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Towards an environmental awareness model integrating formal and informal mechanisms – Lessons learned from the Demise of Nortel

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ABSTRACT: This case study uses multiple lines of enquiry to better understand how Nortel went from being a 'global powerhouse' at the turn of the century to filing for bankruptcy just nine years later. It tracks competitive intelligence as well as other environmental awareness capabilities of the company and theorizes on how they have contributed to its rise and fall. The findings suggest that Nortel was a company with significant environmental awareness capability in the early 90's that had all but lost this competency by the year 2000, which impacted their ability to make decisions consistent with a changing environment. Through interviews with 48% of all Nortel officers that were there during the period of interest as well as other stakeholders, the researchers identify a two-layer typology that includes a set of cognitive factors as well as three broad categories of monitoring practices that can help companies better understand their environment: 1) formal external monitoring practices, such as competitive intelligence units; 2) informal external monitoring practices such as board meetings with members with industry connections and knowledge, and 3) internal monitoring practices with external insight capability, such as performance management reviews and accounting reports. Cognitive factors identified include decision maker orientation, as either technical or business, internal vs., internal focus, cognitive complexity and open mindedness.

KEYWORDS: Nortel, Competitive intelligence, Corporate Failure, Monitoring Practices

1.0 Introduction- Description of the case study

By 2001, Nortel, a Canadian Telecommunications Company with a capitalization approaching $300 Billion, was accounting for nearly one third of the Toronto Stock Exchange; the largest valuation in Canadian history. MacDonald (2000), in his book entitled "Nortel Networks : How innovation and vision created a network giant" described the company's extraordinary success that lead to 75% of all internet traffic in North America being funneled through Nortel equipment at the time the book was published. Indeed, in 2001, Nortel had crafted itself an enviable leadership position in optical, wireless, wireline and the business enterprise markets. Yet, by 2003, less than thirty-six months later, Nortel's long-term viability was being seriously questioned by its own customers. A few years later as detailed in a 2007 note from senior management, Nortel was experiencing continued erosion in the company's ability to influence the business roadmap of an increasing number of key customers. In January 2009, the company filed for bankruptcy protection. This was the single biggest corporate failure in Canadian history and one of the largest worldwide.

This case study looks at the role played by the environment and the company's environmental monitoring approaches/systems to understand both the success that culminated to Nortel's position in 2001 and the failure that brought about bankruptcy in 2009. Specifically, theorizing from an extensive data set that includes both interviews and surveys, the authors seek to understand:

1. How the environment changed and in particular whether significant opportunities or threats arose.
2. Given the changing environment, the extent to which Nortel's response contributed to both its success and to its failure.
3. Nortel's capabilities/approaches to understanding its environment.

This study proposes a revelatory single case study of both epic success and epic failure, theorizing about the role of competitive intelligence in both the rise and fall of a company. This is in keeping with Solberg Søilen's findings (2014) regarding the need for more case studies in intelligence.

2.0 Case study methodology

The study features multiple data collection methods, including an initial survey (343 respondents), interviews with Nortel stakeholders (133 people), a follow-up survey of those interviewed (57 respondents) and a validation check of the study results with 22 of the interviewees. The methodology had at its core a grounded theory approach. Grounded theory was used to ensure that a-priori hypothesis and existing literature did not bias or drive study conclusions but that the study participants drove study findings. Analysis moved in an iterative fashion with data collection as initial interviews and surveys allowed the researchers to refine the interview protocol.

Methods for analyses included three main techniques that have been identified as prominent in process research (Langley, 1999): a grounded theory approach was taken for coding the interviews (Glasser and Strauss, 1987), a narrative strategy was used to uncover the richness of this revelatory case (Yin, 2003; Patton, 2002) and temporal bracketing was used to organize the findings in building a model and uncovering monitoring practices as well as cognitive factors (Eisenhardt, 1989).

The initial survey consisted of open-ended questions combined with a series of seven-point Likert scale questions around causes of failure. In total 343 responses were received (table 1). Interviews were then conducted with those familiar with Nortel's failure. In all 133 people were interviewed (some multiple times) including 48% of all Nortel officers who were at Nortel at some point over the study time period (1997-2009), several key customers (interviews were with senior customer personnel generally at the "C" level), competitors (including competitive intelligence personnel of key competitors), suppliers and others that would have knowledge of the Nortel failure. The second survey was sent to all informants who were interviewed (133) giving them a final opportunity to list the reasons for Nortel's failure. Responses were received from 57 of those interviewed. As a final validation step and in keeping with the case methodology, the final case results were presented to 22 of those interviewed.

In the first step of the analysis, both the interviews and the surveys were coded using a mixed logic, as we derived our codes partly from our literature review on organizational failure and partly by letting them emerge from the data (Gioia, Corley & Hamilton, 2012). Established techniques of the field such as inter-rater reliability were applied and we conducted this work using NVivo 10. In the second step we layered temporality on the data, to identify when each failure factor happened, both in terms of the external and internal perspectives (Mellahi and Wilkinson, 2004). In the final step we built a narrative of Nortel's events, providing a rich account from the temporally layered fine grain data we had collected and analyzed (Van de Ven and Poole, 1990).

Three temporal periods were identified:

1. 1997 to 2001, corresponding both to the CEO tenure of John Roth and also the rapid rise of Nortel culminating to its maximum market capitalization value in 2001.
2. 2002 to 2004 corresponding to the CEO tenure of Frank Dunn, rapid change in industry dynamics and a series of internal crises within the company.
3. 2005-2009 – The CEO tenures of Bill Owens (interim CEO appointed on the firing of Frank Dunn) and Mike Zafirovski culminating in Nortel's filing for Bankruptcy protection.

Table 1 – Data Collection methods and response numbers

Data collection step	Total*	Officer/senior employees	Other employees	Customer	External
Initial survey	343	60	265	53	127
Initial interviews	133	46	45	18	35
Final survey	57	20	18	8	13
Validation interviews	22	11	0	7	6

*Note that the totals do not necessarily correspond to the summation of the columns as in some cases respondents during the study period fell into two categories. For example in several cases officers/senior employees in the 1997-2004 period then moved to customer or competitor organizations in the later years.

3.0 Findings: An overview of environmental changes for each period in the telecommunication industry between 1997-2009

The majority of interviewees commented on the significant industry change throughout the study period. Indeed, interviewees recounted how 1997 to 2001 was a period of great opportunity in the industry; fuelled by the advent of the Internet, as well as the growth in demand that accompanied the deregulation of various foreign markets, providing new vectors for market development. These created opportunities that propelled many of the firms in the telecommunications supply industry to historically high market capitalization values by 2000/2001.

The second period ranging between the years 2002 and 2004 was also one of significant industry change. Participants of our study described how the .com bubble bursting resulted in significant decline in demand for all industry participants. This was further complicated by new competition arising from China, which had made important strides in catching up with the incumbents in the market in terms of technology expertise. While demand was stalling, rapid technology advancement continued unabated.

The third period during 2005-2009 saw continuing increase in competition and major changes in both how customers bought telecommunications product and the criteria used for acquisition. Furthermore, the customers during this period began to push industry suppliers towards interoperability with other equipment makers and also sought to diversify their risk by purchasing from multiple suppliers rather than following the historical pattern of relying on a single supplier. Unfortunately for Nortel, as new and old competitors were gaining ground gaining access to Nortel's traditional customer base, Nortel was not taking customers from rivals.

The global recession was also part of this third period. The events in this period, according to our data, had a significant impact on underlying industry profitability and the nature of the opportunities. Indeed, while the latter period presented firms with significant opportunity due to rapid growth in both Internet and wireless lines of businesses, the growth opportunities came at the expense of a more commoditized and competitive landscape. By 2009, Nokia and Siemens Telecommunications divisions had merged to become NSN and Alcatel and Lucent also merged creating ALU.

4.0 Findings: Nortel's response to the changing environment

Interview and survey results overwhelmingly noted that Nortel appeared to respond well to industry opportunities in the late 80's and early 90's but that the company had lost its way by the later 1990's. The practices to understand the environment was not seen as being effective; nor was the company's ability to both sense and appropriately respond to industry changes in the 2000's. For example, interviewees talked about the fact that in the 80's and 90's Nortel was the first company to go from analog to digital. However, many respondents in both the initial and final survey listed Nortel's failure to adapt to the market as a primary reason for failure (table 2). Customers listed this as the #1 reason for Nortel's failure citing in particular lack of appropriate response to customer needs . In fact, both customers and others said that Nortel was late to the Internet in the late 90's.

Table 2 2009 Initial Survey responses to environmental related questions

	Nortel responded well to its		
	Markets and customers	Competition	Suppliers
Strongly disagree	13%	20%	10%
Disagree	18%	29%	10%
Somewhat disagree	23%	18%	14%
Not sure	9%	6%	37%
Somewhat agree	21%	16%	18%
Agree	13%	9%	9%
Strongly Agree	2%	2%	2%

Findings in other reports from the Nortel study provide both support and provide insight into the survey and interview observations listed about (see Calof et al 2014, Vasudev 2014 and MacKinnon et al 2015). In examining technology choices, MacKinnon et al (2015) found that research and development and commercialization activities tended to focus on legacy products which would be sold to mature markets and not innovative products for growth markets – 55% of research funds going to late life cycle products, 36.5% towards mature products and only 8.5% allocated to future and emerging products. Their analysis found that in the 2000's Nortel failed to commercialize several of those products that were under development. They also did not develop products and services that could have been sold to those areas of the market that were profitable and growing. They concluded that while the products in R&D were very advanced, sometimes even exceeding customer needs, the products Nortel chose to commercialize were more oriented towards existing technologies and did not support their customer's emerging needs. The Calof et al (2014) report also noted that Nortel responded to the changing market conditions later than many of the other competitors concluding that they were late to both perceive and accept the changes in the environment.

In summary, our data suggests that while the environment changed in a significant way during all three periods of the study, that Nortel, a company that was known historically for its innovativeness, for anticipating and creating future markets, and for leading customers during the pre-1997 period, responded inadequately to these changes. More specifically we found that Nortel:

- Was late to recognize and respond to environmental changes,
- Commercialized the more mature technologies in its portfolio and,
- Did not respond appropriately to new customer business requirements

5.0 Findings: Towards an environmental awareness model

Sections 3 and 4 described how while Nortel had historically seen and taken advantage of opportunities created from industry change, in the period of interest from 1997 to 2009, it was late to recognize and make appropriate changes. This failure eventually led to the erosion of its enviable pre 1997 leadership position. How then could a company that had exhibited foresight in the past, go from frontrunner to laggard in the industry in such a short time span?

To better understand Nortel's ability to assess environmental changes, the research team examined data collected during the case study that would shed light on Nortel's monitoring practices as well as its cognitive makeup, the way it understood its own world. In particular, we reviewed interview notes and survey written responses for specific comments around Nortel's ability to learn about and act on the environment.

Many of those interviewed talked about the early to mid 90's and Nortel's extraordinary competitive intelligence unit and competitive intelligence guild (an across-lines of business "club" that brought together Nortel CI practitioners and users, Hogan 2001). They talked about Nortel's design and interpretive center – a unique center where Nortel invited their customer's customers (the end users of telecommunications equipment) to use the Nortel products that would be sold to the telecommunication companies. This helped Nortel learn more about the end user's needs so that they could develop better products for their customers. Many talked about an advanced planning function (some referred to the unit as division 6) that engaged in environmental scanning and reported directly to the top levels of the corporation and about customer surveys, something of great importance at Nortel which provided a wealth of information. The competitive unit, the competitive guild, the planning unit, the design interpretive center and the customer survey, we have grouped under our first type: formal external monitoring practices (see exhibit 1).

A second type that emerged from our data was practices that that also helped Nortel gain insight into the external environment without being part of the formal external monitoring mechanisms, but rather were informal. For example, many talked about Bell Northern Research (BNR) units and their work, a long-term oriented research group that conducted fundamental research for both Nortel and Bell. This unit through its relationships with scientists around the world, its involvement in symposium and even through its own magazine can best be described as Nortel's long-term competitive technical intelligence unit. BNR it was said in many interviews created the future environment.

BNR was an important part of an external technology monitoring capability that would then translate this knowledge into design and future products. They were not intelligence personnel but scientists in what many called an ivory tower environment. Their job/role was not environmental scanning but developing new technologies and in doing so they would scan the pertinent literature, attend appropriate conferences and network with various external experts, in an informal yet effective manner.

Several respondents also talked about how Nortel learned a lot due to ongoing interaction between technical staff and Nortel clients. One senior technical person commented that by listening to the clients' concerns they could 'in 10 minutes develop new solutions'. Industry relationships were also seen as a method for gaining knowledge about the industry with many of those interviewed commenting on the closeness between Nortel senior management (in particular sales management) and customer senior management, outlining the information they gained because of these relationships. One interviewee commented that the Telecommunications supply industry was 'truly a village, a community where everyone knows each other'. Others talked about the valuable information gained thanks to for example board members, in particular the board members who represented Bell Canada Enterprise (BCE), a key Nortel customer. Having a customer on the board provided Nortel with valuable information on customer's needs and concerns as well as test sites for new technology. Also mentioned was Nortel's links with universities through endowed chairs and research programs, which provided valuable insight into technology developments to Nortel. Trade shows and conference involvement were also mentioned as notable sources of industry information. Finally, many talked about management development programs such as the Princeton Series, where once a year Nortel senior management would attend an in- house program in which leading management thinkers (for example Drucker) would provide Nortel with insights into new management techniques, management approaches and evolving market changes. While none of these activities/organizational elements were specifically designed as formal environmental monitoring mechanisms, respondents were clear that each provided valuable insights into the

external environment, early warning on customer needs/changes, technology changes and even early warning on competitor movements. We refer to these as informal external monitoring mechanisms (see exhibit 2).

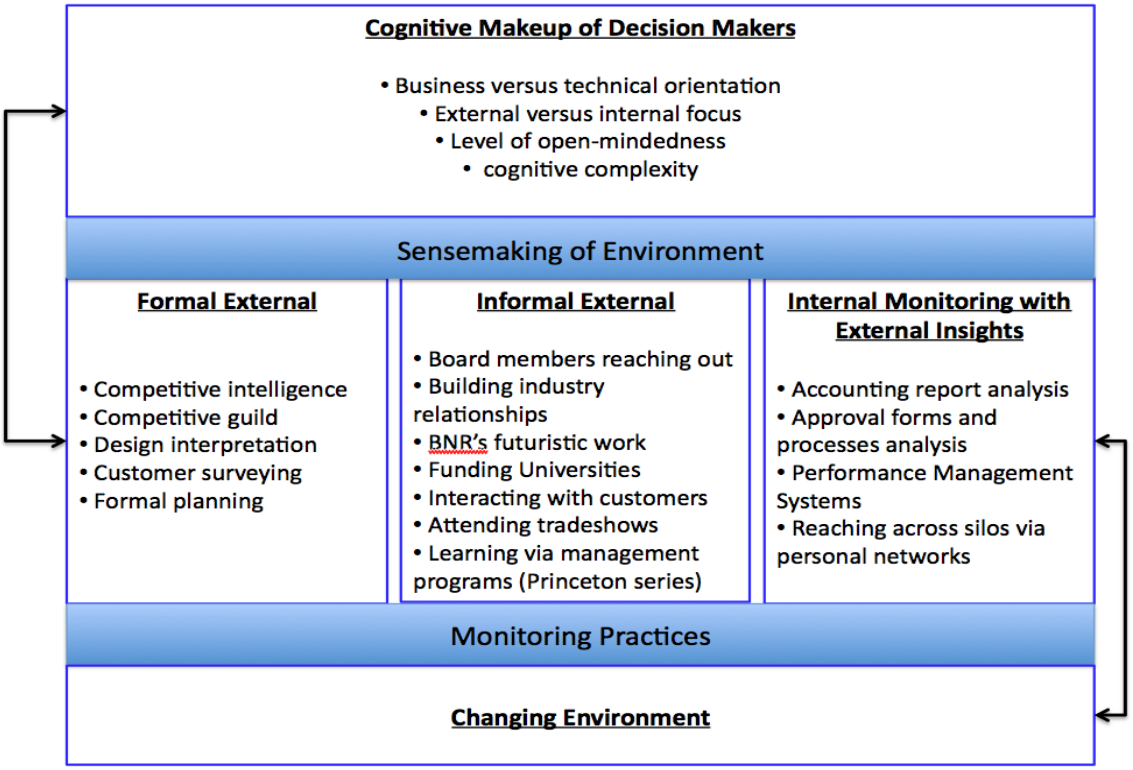
Thirdly, respondents talked about internal systems such as the accounting system, and how those also provide insight into the external environment. For example, respondents talked about how by analyzing where sales were coming from (legacy products versus new technologies) they could figure out underlying customer sentiments. In addition, forms used in the sales approval process (many talked about B forms), provided insight into customer demands.. Performance management practices (increasingly developed in 2007) proved to be valuable in identifying markets and research and development using the product life cycle stage model. Many also mentioned that internal relationships facilitated information flow across units; that no matter how bad systems were, they were always able to call up someone they knew to get information on what was truly going on. Internal relationships were used for example to provide updates on technology developments within and outside of the company. We refer to these as internal systems with external insight (see exhibit 1).

Thus we found three types of monitoring practices: formal external, informal external, and internal with external insights. However, our data analysis unveiled another important component to the model: the cognitive makeup of the company, which impacted its ability to make sense of the data that was unearthed by the monitoring practices.

Indeed, respondents talked about the mindset and cognitive abilities of decision makers when receiving information about the environment and how these abilities impacted decision maker's sensemaking (Cite Weick here). Our analysis indicates that it was not just about having the information, that decision makers also needed the right mindset when receiving it. For example many talked about Nortel's strong culture creating a "not invented here" type mindset resulting in the perception that management was not open minded to information about possible environmental changes that came from outside the company, especially when it was contrary to their beliefs in technology needs. Some referred to this as "not invented here syndrome" and some referred to this as open-minded versus closed-minded. Others talked about an external focus versus an internal focus of management. This was a particular factor brought up in the 2000's when a series of internal crises (restatements, fraud investigation, staff cuts) focused senior management attention on activities inside the organization rather than having the time (or interest) to focus on the external environment. Respondents also talked about technical versus business orientation of management. While a technology oriented company does need a mix of both technical and business orientation, many talked about the ability, or in some case the inability of senior management and board members to comprehend the technology implications of strategic decisions. Specific examples were brought up where it was evident that the decision maker may not have fully understood the technical impact of the decision. Finally a few respondents brought up the complexity of decisions that senior management had to make. This was referred to in interviews as their ability to handle multiple variables at one time (e.g. simultaneous consideration of multiple competitors and customers along with technology change as opposed to assessing one at a time) and overall intelligence of the senior manager. We refer so these factors as decision makers' cognitive makeup.

Exhibit 1 provides the overall environmental awareness model arising from analysis of the respondents comments on Nortel's environmental understanding capability and provides a competitive intelligence perspective of Nortel's rise to prominence leading to the beginning of our three temporal periods.

Exhibit 1 - Environmental awareness model: the case of Nortel



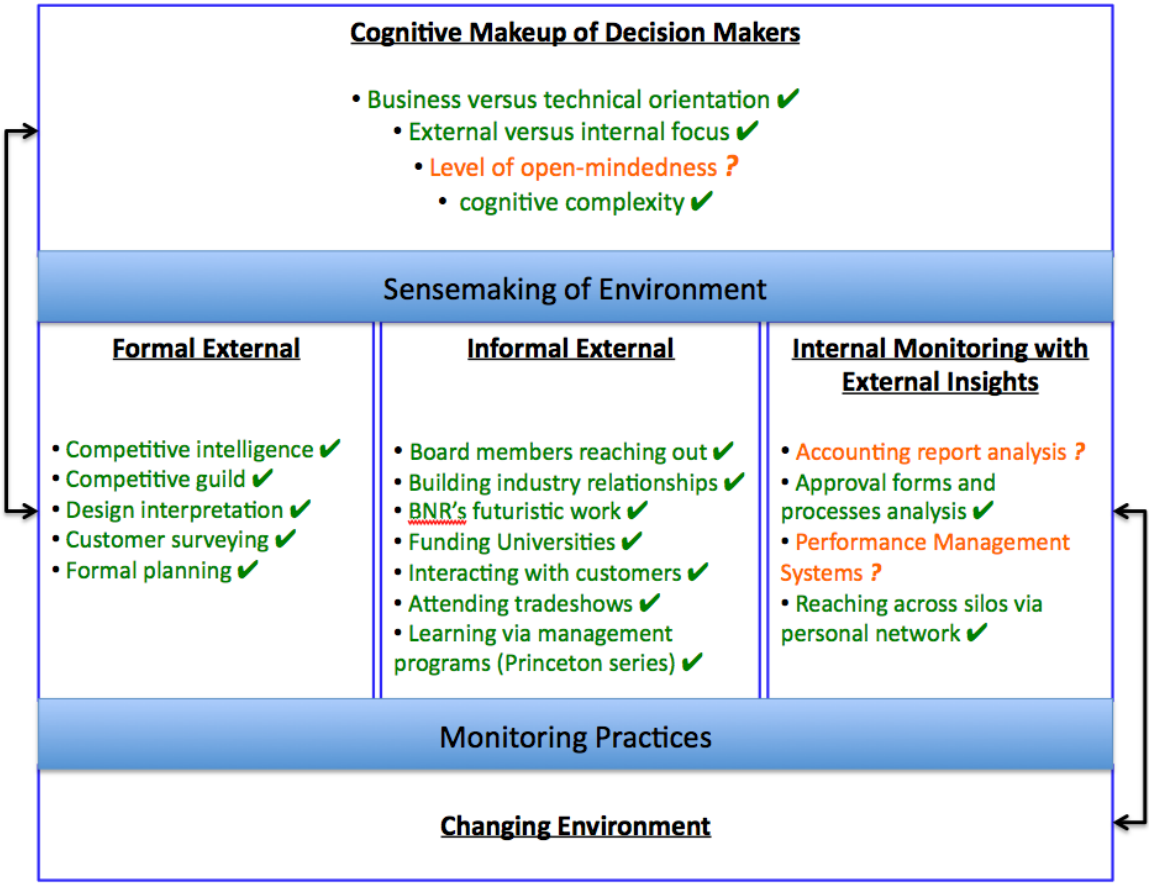
6.0 The evolution of Nortel's Environmental Awareness over the study time period: Decisions, environment and impacts.

In this section we examine developments in Nortel's environmental awareness and discuss key decisions made during the three temporal periods.

6.1 1997 – The starting point of the study

Albeit with a few exceptions (difficulties in gathering intelligence from poor accounting systems, a culture of close-mindedness to outside ideas, and the use of non-systematic performance management systems), respondents commented positively on all but three elements included in the environmental awareness model.. Based on the variables in the environmental awareness model, the 1997 starting point would be defined as good in all four elements. This assessment is based only on the existence of the factors and is not an assessment as to their quality.

Exhibit 2: Environmental awareness model: Nortel, 1997



6.2 1997-2001: Nortel's growth

1997-2001 provided companies in this industry with great opportunities. John Roth (CEO of Nortel) saw the opportunity to significantly grow the company and developed a new vision for Nortel, which he called the Right Angle Turn, a refocusing of Nortel traditional's telephony technology to the Internet Protocol based technology. Roth felt that dealing with rapid growth and massive market opportunity meant the need to eliminate or change any procedures that slowed down responding to customers. Furthermore, since Nortel did not have all the technologies required for the right angel turn, Roth felt that Nortel would have to engage in systematic acquisitions of external technologies.

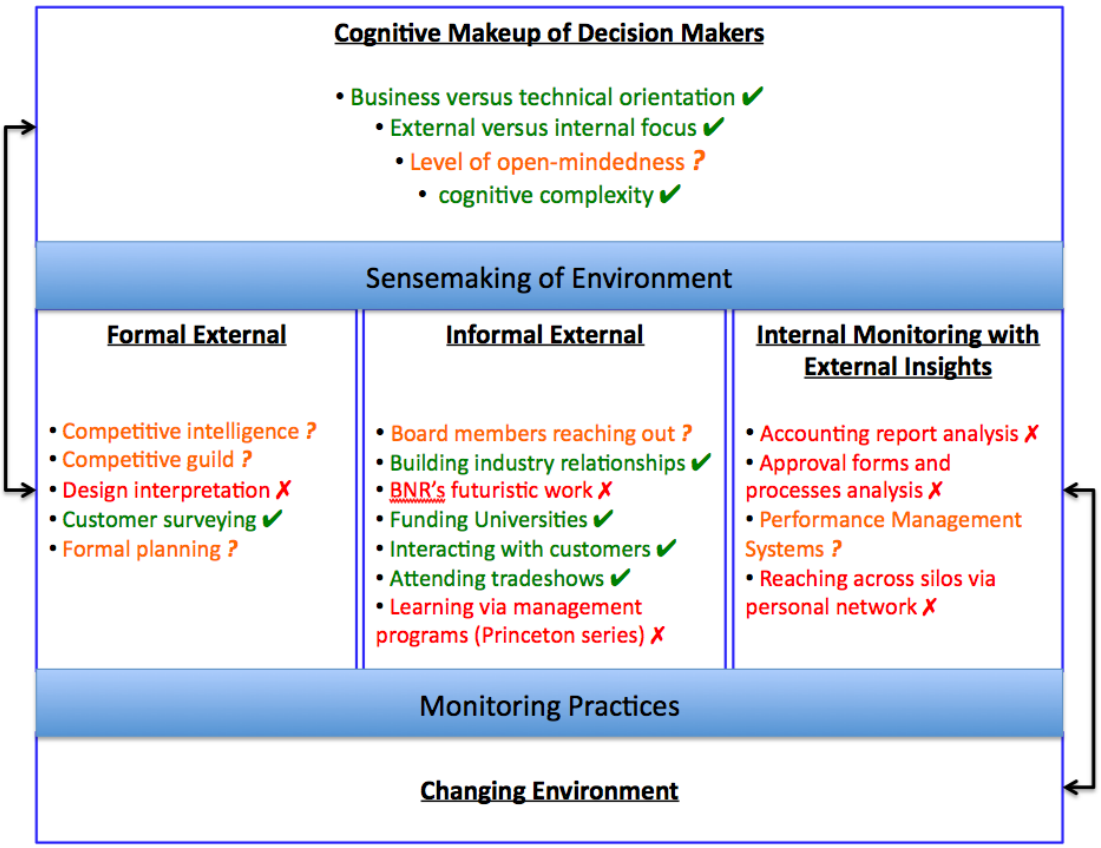
In a business sense these decisions and actions appeared to provide immense value to the company and its shareholders, and were handsomely rewarded by the stock market. In 1997 Nortel's market capitalization was $23 Billion and by 2000 once the strategy was fully in place it was $250 Billion; Sales had more than doubled and the gross margin had improved. As well customers in general were pleased with the company. By the end of this period not only did Nortel realize its ambition to grow in terms of sales and market capitalization but its organization had also grown significantly, going from roughly 30,000 to 95,000 employees.

While the streamlining of decision-making did lead to both sales growth and stock growth, it also had a negative effect on Nortel's environmental awareness capability. On the acquisition side, the buying of dozens of companies coupled with Nortel's antiquated accounting systems left Nortel in a situation where it was had islands of information and no sense of the integrated accounting picture. Some in the interviews commented that it took several months after the quarter before the true numbers could be known. This reduced the ability of Internal systems with external insight to generate accurate environmental information. But perhaps it was those changes made to speed up Nortel's ability to meet customers' needs that had the biggest impact on environmental awareness capability. For example, Nortel eliminated some of the administrative forms, including sales forms (such as B forms) opting instead to place more responsibility on salespersons for sales terms than requiring sign offs of management. While this sped up response, it also reduced the abilities of internal systems with

external insight. Massive hiring during this period (from 30,000 to 95,000) led to reduction in the strength of internal relationships, again a downward impact on internal systems with external insight.

Informal external monitoring mechanisms also were reduced as an indirect consequence of right angle turn. For example, Bell Northern Research (BNR), the central research arm of Nortel was split up and placed into each of the four product divisions. In this way, research could be focused more at the division level. But, since business lines tend to be short to medium term focused, respondents stated that longer-term research and technology suffered. Further, the split up of BNR also fractured the strong network and information sharing that existed within the group. Another change during this period was BCE reducing its ownership and involvement with Nortel (eventually selling all remaining stock in the next temporal period). This reduced the influence and impact of BCE at the board level, effectively removing an important voice of the customer at the table. The result of restructuring decisions and BCE was therefore a significant reduction in informal external monitoring.

Exhibit 3: Environmental awareness model: Nortel 1997-2001



Perhaps the biggest impacts arising from the right angle turn, was in the formal external monitoring. Those interviewed talked about reductions in competitive intelligence both in terms of role and effectiveness, the competitive intelligence guild and the closing down of the design interpretive center and reduction in the role of the central planning unit (again consistent with movement towards more divisional power). Collectively this meant a significant reduction in formal external monitoring.

Exhibit 3 highlights the changes in the elements of the model. It shows how seeking to develop a faster customer response capability had negative impact on several monitoring practices. Next we look at the second period.

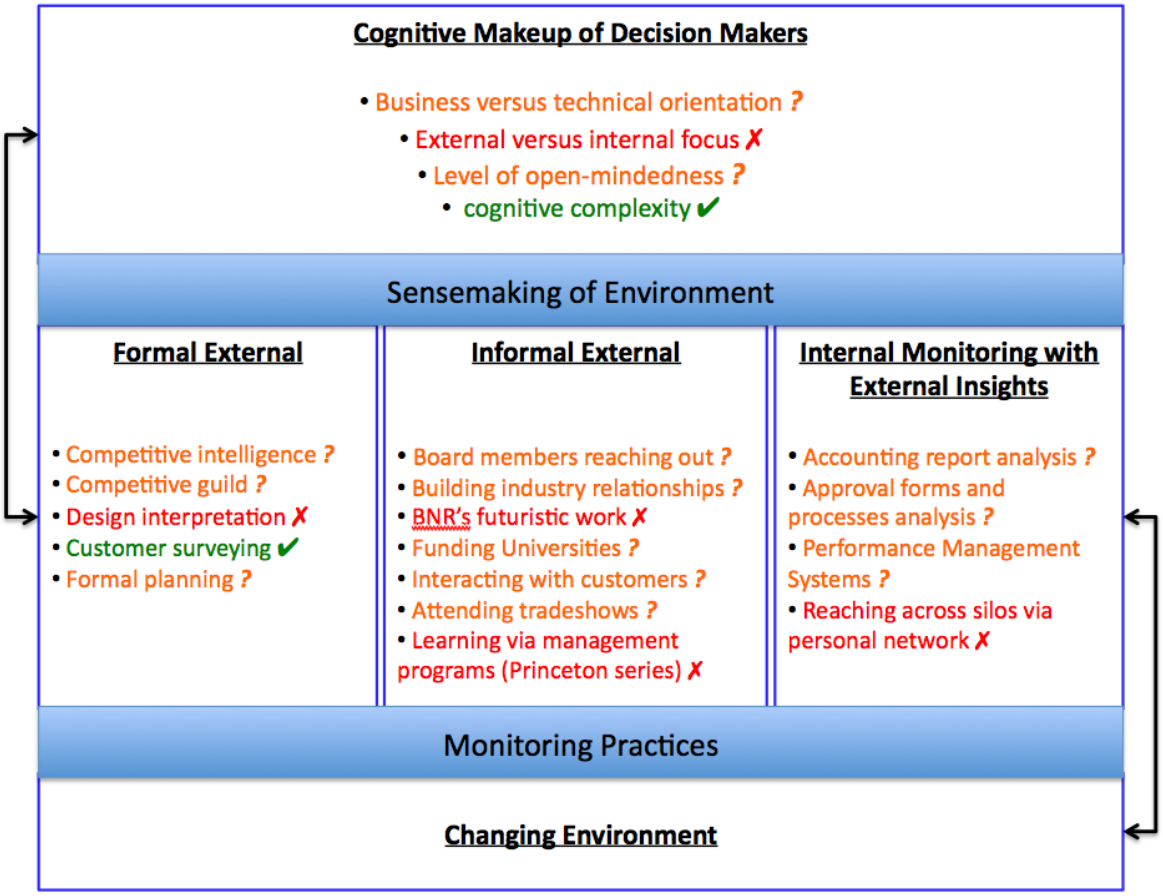
2002 – 2004 The market turns and internal focus begins

Much like the first period, 2002-2004 was a period of significant industry change. However, the change was much different: from a positive growth environment in the first period, Nortel experienced a hostile retracting demand environment after the dot.com bubble. It meant that there was significant oversupply in the industry and with increased competition from Asia and increasing customer power there was downward pressure on prices.

Unfortunately, as was mentioned in interviews the decrease in environmental awareness capability during the 1997-2001 period left Nortel late as many noted to react to these changes.

Our data shows that to remain in this industry, Nortel would have needed to reduce their costs significantly or capture significantly more sales to gain economies of scale. Decisions made during this period were consistent with this idea. A new CEO was hired, Frank Dunn, Nortel's former Chief Financial Officer. A CFO as CEO was logical given that the challenge was a financial one. Under Dunn's leadership the head count was reduced from 94,500 in the beginning of 2001 to 35,160 by the end of 2003 (versus 68,000 in 1996). The new CEO also worked on fixing structural issues and on the accounting systems. As expected, there were other significant cost cutting measures, although efforts were made to minimize the cuts to R&D.

Exhibit 4: Environmental awareness model: Nortel 2002-2004



While these measures helped to stabilize Nortel's financial situation they further weakened Nortel's environmental awareness capability (see exhibit 4). Massive layoffs meant that technical staff could no longer spend as much time with customers as there was limited time outside of the main operational day-to-day tasks. Needed reductions in trade show attendance, in management training initiatives, as well as lower university funding meant that informal external monitoring capability was further eroded. As well, as this period focused on what respondents said were almost weekly requirements for management to reduce headcounts meant that the focus of Nortel management was now internal with limited time to focus on external environmental issues.

Environmental awareness capability also eroded during this period due to the Wilmer-Cutler investigation. Wilmer-Cutler, a Washington law firm was hired by the board to investigate a potential financial irregularity. The subsequent investigation, according to those interviewed in the study, was very intrusive and resulted in a lengthy focus by executives of Nortel on the investigation (once again a factor which further increased the internal focus). Wilmer-Cutler's recommendations, which were accepted and implemented by the

board, included the firing of the CEO (Frank Dunn) and many other senior executives. The firings of senior executives along with the layoffs of some 60,000 staff also resulted in a reduction in the number and strength of relationships between Nortel management/staff and customers. Several customers commented on this.

2004 ended with a restructured Nortel, a new CEO (Bill Owen, a board member who volunteered to temporarily fill the role), and a significantly streamlined organization. However it also ended with eroded capability for informal external monitoring, reduced internal systems with external insight capability and attenuated decision maker cognitive abilities (see exhibit 4).

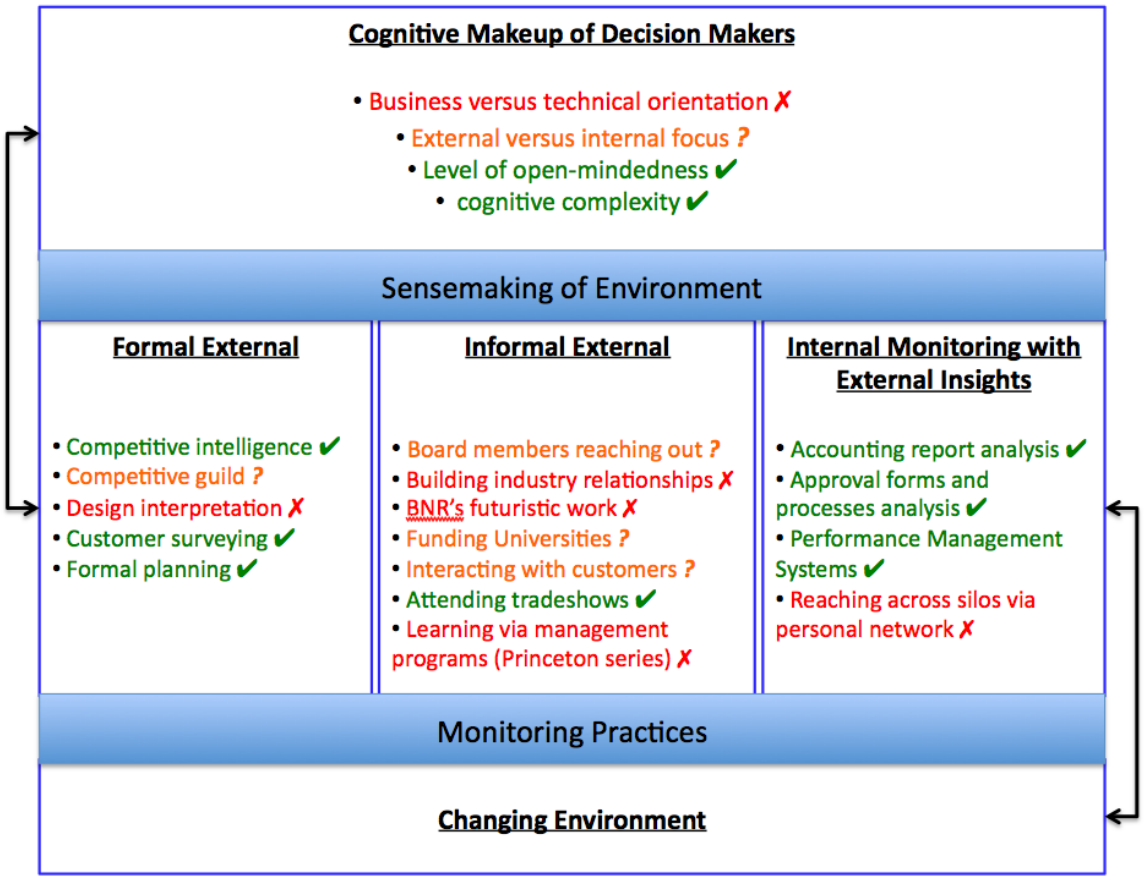
2005 – 2009 The road to bankruptcy protection

With Frank Dunn fired, there was a need for a new CEO. Bill Owens, a member of the board, volunteered to fill this void temporarily until a new CEO could be found. In November 2005 Mike Zafirovski was hired as CEO.

The accumulating weaknesses mentioned earlier in environmental awareness capability were perhaps most visible during this period. For example, in 2006/2007 an internal document noted that the turnaround of Nortel was well in hand with significant recent sales from two key customers. However, the customers themselves told the researchers that the sales were reflective of a concern about Nortel's viability and the need to stockpile Nortel parts should Nortel go out of business. Perhaps with stronger environmental awareness capability as was seen in the 1990's Nortel management would have known this. Further, as was also noted both by customers and by others interviewed, during this period (2005 to 2009) sales were predominantly in legacy products. Customers were reluctant to buy Nortel's newer technology solutions, again for fear that Nortel would not be around to service them. Sales may have been increasing during part of this temporal era but the limited environmental awareness capability meant that Nortel might not have been aware that customers were in fact stockpiling legacy replacement parts, and that the growing customer discontent had them question the company's future. Our data shows that customers wanted Nortel to either merge with another company or sell business units and focus on one or two businesses rather than the current four (optical, wireless, wireline and business enterprise). However, Nortel's decisions during this period were not consistent with these expectations thus significantly eroding customer confidence.

Both Owen and Zafirovski recognized the need to improve Nortel's systems and to also deal with the various lawsuits and other legal issues confronting Nortel. They also saw the need to meet with and reassure customers who were growing increasingly concerned with Nortel. Zafiroviski's strength according to several interviewed was in management systems. Having worked with General Electric (GE) he brought with him knowledge of GE systems and methodologies, which he started implementing at Nortel. He also hired several new "C" level officers with similar backgrounds. Zafirovski also went about trying to improve quality at Nortel and further reduce manufacturing costs by implementing Six-Sigma. He also oversaw the installation of a performance management system that included R&D and technology assessments. Competitive intelligence was also strengthened as part of this investment in systems. Nortel could see what was in front of them. But informal external mechanisms were further weakened. Customers talked about not seeing technology workers as much, different kinds of conversations, and constant changes plagued their once strong relationships. The new top executives came with strong business skills, but did not have the same understanding of technology that past leaders had exhibited. Both customers and technical staff cited specific what was perceived by them as strategic errors made by senior management which were indicative they said of senior management not having a sufficient awareness of the technical dimension of the job.While many interviewed did cite strong business decision making abilities within senior management it was the technology acumen that was questioned.

Exhibit 5: Environmental awareness model: Nortel 2005-2009



In summary, 2005-2009 brought with it strengthening in formal external monitoring, informal external monitoring and internal systems with external insight. However, decision maker cognitive factors appeared to weaken with continual focus on internal matters (e.g. Six Sigma and additional lay-offs) and reduction in technical capability at the senior levels of management.

7.0 Conclusion

In January 2009, Nortel filed for bankruptcy protection and subsequently sold all of its units. While the company had immense technology strength (its patents were purchased for $4.5 Billion), the failure to see and adapt to the new competitive environment contributed to this company's downfall. Yet, strength in environmental awareness in the 90's had contributed to the rise of the company and was a key element of their success during this period. Using a multi-method approach involving multiple surveys and interviews, this in-depth case study has examined the impact of the change in environment on Nortel and of Nortel's environmental awareness capability during the turbulent period (1997 to 2009). This study makes two notable contributions. First, the study theorizes building a model of environmental awareness that features three types of monitoring practices as well as cognitive factors that impact sensemaking abilities of decision makers (Exhibit 5):

1. Formal external monitoring practices (for example competitive intelligence, planning)
2. Informal external monitoring practices (for example board members reaching out)
3. Internal monitoring practices with external insight capability (for example accounting systems)
4. Decision makers cognitive makeup (for example the level of open mindedness)

The case study traces the development of each of these factors during the study time frame and noted that in the last time period (2005-2009) the first three were strengthened while there was not a strengthening of the fourth factor (cognitive makeup factors) with in fact the focus still being internal. This latter factor might have contributed to the customers' perception that Nortel was not responding to their concerns. As a result, customers were wary of buying Nortel's new technology offerings.

Second, the case study has shown how decisions that make sense from a business and environment perspective may in fact have an adverse effect on

environmental awareness. For example, while cost-cutting during the 2002-2004 period was needed given the industry dynamics, it reduced Nortel's informal external monitoring capability. Similarly, organizational restructuring in the 1990's designed to increase speed of response to customers, also resulted in a reduction in formal external monitoring capability. Furthermore BCE's sale of Nortel stock and subsequent exit from the board, also led to a reduction in informal external monitoring capability. Accordingly the study makes a notable contribution to both the academic and practitioner communities illustrating that significant changes to strategy or organization should be examined for any unintended impact on environmental awareness capability.

Readers are advised however that these findings are based on a single case study. The list of items provided above under the four categories (decision maker cognitive makeup, formal external monitoring, informal external monitoring and internal systems with external insight) is exhaustive from the perspective of the Nortel, however it might not be exhaustive for other companies. Future research should seek to expand and to validate the model in different organizations. Furthermore, no attempt is made to evaluate the effectiveness of each of the monitoring practices or the cognitive factors. Further studies are required to validate these findings (Calof et al, 2014).

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