined adversely with the formation of a black cloud, an irremediable loss of confidence by many of Nortel's key customers.

This report explains how a combination of external shocks and managerial decisions led to the eventual demise of a Canadian giant that at its peak in 2000 accounted for more than one third of the total value of the S&P/TSX index, was the ninth most valuable corporation in the world[1] and had employed more than 94,000 employees worldwide as of the end of 2000.[2]

[1] From Financial Post Nortel trail to open old wounds, by Theresa Tedesco, January 14th 2012 and CBC News, January 14 2013,: http://www.cbc.ca/news/business/3-former-nortel-executives-acquitted-in-fraud-trial-1.829361 and http://business.financialpost.com/2012/01/14/nortel-trial-to-open-old-wounds/?__lsa=db9e-1bd7
[2] Nortel 2001 Annual report page 22, https://bib.kuleuven.be/files/ebib/jaarverslagen/NortelNetworks_2001.pdf

This study focuses on the period from 1997 through 2009. It is based on data collected over a three-year period with the objective of identifying lessons that can be learned from the failure of Nortel.

48% of Nortel officers (1997-2009) were interviewed for this study.

This report reflects the synthesized views of hundreds of participants, including 48% of all Nortel officers between 1997 and January 2009, 53 customers, and a number of competitors, journalists, academics, industry watchers, consultants and government officials. The data collected included 343 surveys, over 2,500 pages of notes from 133 interviews, and hundreds of pages from Nortel's annual reports, documents, emails and third-party studies. Study results where then shown to 22 of those interviewed including all major customers, several Nortel partners/suppliers and Nortel officers for a final validation step.

Boards need to understand the concept of resilience.

Customers ultimately decide who survives and who dies in an industry.

The conclusions drawn from the data collected and interviews conducted for this study can be implemented by a broad spectrum of corporate stakeholders. Boards of directors will gain insight into the importance of its primary function which should be to operating a profitable organization and remaining adaptable as a board in order to address emerging needs in an entrepreneurial manner. Boards also need to understand the level of resilience of the companies over which they are providing oversight and need to think about the role that they can play in helping to build resilience and in responding to crises. CEOs and members of the executive-management team will be reminded of the need to stay relevant, to listen to customers' requirements and concerns, and to continuously build strong relationships. It is prudent for corporate stakeholders to heed the lesson that the decisions made in the good times are really the ones that can kill a company in the bad times.

Nortel's technology leadership led to its pioneering of the digital switch.

Nortel's early success was based on a model of deep technological expertise that allowed the company to create entirely new markets as it did in leading the transition from analogue to digital. At this time, Nortel was highly regarded for its technology leadership skills, product reliability and unending customer support. Consolidated R&D management with linkages to Bell Northern Research (BNR) and its strong connections to customers enabled Nortel to gain and maintain a first-mover advantage in many markets.

When success breeds arrogance, resilience decreases.

The organization featured a flexible organizational structure that enabled Nortel to move resources to identified opportunities. It was a model based on designing and building products, informing customers of what they needed, installing products when Nortel felt that they were appropriate for the market, and charging accordingly. While this model led to well-designed, reliable products, it also led to a culture of arrogance and even hubris combined with lax financial discipline. Nortel's rigid culture played a defining role in the company's inability to react to industry changes. Respondents suggested that this lack of adaptability was partially based on the company's history as a leader in the market. Others have suggested that the focus on revenue growth and market share in the late 1990s while ignoring profitability left the company in a precarious financial position during the market crash of 2001.

During the good times leading to 2000, Nortel's cost structure grew more quickly than its revenues.

Nortel did achieve rapid revenue growth between 1997 and 2000, doubling its revenues in that time period while its stock price tripled. However, the rapid increase of physical and human resources led to an increase in overhead and duplication. Moreover, as the company reacted to the emergence of Internet technologies and to the opportunities presented by the dot-com boom, it embarked on an acquisition spree. This approach proved to be a failure because ill-chosen and poorly integrated acquisitions de-focused and over-complicated the organization. The company's high cost structure and lack of financial discipline eventually led to financial ratios that were among the worst in the industry. While other players in the industry earned profits during this period, Nortel incurred repeated losses.

Growth through acquisition was a departure from Nortel's culture of internal technology development.

In addition to the strategy of growth through acquisition, Nortel made a series of product-related decisions that would prove to be problematic:

Nortel made a number of strategic moves that eroded its competitive advantage.

- Nortel served a North American-centric market and relied heavily on a small number of customers that were forced to reduce their orders as a result of global recession.
- Nortel's competitive advantages were in a declining market (wireline) and in saturated markets (optical).
- Nortel invested heavily in a growing market (enterprise) but with a differentiation of high product quality and reliability (five nines[3]) that was not as valued within this market. Carrier quality and procedures in an enterprise market led to significant delays in new product releases.
- Nortel had early technology leads in an explosive market (wireless) but consistently bet against emerging global standards and failed to achieve differentiation while at the same time the wireless market became more commoditized.
- Nortel invested heavily in worldwide interoperability for microwave access (WiMax), which was divested in later years.
- Nortel focused on Code Division Multiple Access (CDMA) rather than on Global System for Mobiles (GSM) to serve less than 20% of the market (i.e., North America) when in fact GSM had emerged as the global standard with an 80% share of the market.
- The company did not commercialize Long Term Evolution (LTE) despite an early technology lead and successful deployment tests.

[3] Five-nine reliability means that the equipment is available and running 99.999% of the time.

Nortel made a number of wrong structural moves that broke the innovation and technology development system.

In addition, Nortel introduced a number of operational changes that impaired innovation and the ability to discern and respond to emerging industry and customer changes:

- Giving power to business owners and increasing divisional power which resulted in increased internal politics and fruitless competition;
- Dismantling a centralized R&D platform (BNR) that was culturally and structurally optimized to create, innovate and develop telecommunication products using cooperative teams;
- Removing several of the financial controls / forms and procedures and introducing a system that favoured legacy products (high margins) over radical innovation (high risk); and
- Reduction in the role of the intelligence team, elimination of the design/interpretive centre and other strategic-planning functions.

Nortel lost elements of both internal and external situational awareness

Nortel lost its way and became distracted.

When the dot-com bubble burst in 2001-2002 and the market became more competitive due to oversupply, the precipitous drop in demand and the entrance of the Chinese competitors, Nortel entered the new competitive environment ill prepared. The cumulative effect of its previous decisions forced it to become internally focused – dealing with massive downsizing, financial restatements and regulatory issues, as well as effectively ignoring customer needs and losing sight of the changing business environment.

Change in Nortel's behavior led to a loss of stakeholder confidence creating a psychological effect: "The Black Cloud".

Customers noticed this. They informed the research team that around 2002 Nortel was no longer behaving in the same way that had in the past; its unending customer support, confidence and technical advances were no longer evident. In looking at Nortel's R&D commercialization road-maps, customers did not see new products but instead were mainly offered software upgrades. In particular, they noted that Nortel did not release any major new product between 2000 and 2008. When asking for product modifications, something that Nortel had readily agreed to in the past, customers were now told that their requests would require approval.

Customers growing concerns with Nortel's finances, strategy and management further fueled the "Black Cloud".

When customers asked for more in-depth explanations about what was happening at Nortel (in regard to restatements, firings and so forth) they were told by individuals with whom they had been close for so many years and whom they trusted (Nortel's sales executives) that the information was on the Nortel website or that they should consult with headquarters. Even those who were on the front line (the sales executives) were changing as a result of a steady stream of firings and executive resignations. A company once known for technology leadership focus and vigilant customer support was no longer trusted. Customers referred to this loss of trust as the 'black cloud'. The cloud started to develop in 2002. By 2005-2006, most key customers were concerned that Nortel did not have the ability to survive beyond the next five years and, as a result, they were increasingly unwilling to make longer-term sales commitments.

By 2006 key customers conclude Nortel unlikely to survive in the longer term.

By 2006 key customers had concluded that the probability of Nortel surviving over the long term was low. The appointment of yet another CEO did not seem to do much to control the growing black cloud of doubt. The recession that began in 2008 set Nortel back on its heels once again and the board and most of the senior executive team concluded that bankruptcy protection was the only viable approach to straighten out the company. Unfortunately, the benefits thought to be gained by the filing did not materialize and in June 2009 the company announced that it would sell all its business units and effectively end over 100 years of operations.

Nortel fails:

A hostile environment combined with the company's low resilience and the "Black Cloud" effect

In summary, the study identified three broad factors that are consistently cited as reasons for the demise of Nortel:

- External business environment – Nortel misread the market and was ill equipped to respond to increased competition, the accelerating rate of technological change and the power shift to customers;
- The black cloud – key customers no longer believed that Nortel would be around for the long term to fulfill their R&D and maintenance promises; and
- Lack of resilience – Nortel's strategy, structure, poor financial management, business processes, people and culture decreased the company's ability to adapt to disruptions in the business environment such as global recessions and increased competition.

Key Lessons Learned

This project was not oriented toward pointing fingers or assigning blame, but instead to using the Nortel situation to learn more about corporate failure, about its causes and potentially about how analogous failures can be prevented. We draw two key conclusions.

Failure is complex.

The first conclusion is that failure is complex. In the case of Nortel, failure involved a combination of multiple factors including the changing business environment, a poorly aligned strategy, and board and management decisions. It was not just one factor that created a pain point but rather multiple factors that created multiple pain points working in parallel that broke the company.

Failure is temporal.

Second, failure occurs over a number of years. Nortel had underlying problems that started even before 1997, which is the first year of focus for this study. Moreover, it took several additional 'shock' events between 1997 and 2008 to finally force the company to face the bitter reality and seek bankruptcy protection.

11 Key Lessons for Leaders

The feedback from the interviewees and the analysis by the research team yielded over 100 lessons learned. In this summary we present eleven essential lessons that we hope will help future leaders.

In thinking about how one wants to grow a business, make sure strategy and culture are aligned.

Nortel tried to acquire companies without the processes or culture necessary to integrate them. This was not an engrained corporate capability. It was a complete departure from Nortel's established skills base, culture and history of developing its own products.

In a fast-moving environment, one has to maintain situational awareness on customers, competitors and the market.

Nortel did not have the appropriate depth and capability to gather reliable external and internal information in order to make timely and informed decisions following the restructuring and dismantling of BNR, the reduction in the role of the intelligence team, and the elimination of the design/interpretive centre and other strategic-planning functions.

Understand your competitive advantage and protect it.

Nortel had people on the technology side who could design leading-edge technology solutions. The company had people on the sales side who understood the customers' needs and had formed close relationships with them. There was also a centralized cooperative structure that enabled product development and commercialization. Yet, in restructuring for growth, the company lost this advantage.

In a technology-driven company, senior management needs to listen carefully.

From the Roth era to the Zafirovski era, until Nortel hired a new Chief Technology Officer (CTO), it was felt by many R&D staff that management rarely listened to the engineers and that, when they did, they did not appear to understand.

When it comes to customers, one needs to strike a balance between meeting their current requirements and future needs.

In winding up BNR, Nortel effectively lost the ability to see and understand longer-term needs. Furthermore, the limitation of the amount of time that technology personnel spent with customers and the limitation of attendance at conferences resulted in the company losing an understanding of the current and medium-term needs of customers.

Watch the bottom line, not just in bad times but also in good times.

From at least the mid-1990s through to the bankruptcy filing in 2009, Nortel's business results were unstable. Its operations earned profits only in some of the years. The lack of a sound business model and the resulting financial weakness made Nortel more vulnerable to external shocks and to adverse changes in the competitive environment.

Boards are the last line of defence and as such should make evidence-based decisions.

In the case of Nortel, internal information systems could not provide management or the board with appropriate and timely information. Given the fact that the board members' backgrounds were generally from outside the telecommunications ecosystem, it would have been difficult for them to obtain and provide accurate and timely information.

Customers pay attention to how suppliers behave.

The customers interviewed noted that in 2002 Nortel's sales teams had begun "acting differently". Customers therefore began to examine the financial statements and the core Nortel business model and they uncovered a company that had a very weak financial position. This discovery initiated the formation of the 'black cloud'.

Business leaders need to know when and how to shift their own corporate culture.

Nortel's sense of pride might have seemed to be a strength in the early days but it created inflexibility in the latter days of the company. In fact, it escalated into hubris to the extent of making it especially difficult to absorb acquisitions, to quickly respond to market needs (largely as a result of the creation of inflexibility), and to accept and understand what customers wanted (largely as result of the delusion of "we know better").

Manage the 'business', especially during crises.

From 2001 to 2006, Nortel's board and senior management were more focused on dealing with restatements, investigations, crisis management and reputational management. As a result, they ignored the fundamental requirement to satisfy customers' needs and commercialize new products.

Knowing when to retrench is essential in rebuilding resilience and in reducing and eliminating a black cloud of customer doubt.

With low resilience and the black cloud that began growing in 2002, Nortel was in a position to solve both problems by retrenching by selling business units. Instead, the company chose not to retrench and effectively contributed to the growth of the black cloud. By 2005-2006 when the black cloud had reached a critical size, Nortel's leadership again could have retrenched and thereby solved both problems. Instead the senior management focused entirely on resilience issues. As difficult as it is to consciously reduce the size of a business by selling units, this study concludes that, in the case of Nortel, this option may have been the best and only alternative.

SECTION 1

Introduction to the study, methodology and the narrative

Preamble

In June 2009, Nortel Networks (Nortel), once Canada's largest company and a firm that had recently been number one in the global telecommunications supply industry, announced that it would sell all its business units and effectively end over 100 years of operations. A research study conducted by a diverse team from the University of Ottawa set out to learn why Nortel eventually found itself in this situation. The objective of the study was to identify lessons learned about corporate failure. We hope that these lessons learned will help leaders in organizations to identify critical failure factors; and thus, take steps to avoid following the path of Nortel.

The lessons learned emerged from a research project that included faculty members from the schools of management, law and engineering. The researchers collected data using surveys and interviews drawn from hundreds of key figures in the global telecommunications industry. This report reflects the combined knowledge of hundreds of customers, competitors, government officials, academics, consultants, association executives, ex-Nortel employees, media specialists, industry watchers and thought leaders who formed part of the Nortel ecosystem.

The remainder of this document provides an introduction to the study, describes the key milestones noted in the demise of Nortel and sets out the attendant lessons learned. It then proposes a 'failure model' that can be applied in analyzing the potential for organizational failure.

Introduction

The study was kick-started when Jean Monty (CEO of Nortel 1993-1997; CEO of BCE 1997-2002; and currently the Vice Chairman of Alcatel Lucent) approached a member of the project research team. Mr. Monty offered funding and assistance for an academic investigation into why Nortel failed and what lessons could be learned from its failure – a case study. Other senior ex-Nortel officers joined Mr. Monty in this endeavour offering financing and other assistance. Over the course of the project, these individuals acted as an advisory group, which was expanded with the addition of several other ex-Nortel executives from the United States and Europe, each of whom offered to help us learn about the failure of the company. The advisors shared their knowledge with the research team and were instrumental in encouraging their industry colleagues to participate in the study.

Thanks in no small part to the efforts of these advisers, we interviewed, surveyed and in some cases re-interviewed 48% of all of Nortel's officers from 1997 through January 2009, including CEOs, several senior officers who were in the room when Nortel decided to file for bankruptcy protection and multiple customers, including 18 who were interviewed and seven who reviewed the final study findings – all of whom were at the 'C' level in their current companies. In addition, many competitors, journalists, academics, consultants, government officials and politicians provided their time and insights and in some cases connections to help with this study. In addition, we reviewed annual reports and 10K securities filings[4] over the study period, as well as numerous studies and articles.[5]

The study used multiple lines of enquiry that enabled triangulation and validation. The process started with a review of the failure literature and with reviews of articles, studies and other documents about Nortel. This produced an initial list of potential reasons for Nortel's failure. This list was used as the basis for creating a survey and an interview guide. These were tested on a group of former Nortel officers to assess its efficacy. The instruments were then revised based on their feedback.

The interviews consisted of open-ended questions asking participants why they thought that Nortel had failed. Additional open-ended questions were asked in the areas of organization, technology, strategy, governance, environment, and finance. All interviews were transcribed and then coded. Codes were developed based partially on the literature on corporate failure and partially on a review of the initial interviews. The survey consisted both of open-ended questions (for example, "list three reasons why you think Nortel failed") and of Likert questions that asked respondents to evaluate the extent to which they agreed with statements about Nortel (for example, "Nortel was a leader in technology").

Table 1: Those Interviewed and Surveyed

Method	Total*	Officer/Senior	Employee	Customer	External
Initial survey	343	60	265	53	127
Interviews	133	46	45	18	35
Final survey	57	20	18	8	13
Validation interview	22	11	0	7	6

*Note, in several cases respondents identified themselves as "wearing more than one hat" during the time frame of the study. As a result, in adding up officer/senior + employee + customer + external the number is greater than total number of actual interviews/survey responses.

A second survey was sent out to all those who had participated in the interviews. Participants were asked four questions. Why did Nortel fail? What could have been done to prevent the failure? What are the lessons learned from the Nortel failure? What were Nortel's strengths in the end? Section 5 of this report (Appendix) summarizes the results from the surveys and interviews.

The data arising from the two surveys and the interviews were then used to develop lessons learned about the failure of Nortel and used as the basis from which to develop a model of corporate failure. As a final validation step, these findings and the model were presented to 22 people who were interviewed for the study. Table 1 provides a summary of the respondents to the surveys and interviews.

[4] 10K securities filings are to the U.S. Securities and Exchange Commission (SEC).

[5] While several ex-Nortel board members volunteered to be interviewed, they were advised by counsel not to participate at this time. We appreciate their offer and recommend that they be interviewed when they are able to participate in future phases of this study.

The Narrative

Using the results of the surveys and interviews, and the model adopted and developed for the study, we offer the following narrative and lessons learned from the demise of Nortel. Our examination of the historical aspects of the organization and its progressive degeneration reveal that its initial business model, people and structure created a culture that was well adapted to the external environment at one time but was difficult to change when that environment shifted.

Critical Factor 1: Inflexible business model and organizational culture

In its earlier days (1970s and 1980s), Nortel's business model focused on technological superiority based on custom product research and development for large customers. Nortel developed strong relationships with its customers under this model. The company had an extraordinary ability to design and develop products, along with the flexibility to move people and resources towards new opportunities. Customers operating under this model came to trust Nortel for its technological expertise and allowed the company to tell customers what they really needed. Nortel would not supply a product until its quality was up to Nortel's standards. It was a model, as one customer put it, of "build, sell and eventually deliver". Nortel wanted and obtained full control in this model, including building and designing most of the product components.

This was a great model for an environment in which customers were price takers and suppliers could 'force' specific technology-based products on customer who were typically telcos. Not only was this model expensive for customers; but it also fostered an arrogance that Nortel knew best. Nevertheless, during this period, Nortel's technology and product development model, structure and people enabled the company to deliver extraordinary technologically sophisticated products to its customers. This model allowed the company to be at the vanguard of the move from analog to digital, and thus played a central role in establishing Nortel's market leadership.

Another aspect of the initial business model was the fact that Nortel had a benevolent majority shareholder (Bell Canada Enterprises or BCE) that was willing and able to provide cash when needed, and at the same time had clients that would pay what was asked. However, this led to a lack of regard for cash flow and financial discipline.

In summary, Nortel's business model before the study period (1997-2009) clearly encouraged the development of extraordinary technology and products but in so doing inspired a sense of arrogance coupled with a lack of financial discipline.

Critical Factor 2: Building for growth at the cost of innovation and resilience (1997-2001)

Nortel recognized that the organizational model of the 1970s and 1980s could not accommodate the massive growth opportunities of the 1990s and given its desire to become the number one company in the market, Nortel made organizational changes designed to enable units to react quickly and grow aggressively. In addition, acquisitions were made to improve the time to market with externally developed technologies and products that responded to Nortel's Internet Protocol (IP) strategy and could help meet the opportunities of the dot com boom. Organizational changes in the 1990s allowed Nortel to grow to the top position in the global market. But this dramatic growth came at a significant cost. These organizational changes broke Nortel's innovation capability. They also had a negative impact on management's ability to sense what was happening both within and outside the organization. Structural changes, which increased the power of various divisions, also set up a state of affairs that fostered a more politically charged internal environment.

During this period, ill-chosen and poorly implemented acquisitions de-focused and over-complicated the organization and led to increased overhead and duplication as well as to a growing head count that added to Nortel's operating costs. At the same time, instead of focusing on business fundamentals, including profitability, management was preoccupied with the stock price. As a result of the escalating costs, the focus on growth as opposed to profitability and cash flow, and the arrogance and lack of financial discipline that developed during the 1970s and 1980s, Nortel did not have the resilience to deal with the changes that were to arise in the market. Consequently, Nortel entered the 2000s with low resilience to market change – notwithstanding the strong innovation capability at the research and product development levels in the company. Unfortunately, restructuring (e.g., the disbanding of BNR) worked against innovation and obstructed the development of a coherent vision of the future.

Summary: Organizational changes in the 1990s damaged the innovation engine and reduced Nortel's ability to sense and cope with industry changes.

Critical Factor 3: Building resilience but at the cost of the 'black cloud' (2002-2009)

When the market changed in the early 2000s, Nortel was ill prepared. If Nortel had developed a greater degree of resilience, this would have been an outstanding time to use the company's competitive advantage (i.e., technical capability) as a basis for shifting into more attractive portions of the market (e.g., to move up the segmentation of the market with applications and new mobile devices) or for moving into an entirely different sector of the industry that would have been more aligned with the Nortel model of doing business. It appears that Nortel's model of providing high reliability and quality to the enterprise market resulted in a product development cycle that was far too long while the same approach when applied to the newly commoditized carrier market was far too expensive.

Instead of moving into more attractive markets, Nortel tried to stay within its existing markets by implementing massive cost cuts, which was a logical move given the declining prices brought on by the environment. At the same time, however, the company also increased its R&D costs. The problem was that both economies of scale and cost reductions were needed to succeed in this changing environment.

The approach to cost cutting and the company's internal focus affected the way in which Nortel served its customers, many of whom noted a distinct change in the company's behaviour at the time (in fact, one customer referred to the company as a "face changing monster"). Several customers mentioned that, during meetings with Nortel staff around 2002, people whom they had known on a personal level for years were not acting as they had acted in the past. They were evasive, and needed to check with Nortel management before agreeing to any product functionality changes. Several customers told us of the experience of looking across the table and saying "we both know you are lying." Trust in Nortel as a company that was focused on its customers, delivering where others could not deliver, had been broken. Beginning in 2002, a "black cloud," as customers referred to it, was forming around Nortel.

Rather than focusing on dealing with this black cloud and on adopting an external orientation, the CEOs from that time onward focused on competing in the emerging environment (e.g., by cutting costs, fixing systems and so forth). It was hoped that restoring margins and quality would satisfy customers and dissipate the black cloud. The cost-cutting emphasis and the internally focused orientation are among the factors that contributed the most to the list of characteristics that customers stated were evidence of the black cloud (see below).

The customers in the interviews were clear regarding what they felt Nortel needed to do in order to dissipate the black cloud. Two major strategic choices discussed by customers included, selling units/being focused or merging with another telecommunications equipment supplier. The interview participants also indicated that, in addition to pursuing one or both of these options, they wanted to see the old Nortel – at least in terms of being innovation-driven and customer aware.

By 2006 customers stated that it was clear to them that Nortel was neither selling units nor merging with another company. As well, the continuing internal focus in a relentlessly changing technology environment coupled with an innovation engine that had been broken since the mid-1990s meant that innovative products would not emerge for almost seven years throughout the period 2002 through 2009. The internal focus also meant that the company could not devote as much time and resources to customer relations, a failure that was noted by a number of key customers. In addition, a series of internal crises, including the termination of senior executives, such as the CEO, and financial restatements resulting from a review by Wilmer-Cutler[6], intensified the preoccupation of senior managers with administrative issues and in turn exacerbated customers' concerns.

As these events unfolded and were reported in the mainstream press, Nortel's customers concluded that the explanations that they were being given were insufficient. Several mentioned that, as loyal and key customers, they felt that Nortel should have been more forthcoming, especially in terms of providing them with more information on the actual state of the company. As one customer said, "When they don't tell their customers more than what is on the website, you assume the worst". When the truth finally emerged, many customers indicated that, even though the situation was not as serious as they had initially thought, the damage already had been done.

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[6] *Wilmer-Cutler*, now called *WilmerHale*, is a full-service international law firm headquartered in Washington, D.C. The firm was retained by the Audit Committee of the Nortel Board with a remit to investigate any serious possibility of financial improprieties within the upper ranks of the company.

The major factors cited by customers as having contributed to the formation of the ‘black cloud’ of opinion about Nortel can be grouped into four areas: performance, communication, reliability and technology development.

Company performance

- Financial ratios and other analyses revealed that there was a high probability of bankruptcy.

Communication

- CEOs not creating a sense of comfort, not seeing customers frequently enough
- A lack of appropriate communications at the senior level
- Financial statements and other bad news not being properly explained
- Nortel staff who met with customers not acting/behaving in the ways that they had in the past
- Nortel not supporting customers, not acting in the same ways as in the past, and
- Feeling lied to by the company.

Reliability

- No longer doing what they said they would do / broken promises
- Not meeting commitments in terms of sales, R&D, product quality and so forth , and
- Reduction in customer orientation.

Technology development

- Key technical people that customers trusted leaving Nortel
- Delays in software releases, delays in product delivery
- Escalation in the number and frequency of failures and software bugs
- Absence of an ’appropriate’ road map showing the commercialization of desired technologies and products
- The demise or at least the slippage of the company’s product road map, and
- A focus in commercialization road maps on software upgrades rather than on new products.

It is not the existence of one or two of these factors that matters but the combination and compounding effect of them as well as the increasing frequency of their occurrence. It appeared from the interviews that, as the black cloud grew, the customers became less tolerant of ‘mistakes’. The implication is that, when the cloud had reached a critical size (which we estimated as occurring roughly in 2005), any misstep was perceived as a confirmation of Nortel’s lack of long-term vision and survivability. Unfortunately two more financial restatements (2006 and 2007) and a perception by the customers of three CEOs in a row not “listening” to them and not adopting what they felt was an appropriate strategy, caused the black cloud to grow to an overwhelming and critical size. Each CEO was focused on the internals, namely increasing resilience through cost cutting and fixing internal information systems, especially financial tracking.

Successive CEOs did try to address the black cloud. Each spent time meeting with customers and talking points were developed for the sales force but the customers' perceptions and the factors mentioned above dominated. What was learned in reviewing the internal Nortel documents was that speaking points and public relations are of no avail if the fundamental factors that underlie the black cloud were not addressed. By 2005-2006, major customers had concluded that something was fundamentally wrong with Nortel. It was no longer the same company and its probability of surviving beyond the next five years was perceived to be low. While customers hoped that Nortel could pull off a miracle, their sense was that the executive management, organization and strategy were not appropriate for the new environment and that the company would not make the decisions necessary to ensure survival.

When Zafirovski announced in 2006 his plan to focus on such areas as reducing costs, improving quality (e.g., Six-Sigma[7]) and improving R&D, additional concern was created among customers because they felt that Nortel was heading in the wrong direction. As a result, post-2006, when customers were looking at upgrading their systems to fourth-generation mobile communications or were considering Long Term Evolution (LTE), they were not prepared to commit to a company that they felt would not be around beyond the next five years. They effectively switched out of Nortel.

By 2008, while Nortel's financial performance had been improving (apart from the 2008 global financial crisis), the uncertainty surrounding the company led to the loss of new access/wireless-technology sales from major customers such as British Telecom, T-Mobile, Vodafone and Verizon. With approximately 70% of customer capital expenditure generally going into access, this was going to make future survival difficult. Even sales in products that did not require long-term survival or were not seen as being as difficult to swap out (core products) were on the decline. Despite having top-flight staff, great research in LTE, award-winning products in enterprise and optical and a great patent portfolio, the company was in trouble – the black cloud had become overwhelming.

Summary: Nortel continued to focus internally on building resilience instead of externally on customers' concerns and on moving into new market opportunities. The black cloud of customer sentiment led to the loss of sales and abandonment by key customers.

Critical Factor 4: Filing for bankruptcy protection as another resilience move at the cost of the black cloud

On January 14, 2009, outside consultants recommended that Nortel file for bankruptcy protection. According to an article written by James Bagnall of the Ottawa Citizen, a long-time Nortel observer and commentator[8]

[7] Six-Sigma is a quality-control approach for process improvement. Developed by Motorola in 1986, its aim is to improve product quality, meet customer requirements and improve customer retention. www.investopedia.com/terms/s/six-sigma.asp

[8] James Bagnall, *The Ottawa Citizen*, published Saturday, October 31, 2009.

"Terry Savage of Lazard Frères offered the board the expertise of his firm, investment bankers who since 1999 had helped more than 250 companies to restructure. Savage advised Nortel to file while it still had cash and flexibility. "We've never seen a company as well prepared for Chapter 11", he said in an apparent reference to Nortel's cash reserves."[9]

Filing for bankruptcy protection is typically a move that increases resilience by buying time and allowing the company to reduce financial pressures. Although filing for bankruptcy can be a successful manoeuvre in many industries, according to the article mentioned above, Nortel's Chief Legal Officer is said to have pointed out that the fast pace of the technology industry meant that bankruptcy would have a negative impact on Nortel. At the same time there were potential offers for the Enterprise and Optical business units.

The Lazard Frères recommendation was accepted by most of the senior management and the board. This move would have an additional negative impact in terms of enlarging the black cloud. As the months after the filing accumulated, it became evident that Nortel would never emerge from bankruptcy protection. The impact of the black cloud on sales was higher than had been expected and the anticipated benefits of filing for bankruptcy protection in terms of buying time to straighten out Nortel's business and sales and building resilience never materialized.

Summary: The move to file for bankruptcy protection was not what customers fully expected, thus causing the black cloud to overwhelm Nortel's ability to recover.

The Epilogue

By 2013 LTE was finally in the commercial market. However, in order to have been in a position to commercially implement LTE, Nortel would have needed to be financially strong from a cash perspective for five years after filing for bankruptcy. That means that a potential customer back in 2008-2009 that was preparing to commit to LTE would have needed to trust Nortel to have the cash to do the R&D required to commercialize LTE (hundreds of millions of dollars) and then to trust that the company would be around for over 10 years thereafter in order to service the new LTE products. As several of the customers stated, they were not concerned about Nortel having the technical capability to do this. Rather, they did not trust that on a strategic and managerial level the company would survive for the five years required for the eventual roll out. The challenging environment, the low level of resilience, which resulted in difficulty in adjusting to this environment, and the black cloud combined to bring about the demise of Nortel.

Key Lessons Learned

Feedback from the interviewees and the analysis performed by the research team yielded over 100 lessons learned. The research team reviewed these lessons in terms of their significance in relation to

[9] Chapter 11 refers to U.S. law concerned with filing for bankruptcy protection.

the Nortel story and their uniqueness. What follows are the key lessons learned in this study. The lessons are not ranked or prioritized. Failure, as we found, is complex. It is the result of the accumulation of decisions made over time. In consequence, no one lesson is more important than any other.

In thinking about how one wants to grow a business, make sure that the tactics align with the organization's strategy and culture. Nortel tried to acquire companies without the processes or culture necessary to integrate them. This was not an engrained corporate capability, and constituted a departure from Nortel's established skills base, culture and history of developing its own products.

In a fast-moving, competitive environment, one needs to maintain situational awareness about customers, competitors and the market in general. Nortel did not have the appropriate level of depth and capability to gather reliable external and internal information to make timely and informed decisions.

Understand your competitive advantage and protect it. Nortel had several key advantages such as people on the technology side who could design incredible technology solutions, people on the sales side who understood the customers' needs and had formed close relationships with key buyers, and a centralized cooperative structure that enabled product development and commercialization. In restructuring for growth, in downsizing and in adopting the Wilmer-Cutler recommendations, Nortel lost many of these key people and the strength of the organizational structure.

In a technology-driven company, senior managers need to listen carefully and understand, and to demonstrate trust in what their technology leaders are telling them. From the Roth era until Zafirovski hired a new Chief Technology Officer (CTO), it was felt by many R&D staff that the senior managers rarely listened to the engineers and that, when they did, they did not appear to understand.

When it comes to customers, one needs to strike a balance between meeting current requirements and anticipating future needs. In winding up BNR, Nortel effectively lost the ability to see and understand longer-term needs. Furthermore, by limiting the amount of time that technology personnel spent with customers and by limiting employees' attendance at technical conferences, the company experienced a loss of understanding of the current and medium-term needs of customers. In short, Nortel sacrificed the future.

Watch the bottom line. From at least the mid-1990s until the bankruptcy filing in 2009, Nortel's business results were quite unstable. The company's operations earned profits only in some of the years. The lack of a sound business model and the resulting financial weakness made Nortel more vulnerable to external shocks and to adverse changes in the competitive environment.

Boards are the last line of defence and as such should make evidence-based decisions. In the case of Nortel, internal information systems could not provide management or the board with appropriate and timely information. Given the fact that the board members' backgrounds were generally from outside the telecommunications ecosystem, it would have been difficult for them to obtain accurate and timely information.

In the telecommunications industry, customers pay attention to how suppliers behave and how they run their businesses. The interviewed customers noted that in 2002 the Nortel sales team members were 'acting' differently. Customers therefore began to examine the financial statements and the core Nortel business model and they uncovered a company with a very weak financial position. This 'discovery' initiated the formation of the black cloud.

Business leaders need to know when and how to shift their own corporate culture. Nortel's sense of pride might have been a source of strength in the early days, but it created inflexibility in the latter days of the company. In fact, the pride escalated into hubris and made it difficult for the company to absorb acquisitions (the "not invented here" syndrome), to respond to the market needs quickly (due to inflexibility), and to understand and accept what customers wanted (the delusion of "we know better"). This culture compromised the company's global reach when it interfered with adapting products and marketing literature for appropriate languages (e.g., the sales force being told that "It's sold that way in the USA").

Manage the 'business', especially during crises. From 2001 to 2006, Nortel's board and senior management were more focused on dealing with restatements, investigations, crisis management and reputational management. As a result, they ignored the need to satisfy customers' needs and to commercialize new products. Certainly crisis demands management and board attention, but it appears from the interviews that most of the attention was focused on dealing with individual crises. In managing the 'business', Nortel should have managed its crises in ways that responded to customers' concerns like, for example, with appropriate messaging about the crises and with greater openness and honesty about the true state of the company.

Knowing when to retrench is essential in rebuilding resilience and in dissipating the black cloud of customer doubt. With low resilience and the black cloud that began growing in 2002, Nortel was in a position to solve both problems by retrenching through the selling of business units. Instead, the company chose not to retrench and effectively contributed to the growth of the black cloud. By 2005-2006 when the black cloud had reached a critical size, Nortel's leadership could have retrenched and thereby solved both problems but this was not done. Instead, the leadership focused on resilience issues. As difficult as it is to consciously reduce the size of a business by selling units, one of the conclusions of this study is that for Nortel this might have been the best alternative that would have allowed the company to survive.

SECTION 2

The Failure Model

The failure model represents a synthesis of the foregoing narrative with the aim of defining and exploring in greater detail the various factors that can lead to failure. At the most basic level, this study identifies three broad factors, each of which has many underlying contributing elements. These are set out hereunder.

1) The 'black cloud': In the end, Nortel failed because its key customers, the major telephone companies (or telcos), no longer believed that Nortel would survive. The black cloud resulted in the telcos being unwilling to buy new access (wireless) technology from Nortel. As mentioned above, the black cloud is a term used by customers interviewed in this study and refers to their belief that Nortel would not survive over the long term (i.e., for 15 or more years for access). This would not be long enough for Nortel to fulfil its R&D promises or to service any new technologies. One of the major contributions of this study is that, through interviews with major customers, we were able to discern when this black cloud began to form and what caused it. We saw how it grew and at what point it overwhelmed the company. We have gained an understanding of the dynamics driving the black cloud and, armed with this understanding, have offered approaches to managing analogous situations. The customers' assessment of the size and strength of the black cloud was based on three broad factors:

    a. Comfort/likeability – This was the first factor mentioned in terms of allowing a supplier into the chain. It is more of an emotional factor and when the black cloud started it was because of a gut/visceral feeling among the customers (as well as some suppliers) that something was wrong; Nortel were not acting in the same way as it had acted in the past.

    b. Business assessment – In a classic business analysis of Nortel as a supplier, the factors mentioned most often were: financial strength, strategy assessment and management strength. For Nortel, the assessment by 2005-2006 included weak financials strategy and management.

    c. Ownership/shareholder/board support – This involved an assessment of the extent to which those ultimately responsible for oversight would support the organization in the longer term, either financially or by supporting appropriate strategies. For example, in the case of Ericsson and Nokia Siemens Networks (NSN), the assessment was of a referent shareholder (Ericsson) and two wealthy parents (NSN) that could and would support the organization through difficult times. For Alcatel Lucent (ALU), there was a perception that the government would not allow the company to fail. For Nortel, there was a perception of no clear support along these lines, as well as a perception of a lack of appropriate support from the board.

The black cloud started to form around 2002 and continued to grow over the years that followed. By 2005, the black cloud was large enough that there appeared to be a real risk that Nortel would eventually fail. By 2006, the cloud had expanded to the point that the company was losing significant sales opportunities in access. By 2008, the cloud was so massive that it was clear that viability in wireless and wireline in terms of minimum economies of scale (MES) would be difficult to achieve for some years to come. It should be noted that technology did not form a major part of the customers' assessment and that financial strength figured strongly in both the business and support analysis. What was the cause of the black cloud? Why did it grow? Two factors explain this – external environment and resilience.

2) External environment: By the late 1990s, Nortel's business environment had changed significantly. Notable contextual changes included increased competition, the oversupply caused by the end of the dot com boom, the increased rate of technological change, the increase in customer bargaining power and the ensuing global recession. In Europe and Asia, for example, new Chinese competitors were buying their way into the market with prices that were significantly lower than those of existing competitors. While the opening up of markets in the 1990s as a result of deregulation in many countries did provide Nortel with access to many more potential customers, it also provided customers with access to many more suppliers; and the customers liked the different options in product choices, especially because they perceived and took advantage of the ability to play one supplier off against the other in order to reduce prices. In one interview we asked a customer why in the 2000s he had forced Nortel to reduce its prices. After all, given this telco's impressive profits, there was no lack of ability to pay prices in the range that had been paid in the 1990s. The answer was simply "because I could".

   The increase in supply and competition shifted the power to the customers to the extent that they now were dictating terms, technical choices, schedules and so forth. If the environment had not become structurally unattractive, none of the resilience issues that are examined in this study would have mattered. One of the overarching observations of this study is that a good business environment hides all manner of 'corporate sin'. Yet, it is becoming more and more difficult to disguise inadequate management in this way because industry change is happening at an increasingly frequent rate. Nortel's approach of building slowly (and controlling all the elements), pushing the products to the customer and then delivering only when Nortel was ready, combined with the high-cost model of high reliability in design, did not align with the increasingly commoditized world of responding to requests for proposals (RFPs), building the equipment to the customer's specifications and then delivering on time. Therefore, one must ask why Nortel failed to see these changes and to adapt appropriately to them.

3) Resilience: Nortel lacked the resilience to deal with industry disruption and change. Resilience was strong in the early days relative to the conditions that existed in the environment by the

mid-90s**.** By the end of the 1990s resilience was comparatively weak (but still seemingly acceptable for the environment). At that time, instead of investing in building resilience, Nortel made a series of decisions that virtually eliminated all elements of resilience. The five categories of resilience factors identified in this study are set out hereunder.

a. Resilience factors that impact the ability to sense the need for change: These include information/decision-making systems, environmental monitoring systems, appropriate goals on which to focus, and adequate time to look for and sense change. The survey and interviews pointed towards low resilience in most of these areas and in particular to the distraction arising from an internal focus, from poor information systems and from the wrong strategic goals (for example, the focus on increasing the stock price in the 1990s).

b. Resilience factors that impact the ability to believe in the need for change: This is primarily a cultural factor and involves being open minded, assimilating outside ideas, avoiding arrogance, embracing change and maintaining a learning culture. Nortel's unwillingness to accept ideas from the outside environment (the "not invented here" attitude) was mentioned frequently in interviews.

c. Resilience factors that impact the ability to execute on needed changes: Factors in this category include strong financial resources combined with financial discipline; an adaptable culture that accepts change; robust technical resources and capabilities; strong leadership with the ability and vision to direct the company; a management structure that enables the transfer of resources between units and projects; sophisticated technology-management processes and systems; good relationships with customers and customer goodwill. With the exception of technical resources and capabilities, all of the resilience elements listed above were inadequate or virtually non-existent according to those who were interviewed and surveyed. In particular, there was a lack of financial discipline and a lack of strong central leadership in the 2000s. A final item in this category is the impact that past decisions can have on future decisions. An example mentioned in many interviews was the outsourcing of manufacturing to Flextronics. Some interviewees said that the long-term contract limited flexibility in terms of future manufacturing decisions. Another example cited was that the refinancing/funds raised in 2006 imposed a significant interest expense for the near future and that settlement packages as a result of layoffs also imposed financial limitations for the future.

d. Strategic resilience factors: The factors included in this category are strategic clarity, a clear focus, a strong value proposition, a strong competitive advantage, and an international strategy and orientation. While Nortel did have a strong competitive advantage in terms of its technical competence, it was noted in the interviews that the overall strategy was unfocused and confused by the late 90s and that, as a result of various organizational impediments, this competitive advantage was not being leveraged in the 2000s. Moreover, in an industry in which establishing and maintaining a global reach was important for economies of scale, Nortel was weakened by its heavy North American focus and its limited perspective on what was happening overseas.

e. Board of directors: The survey results were gloomiest on questions relating to the board and the effectiveness of its business oversight, which is part of resilience. Even though the board members appeared to have outstanding credentials, the board members were generally perceived as being non-entrepreneurial and as lacking industry knowledge and expertise necessary to make informed and critical decisions, especially when Nortel was facing headwinds and increasing competition. In this respect, those interviewed saw the board as a potential source of information needed for resilience factor (a) – the ability to sense the need for change. Participants noted that having board members that are in the industry (like, for instance, customers and suppliers) can provide this kind of information. Cisco was often cited as a company with this kind of board. In the case of Ericsson and Nokia Siemens Networks (NSN), board resilience was linked with factor (c) – resilience factors that impact the ability to execute on needed changes by providing financing and other support when needed. Finally, board-related resilience was brought up by many of those interviewed in the context of the Wilmer-Cutler investigation, which was noted for having increased the inward focus which tied up management time and make it even harder to discern that change was needed (part of resilience factor (a) – the ability to sense the need for change).

The lack of resilience that arose from decisions made in the 1980s and 1990s meant that Nortel was not in a position to foresee industry change early enough to be able to adapt to it (or even to leave selected market segments). The lack of resilience also meant that it was much more difficult for the company to formulate and implement an appropriate strategic response to change. By the time that the company recognized the need for substantive changes, the black cloud had already started to form without its knowledge. In the 2000s, CEOs would return to focus on building resilience but the continued growth of the black cloud due to resilience issues meant that this was the wrong focus. A key lesson here is that, in the good times, companies need to invest in building resilience – not just in order to deal with the bad times that likely lie ahead but also in order to give them the ability to pursue new opportunities.

To conclude both this section and the narrative from Section 1, we present an assessment of the following: the changes in resilience elements over the study time line (table 2), the overall changes in the model elements (table 3) and the impact of what those interviewed mentioned most often in regard to the black cloud and resilience (table 4). As the reader examines the tables in the context of both the failure model and the narrative, we trust that the complexity of the failure becomes evident. It is not any one of these factors (poor environment, low resilience, massive black cloud) that resulted in the failure of Nortel; rather it was the combined effect of all three factors.

Table 2

Changes in Resilience Factors over the Study Time Line

	Early days	**1997-2001**	**2002-2005**	**2006-2009**
The ability to sense the need for change	Strong, many informal elements	Weak information systems internally and externally, wrong focus	Improving but still weak	Significant improvement
Ability to believe in the need for change	Strong, flexible, learning oriented	Low, emphasis on defending turf	Low to medium but with an entrenched culture	Improving but with a divided culture
Ability to execute on change	Extremely strong, except for financial discipline	Decreasing by 1999, with barriers created by strong divisions	Difficult and worsening, especially financially	Weak at the beginning and strengthened at the end
Strategy resilience factors	Strong and focused strategy and clear competitive advantage	Well-formulated strategy, but poor focus and poor implementation leading to the weakening of advantage	Unclear strategy, failure to leverage advantages and the loss of elements thereof, failure to achieve minimum economies of scale	Unclear tactics, operational focus, short-term focus, value proposition and competitive advantage
Board resilience factors	Not assessed	Not assessed	Not assessed	Not assessed

Table 3

Changes in the Environment, the Black Cloud and Resilience over the Study Time Line

	Early days	**1997-2001**	**2002-2005**	**2006-2009**
Environmental attractiveness	Extremely high	High but deteriorating at the end	Low	Low
Black cloud	No black cloud, just goodwill	Slight goodwill erosion	Formation and expansion of the black cloud	Overwhelming size of the black cloud
Resilience	Strong for the time	Low but adequate for the environment	Low but improving	Medium and improving until 2009

Table 4
Key Inflection Points Mentioned in the Interviews and Surveys

Incident	Impact on the black cloud	Impact on resilience
Acquisition of companies	Slight concern – very minor	Significant reduction
Structural and system changes for RAT and the dot-com boom	Initially positive for goodwill	Significant reduction
Cost-cutting strategies	Core of what started the black cloud	Slight improvement
Financial restatements (after the first one)	Increase	Slight reduction
Wilmer-Cutler process	Limited	Significant reduction
Following the Wilmer-Cutler recommendations	Significant increase	Reduction
Announced appointment of Zafirovski	Slight reduction and a hold	Not applicable
Zafirovski's announcement of the program of six sigma, quality improvement and system development	Significant increase	Significant improvement
Filing for bankruptcy protection	Increase	Reduction

SECTION 3

Lens Leader Summaries

The organization/structure of this research program was built around the concept of 'research lenses'. Lenses refer to various areas of academic expertise associated with the factors that we believe to have caused Nortel's failure. As mentioned in the description of the methodology adopted for this investigation, the team reviewed the failure literature and conducted preliminary interviews and surveys with ex-Nortel officers in order to develop a list of the reasons for failure. This led to the formation of a research team with expertise in: corporate governance, strategy, organization/performance management, technology and technology management, competitive intelligence and customer/ competitor/environmental analysis.

While accounting and finance do form a major part of the Nortel story, the research team did not add this kind of expertise to the team as it was felt that the complexity of the financial situation at Nortel had been well explained in other literature, which in turn could be used for this study. The intent of the research team was to combine the expertise of these lens leaders to produce an integrated model and understanding of the Nortel failure and lessons learned from it. Sections 1, 2 and 4 of this report set out these lessons.

In addition, each lens leader produced a 'lens report' that provides specific details about each particular lens. The following four vignettes present a high-level summary of four of these lenses: corporate governance, strategy, performance management and technology/technology management. The other lenses mentioned (competitive intelligence, customer/competitor/environment) represent a significant portion of the black cloud, environmental and resilience model and therefore vignettes of these two lenses were considered to be redundant for this section of the report.

Corporate Governance at Nortel: Board functions and the need for redefinition

The Nortel episode is significant for at least two reasons. First, it underscores the position of boards as the last line of defence in companies facing serious challenges and the inadequacy of the monitoring principle as a universal prescription. The events at Nortel raise some important questions. Should boards, as a rule, have a restrictive monitoring function? Or should directors adapt to emerging situations and be more pro-active and entrepreneurial in challenging times? The experience of Nortel offers valuable lessons for corporate-governance theory by emphasizing the limitations of the bare monitoring function of directors and the need for adaptive boards that can better cope with challenges arising from leadership problems and the external environment.

In a nutshell, the Nortel episode underscores the importance of adaptive boards. In good times, it might be sufficient for a board to play a background role in terms of monitoring but, in a company facing headwinds and competitive pressures, the board may need to adapt to changing circumstances and suitably calibrate its role. Adaptive boards can craft their functions to suit emerging needs and provide stewardship in handling and overcoming challenges. Board functions should not be static or limited in all situations. In troubled companies, boards must do more than just monitor: Nortel's experience suggests that boards that are mostly independent and that just engaging in bare monitoring might not always be adequate. Rather, the need is for an adaptive board that can respond to evolving situations. The board of a corporation that is facing challenges and leadership instability must recalibrate its oversight function in order to engage more effectively and develop strategies for the medium and long term.

Evaluating Nortel's Strategy

1. Great technology is good, but great products are what really count

Our study is replete with quotes about how great Nortel's technology was. The $4.5 billion paid by the Rockstar Consortium for Nortel's patent portfolio in 2012 helps to triangulate this fact. Nevertheless, in the 2000s Nortel failed to bring products to market and to convert radical technology into disruptive innovative products. Our study shows that very few Nortel products were recognized as "great products" by customers beyond the early wins in DMS, a large-scale central office switch, and in some of the optical products.

2. Formulation is half the battle, but implementation wins the war

The study points to failure in the wireless space despite Nortel's formulated strategy of making this a priority in the late 1990s and early 2000s. Nortel had developed CDMA, TDMA, GSM, WiMax and LTE technologies either before or at the same time as their competitors.[10] However, the company failed in the implementation of its wireless strategy, either by focusing excessively on the technology needs of its North American clients (e.g., CDMA over GSM) or by commercializing for the market too late relative to others (e.g., LTE).[11]

3. Strategy is relatively easy to change, but culture is not

Our study points to several instances where a viable strategy was rejected because of a rigid and incompatible culture. For instance, the major decision to move into the enterprise space by acquiring Bay Networks – a reflection of a desire to shift Nortel's culture towards a more nimble ethos – was a failure because it was rejected as alien by many of the old guard from the BNR era. As mentioned above, Nortel was infamous for it's "not invented here" mind set.

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[10] CDMA was licensed technology from Qualcomm, an American wireless company. Nortel made certain enhancements/adjustments to CDMA, but it paid substantial monthly royalties for its use.

[11] GSM was the emerging global standard for wireless evolving in almost all countries outside of North America. LTE is the latest global standard for wireless 4th generation (4G) telephony.

Performance Management Lens Summary

In the case of Nortel, it was evident that the organization did not have the management information needed to make informed decisions. Furthermore, the theme of “out of control” was frequently noted by the study participants, namely in relation to uncontrolled growth and uncontrolled spending.

A summary of this perspective leads to three conclusions. First, performance indicators should be clearly defined and linked to organizational objectives, especially if these indicators are used as criteria to reward staff. In addition, indicators should be balanced and should provide comprehensive coverage of the standards that individual employees are required to satisfy. Finally, the use of customer measures is critical for maintaining contact with and knowledge of customers. In addition, the capabilities needed to deliver on the value proposition must be maintained, even during times of massive downsizing.

In summary, Nortel appeared to link individual performance to the wrong performance indicators, and the indicators themselves were measured ambiguously (e.g., through pro-forma and GAAP financial statements). The tracking of KPIs, the protection of critical resources, and the redevelopment of the product design and commercialization processes needed to continue the delivery of customer value were other OPM practices that appeared to be ineffective.

Technology Lens Summary

Nortel depended on creating and/or gaining access to technologies essential for its various product offerings. Our research shows that, until the end, Nortel’s technology, people and adaptability remained among the best in the industry.

The attempt to gain technology through acquisition was a failure at Nortel. Once the company began to return to its roots circa 2004 and to re-focus on developing technology in-house rather than on trying to acquire technology through acquisitions, it managed to revive that leading-edge capability of the past.

At the time of filing for protection from creditors, Nortel held leading technology in a number of emergent areas, notably in 4G/LTE wireless, in long-haul optical and in other fibre-optic transmission technologies.

In the end, our analysis shows that Nortel did not fail because of its technology or because of allegedly wrong choices in terms of specific technologies. The fundamental technology issue was the extent of the senior management’s willingness to continually recognize and appreciate the strength of the in-house technology capability.

Many lessons were learned with respect to both technology decisions and technology management. A fundamental lesson learned is to avoid losing sight of the fact that technology companies need forward-looking technology vision and technology-oriented decision-making at key points within the organization (e.g., according to one executive, in the case of Nortel only one of the top 15 officers had any technology background). While this does not mean that the CEO needs to be a technology visionary, such an individual should be near the top of the corporate hierarchy and should have the ability to make and enforce decisions. In addition, in the case of a company like Nortel with strong P&L divisions, an individual with a deep understanding of technology needs to be in a central role in each of the business lines.

SECTION 4

Study Conclusion and Future Research

A failure model and a lens summary were provided in Sections 2 and 3 to help readers understand the causes of Nortel's failure. The key research findings are set out hereunder.

- Failure is complex. For Nortel, it was the result of a combination of many factors such as the changing business environment, a poorly aligned strategy, selected management decisions that were catastrophic in their implications for the future of the company, information systems that were out of step with business needs, discontinuities in the succession-planning process for CEOs and so on. It was not one factor but rather multiple compounding factors that imposed increasing stress on the firm.

- Failure is a temporal phenomenon that occurs over a number of years. Nortel had underlying problems that started even before the 1997 start date for the study. Moreover, it took several additional 'shock' events between 1997 and 2008 to finally force the company first to face the bitter reality by January 2009 that seeking bankruptcy protection was the only viable option to re-group and re-focus and second, to accept by June 2009 that even that option would not succeed.

These results would suggest that assigning blame to one person or one decision is overly simplistic. In fact, it was clear from our research that all CEOs were trying to make the best decisions for the company based on their knowledge and experience. Nevertheless, the survey results (presented in the Appendix – Section 5) ascribe a major reason for the failure to the top management, specifically the CEO. If it was the CEO's fault, then which one should bear the blame? Several respondents to the survey put the blame on the last man in the chair, but customers interviewed made it clear that, by the time of Zafirovski, the last CEO, many had doubts about Nortel's future and there was very little that could have done short of selling a business unit or two right at the beginning of his term to ease these doubts. In fact, Zafirovski is credited with the development of information and decision-making systems and for improving quality and margins. Can you blame Dunn? Non-strategic cost-cutting over an extended period of time certainly made the company inward looking for a long time and had a negative impact on customer relationships and behaviors. Should Roth bear the brunt of the blame? He built Nortel into one of the top companies in the industry but at the cost of resilience.

Comments from the surveys and interviews also placed responsibility failure on the board. As was pointed out by many respondents, it was the board that selected the CEOs and made some of the key decisions that resulted in the loss of resilience. Perhaps the board should have been bolder and more entrepreneurial. According to several respondents, the board should have shown greater support for Nortel's managers (with reference to Wilmer-Cutler). Respondents were critical of the role of the board in the Wilmer-Cutler process, acquisitions process, CEO succession planning and filing for bankruptcy protection. However, if one concludes that the board deserves a large share of the blame, then one must determine which board inflicted the greatest damage? For instance, the board that hired Wilmer-Cutler and the board that approved the filing for bankruptcy did not have any overlapping members. Yet, while their compositions were different, for some reason they acted in a similar manner.

The legal lens report, which forms a part of the Nortel study output, emphasizes the statutory limitations on the board's freedom of action, especially in terms of encouraging risk-averse decision-making. Surveys and interviews mentioned the environment as a cause for failure. Which stakeholders and industry players caused the increase in the competitiveness of the market? Did the customers have to force down prices so much? Did the Chinese companies have to buy their way into the market? The reality is that, even though the market was largely unfavourable, wireless and wireline infrastructure providers like Ericsson, Alcatel-Lucent and Nokia-Siemens and enterprise providers like Cisco, Avaya and Ciena managed to survive and in some cases to prosper. Yet Nortel did not.

In conclusion, the study refers to a Conference Board of Canada report written in 2011.[12] In this report, Lyons identifies nine stakeholder groups that have a role to play in the defence of a company in crisis: regulators, rating agencies, shareholders, external auditors, internal operational line managers, provision of tactical oversight by management, independent internal assurance, senior managers and the board of directors. Each of these stakeholder groups has a role to play in helping a company build and maintain needed resilience. This study challenges the nine stakeholder groups identified above and others as well to examine what they could have done and urges those reading this report to consider their own role in terms of lines of defence in the future. Instead of trying to blame someone or something for Nortel's demise, try to learn from it. Those who have decision-making powers and those who are thought leaders and change agents should work towards identifying, measuring and building the resilience that an organization needs in order to deal with turbulent times. It is necessary to watch for signs of the emergence of a black cloud and, if and when it does emerge, to implement measures to ensure that it is managed appropriately with a view to dissipating it with maximum haste and minimum disruption. Finally, board members and other senior officials are urged to measure the environment and the level of resilience and to use that information to position their organization toward more structurally attractive parts of their business environment.

Areas for Future Research

We invite those who have read and are interested in the findings of this study to continue with us on the journey into understanding the origins and mechanics of corporate collapse. The Nortel case study is but one step into learning from failure. Despite the thoroughness and robustness of the research methodology, more work is needed to help others to learn from the lessons of failure. A few topical areas are suggested below.

[12] Lyons, Sean. *Corporate oversight and stakeholders lines of defense*. Conference Board of Canada, No 365, October 2011

Generalization of the Model: Application to the telecommunication industry, other industries and other countries

The observations pertaining to the black cloud, resilience and the environment are based on a single case study (Nortel). The results can be considered to be robust from a research perspective as the study used a multi-method, multi-measure approach. Nevertheless, future research should test this study's findings against other organizations in order to increase the generalizability of the findings. Within the telco supply industry, NSN appeared to be in trouble and is now improving after re-structure ownership, among other moves. Can the study results help us to understand why this happened? Motorola exited this part of the business; Marconi failed and was sold to Ericsson. Once again, can the model developed in this study explain these events? ECI Telecom, a niche player in the industry, developed a strategy to address the new environment which resulted in financial success followed by crises again in the final years of the decade. Can Blackberry's rise and fall in the handset industry be explained by the model? During our interviews we asked some questions about these companies and partial support was provided. However, a more detailed study would be required to fully extend and validate the model in a manner that is specific to those firms.

Validation within the telecom supply industry of the study findings would seem to be a natural extension of this case study. Testing the study findings within other industry contexts should also be considered as a means to ascertain the degree to which the results can be generalized to other industries. For example, can the model be used to understand the situation that led Kodak to file for bankruptcy protection in 2012? Nortel may be thus far the largest corporate failure in Canadian history, but other countries also have prominent failures that could be investigated using the techniques developed for this case study.

More Research on the Black Cloud and Resilience

A second area of research would be to study how companies can manage the black cloud. In many of the interviews, respondents talked about how Apple was in serious trouble in the computer industry in the 1990s, to the extent that a black cloud was said to be surrounding the company. Yet, Apple re-focused, survived and is a very successful company as of the time of this report (2014). These are passing observations and not a result of a thorough research program on Apple. Future research should attempt to identify companies that emerged from this black cloud and to learn how to better manage the cloud in order to minimize and eventually dissipate it.

This report ends with a note of thanks. We the researchers are humbled by the hundreds of people who put their faith in the University of Ottawa research team to tell their Nortel story in the hope that it would help in identifying lessons to be learned and in minimizing and/or preventing future corporate failures. It was their hope that this research would aid in educating tomorrow's leaders. We as a research team are grateful for their contribution and hope that what we have written here proves to be worthy of their contributions.

SECTION 5

Appendix: Analysis of Interview and Survey Data

As mentioned in Section 1, all the interviews were transcribed and the comments in the interviews were then coded. In addition, the answers to the survey questions dealing with the reasons why Nortel failed were also coded using the same coding system. The top three most frequent comments as to why Nortel failed were those related to strategy, management processes and the external environment (see tables 5 and 6). The CEO and the board were the next two most frequently mentioned categories. Overall, participants indicated that the strategy that Nortel was following was inappropriate for the external environment. This resulted from poor management processes (decision-making systems), which according to many respondents were ultimately the result of decisions made by the board and the CEOs. This overview of the results was also born out at the sub-codes level.

Table 5
Interview and Survey Results by Top-level Codes

Category	% Interviews mentioned	% Frequency mentioned	Initial survey mentioned	Final survey: Reasons for failure	Final survey: How to prevent
Board	79%	7%	5%	12%	14%
CEO	89%	13%	4%	14%	14%
Culture	72%	4%	4%	7%	1%
Environment	96%	25%	20%	14%	11%
Info management	27%	1%	1%	1%	2%
Management processes	96%	16%	40%	20%	24%
Other	55%%	2%	2%	2%	0%
Strategy	93%	25%	18%	23%	29%
Technology	89%	7%	6%	7%	5%

Poor alignment with the customer environment was among the most frequently mentioned factors in all the research instruments and, in particular, it was the most frequently mentioned reason for failure listed by the customers themselves. Poor financial management (an element of management process) and other process comments were also consistently among the most frequently cited reasons for

Nortel's failure in all the instruments. Finally, comments on poor corporate strategy and other strategy comments were also among the most frequently mentioned reasons for failure across all the instruments. Of note in this category was the 'other strategy' category. The majority of comments under this category were around the notion that Nortel was too focused on the short term, and that the strategy was not externally oriented and that it lacked focus to the extent of being confusing.

Table 6
Top Reasons for Failure Listed by Study Instrument

Sub-code	% Final survey reasons for failure	% Final survey how to prevent	% Interviews times mentioned	% Initial survey times mentioned
Other process comments	11%	14%	5%	23%
Strategy other	9%	18%	8%	12%
Poor financial management	7%	10%	5%	16%
Corporate strategy	7%	8%	4%	4%
Poor fit to customer environment	4%	5%	6%	5%
Poor fit to market	4%		5%	7%
CEO wrong person	7%	8%	2%	
Other board	5%	6%	2%	
Board decision making	5%	5%	2%	
Other environment	5%		8%	5%
Other culture	7%		3%	
Other CEO		5%	5%	
Unique to survey instrument	Business strategy (6%)		Poor fit to competitor environment (4%) Poor decision making (4%) CEO poor decisions (3%)	

Comments about the board members and the CEOs being the wrong individuals for these roles also were frequently mentioned in all the instruments, with the exception of the open-ended questions in the initial survey. Under the 'Board other' theme, there were comments about not managing consultants appropriately (with reference to Wilmer-Cutler and the bankruptcy decision in particular). Poor fit to the market (an external environmental factor) was among the most frequently mentioned reasons for failure in all but the final survey. Nortel's corporate culture came up frequently in both of the final survey's reasons for failure.

In summary, in looking at the coding of the open-ended questions in all the study instruments, the conclusion would appear to be that Nortel's strategy was not appropriate for the markets that the firm was attempting to address at the time. The result was that Nortel failed to meet the needs of customers, while not being competitive with rivals. The emergence of this state of affairs was primarily attributable to poor financial management, poor decision-making, weak systems/structures and cultural factors. As many respondents indicated, these failures and weaknesses were the outcomes of decisions made by the board and by the board-selected CEOs. It is therefore clear that the board must bear a considerable amount of the responsibility for the failure of Nortel.

In addition to the open-ended questions in the initial study survey, participants were asked to evaluate 31 statements. Some of these statements dealt with what were perceived to be Nortel's strengths (for example, technology and customer relationships) and some of these statements addressed factors and reasons identified in the literature review and the initial interviews.

Which statements did participants most agree with and which ones did they least agree with? Very few statements resulted in high rates of agreement (see table 7). No statement received more than 80% of respondents citing agreement (somewhat agree plus agree plus strongly agree). Only two statements received more than 70% agreement: Nortel's technologies positioned the firm well in the marketplace (77% agreement) and Nortel was a leader in technology (75% agreement). In comparison, five statements had disagreement levels of over 80%, including four that were over 90%: Nortel's board of directors provided effective guidance for the company (95% disagreement); Nortel's board of directors provided effective oversight of the company (94% disagreement); Nortel had effective executive leadership at the top of the organization (92% disagreement); Nortel's financial management was a source of advantage (91% disagreement); and Nortel's rate of organizational change was appropriate (81% disagreement). They are ascribing the problems that befell Nortel to a lack of effective guidance and oversight from the board and to a lack of effective leadership from the top management, coupled with poor financial management (a factor that was prominent in all the research instruments) and with inappropriate organizational change. The Likert survey results are generally supportive of the interview results and of the narrative provided in this report.

Table 7
Initial Survey Responses to Likert Questions

	Strongly disagree	Disagree	Somewhat disagree	Not sure	Somewhat agree	Agree	Strongly agree
Nortel's technologies positioned the firm well in the marketplace	**2%**	**7%**	**10%**	**4%**	**17%**	**34%**	**26%**
Nortel's products positioned the firm well in the marketplace	**3%**	**12%**	**16%**	**3%**	**24%**	**25%**	**16%**
Nortel made correct choices about which markets to compete in	**19%**	**23%**	**24%**	**8%**	**17%**	**7%**	**1%**
Nortel made broadly correct technology decisions	**7%**	**16%**	**18%**	**8%**	**22%**	**24%**	**5%**
Nortel's product portfolio positioned the firm well in the marketplace	**5%**	**18%**	**20%**	**7%**	**22%**	**19%**	**9%**
Nortel had a good approach to technical decision making	**17%**	**17%**	**18%**	**10%**	**17%**	**17%**	**4%**
Nortel maintained an appropriate balance between internal development and external acquisition of technology	**22%**	**25%**	**21%**	**11%**	**14%**	**6%**	**1%**
Nortel was a leader in product development	**6%**	**13%**	**12%**	**7%**	**20%**	**27%**	**16%**
Nortel was a leader in technology	**5%**	**8%**	**8%**	**4%**	**20%**	**30%**	**25%**
Nortel was a leader in market acceptance	**7%**	**19%**	**15%**	**13%**	**21%**	**18%**	**8%**
Nortel was a leader in client/customer relations	**7%**	**14%**	**14%**	**14%**	**22%**	**21%**	**8%**
Nortel was a leader in customer service	**5%**	**12%**	**13%**	**12%**	**26%**	**23%**	**8%**
Nortel was a leader in manufacturing	**14%**	**24%**	**18%**	**15%**	**15%**	**10%**	**6%**
Nortel's rate of organizational change was appropriate	**32%**	**33%**	**16%**	**7%**	**8%**	**4%**	**1%**
Nortel had an effective account management approach	**15%**	**14%**	**20%**	**18%**	**20%**	**11%**	**1%**
Nortel responded well to its markets and customers	**13%**	**18%**	**23%**	**9%**	**21%**	**13%**	**2%**
Nortel responded well to its competition	**20%**	**29%**	**18%**	**6%**	**16%**	**9%**	**2%**
Nortel responded well to its suppliers	**10%**	**10%**	**14%**	**37%**	**18%**	**9%**	**2%**
Internal competition within the firm was a source of advantage for the company	**20%**	**27%**	**18%**	**15%**	**11%**	**8%**	**1%**

Table 7 Continued

Initial Survey Responses to Likert Questions

	Strongly agree	Disagree	Somewhat disagree	Not sure	Somewhat agree	Agree	Strongly agree
Nortel's financial management was a source of advantage	**53%**	**30%**	**8%**	**6%**	**2%**	**1%**	**0%**
Nortel's customer financing policy was a source of advantage for the company	**28%**	**22%**	**11%**	**24%**	**8%**	**4%**	**1%**
Nortel's board of directors provided effective oversight for the company	**62%**	**24%**	**8%**	**4%**	**2%**	**0%**	**0%**
Nortel's board of directors provided effective guidance for the company	**61%**	**26%**	**8%**	**4%**	**1%**	**0%**	**0%**
Nortel had effective executive leadership at the top of the organization	**58%**	**24%**	**10%**	**3%**	**3%**	**1%**	**0%**
Nortel had effective leadership at the mid-level of the organization	**13%**	**13%**	**15%**	**11%**	**29%**	**16%**	**3%**
Nortel had effective human resources at the operational level of the organization	**13%**	**11%**	**14%**	**12%**	**23%**	**21%**	**6%**
Nortel's revenue booking model was a source of advantage for the company	**24%**	**23%**	**15%**	**28%**	**8%**	**1%**	**1%**
Canadian federal/provincial government intervention would have prevented Nortel's demise	**12%**	**8%**	**7%**	**18%**	**20%**	**16%**	**19%**
Canadian government support received over the years was appropriate	**13%**	**15%**	**10%**	**28%**	**17%**	**15%**	**2%**
Canadian government policy in telecommunications created a competitive environment	**9%**	**12%**	**9%**	**37%**	**18%**	**12%**	**2%**
Nortel had an appropriate international strategy	**8%**	**15%**	**17%**	**13%**	**24%**	**19%**	**3%**
The relationship between Nortel's subsidiaries was strong	**8%**	**18%**	**15%**	**26%**	**19%**	**12%**	**1%**