A BUSINESS STRATEGY AND BALANCED SCORECARD EVALUATION OF MAXXAM ANALYTICS – BURNABY, BC

by

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Abstract

Maxxam's acquisition of Cantest Ltd. resulted in an acculturation process for employees. Cultural knowledge transfers due to acquisition can lead to mixed feelings on the part of employees as they seek an identity in a newly formed organization. This project explores the feelings of Maxxam employees with respect to how procedures are re-learned, what training opportunities exist, and how acculturation influences personal identities. Secondly, the project explores the fourth dimension of Kaplan and Norton's Balanced Scorecard: Learning and Growth. Metrics for this dimension are developed into an interview questionnaire and delivered to Maxxam employees to both qualitatively and quantitatively measure innovation potential in the new combined incumbent firm. Feelings about opportunities for learning and growth for employees are recorded. Lastly, recommendations are synthesized from employee interview responses on how Maxxam can best capitalize on synergies of acquisition through the ongoing development of a balanced and intellectual capital scorecard.

Keywords: Balanced Scorecard; Intellectual Capital Scorecard; Maxxam Analytics; Maxxam; Kaplan and Norton; Quality Assurance; Learning and Growth; Acquisition.

Executive Summary

In 2010, Maxxam's acquisition of Cantest Ltd. required staff from the acquired company to undergo a training process whereby culture, software, and procedures were re-learned. To become functional with the software required in day-to-day Maxxam laboratory operations (i.e. the LIMS system), an acculturation process was first required of each employee. Only after acculturation to new operational rhythms was successful were new technical details mastered. Knowing that a comprehensive knowledge transfer is a necessary post-acquisition activity, this project explores the feelings and opinions of Maxxam employees with respect to how procedures are re-learned, what training opportunities exist, and how the acculturation process fits with their own identities with respect to growth and the retention of new knowledge.

Feelings of employees with respect to the ability of in-house training programs, learning opportunities, and the future success of the combined company are important in helping employees feel nurtured with a sense of purpose and career direction. As such, this project explores the fourth dimension of Kaplan and Norton's Balanced Scorecard: Learning and Growth (Kaplan & Norton, 1991). Metrics involved in the measurement of feelings associated with this dimension are developed, organized into an interview questionnaire, and delivered to Maxxam employees to both qualitatively and quantitatively measure the innovation potential of the combined incumbent firm. Feelings regarding opportunities for employee learning and growth are also measured. The project summarizes notable areas of concern and recommendations for the firm as identified by employees at each level of the organization's hierarchy in relation to the fourth dimension of Kaplan and Norton's Balanced Scorecard. Lastly, the project synthesizes a series of recommendations from Maxxam employees on how the firm can capitalize on the synergies of the acquisition once the integration phases are complete.

Dedication

This project is dedicated to Chris and to my parents, Nina and Yaswin, who supported me throughout this program. I thank you for your love and kindness on this journey, and for making learning possible thanks to your patience and understanding.

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I wish to thank everyone involved in the Management of Biotechnology MBA Program at the Segal Graduate School of Business. Thank you to the faculty and staff who have supported and encouraged me, guided me, and worked with me to help me to grow as a leader and as an individual. Thank you to the students for your lasting friendship, and for making the program memorable. Lastly, I wish to thank Dr. Pek-Hooi Soh and Dr. Aidan Vining for their wisdom and insight in helping make this project both interesting and challenging.

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Glossary

Chain of Custody	An unbroken trail of accountability that ensures the physical security of samples, data, and records
Control Chart	The graphical plot of analytical test results for a given time period or sequence of measurements on which limits are drawn. Results are expected to fall within these limits when the analytical procedure is in “statistical control”. The chart frequently shows a central line to help detect a trend of plotted values toward either control limit.
Corrective Action	Any measures taken to rectify conditions adverse to quality and, where possible, to preclude their recurrence.
Document Control	The act of ensuring that documents (and revisions thereto) are proposed, reviewed for accuracy, approved for release by authorized personnel, distributed properly and controlled to ensure use of the correct version at the location where the prescribed activity is performed.
Holding Time	Elapsed time between sample collection and either sample preparation or analysis, as appropriate. While exceeding the holding time does not necessarily negate the veracity of analytical results, it causes the qualifying or 'flagging' of any data not meeting all of the specified acceptance criteria.
Proficiency Testing Sample (PT Sample)	A sample, product, artefact, piece of equipment or measurement standard sent to one or more participants in a proficiency-testing scheme (ILAC Guide 13:08/2007, 1.3.4).
Proficiency Testing Participant	A laboratory that receives proficiency test items and submits for review by the proficiency test scheme provider (ILAC Guide 13:08/2007, 1.3.3).
Proficiency Testing Provider	A body (organisation or firm, public or private) that undertakes the design and conduct of a proficiency-testing scheme (ILAC Guide 13:08/2007, 1.3.7). Quality Assurance: A set of activities whose purpose is to demonstrate that an entity meets all quality requirements.
Quality Assurance	A set of activities whose purpose is to demonstrate that an entity meets all quality requirements.

Quality Control	Activities to control the interaction of human and physical resources to ensure a specified quality of results.
Quality Manual	A document stating the management policies, objectives, principles, organizational structure and authority, responsibilities, accountability, and implementation of an agency, organization, or laboratory, to ensure the quality of its product and the utility of its product to its users.
Sample Analysis	All procedures carried out on samples (and standards) subsequent to sample preparation. Includes any chemical or biological alteration to the sample as well as subsequent measurement of specific sample characteristics.
Sample Collection	All procedures carried out on a sample at the time of sample collection, including filtration to remove unwanted material from the sample or to isolate the sample.
Sample History Requirements	Includes requirements for sample collection, chemical preservation, sample container, storage conditions, holding time, and sample pre-treatment.
Sample Preparation	All procedures such as purging, aeration, pH adjustment, extraction, clean-up, digestion, distillation etc. carried out on samples (or standards) prior to analysis.
Uncertainty	An estimate attached to a test result that characterizes the range of values within which the true value is asserted to lie. (ISO 3534-1, 3.25).
Validation	Method validation is a critical step in determining, evaluating and verifying the characteristics of an analytical method. Prior to being used on a routine basis, the analytical method performance must be thoroughly investigated and documented. Validation is a process of systematically determining if the method under consideration has performance capabilities consistent within a defined field of application. The judgment of method suitability, i.e. "fitness for purpose", is implicit in the validation process.

1: Maxxam Analytics International Corporation

Maxxam Analytics International Corporation (Maxxam) is the largest privately owned Canadian laboratory network, employing over 1800 people across the country in 2010. Headquartered in Mississauga, Ontario, Maxxam has laboratories spanning the entire country (See Table 1.1). The company has recently completed a merger and acquisition transaction in Canada and is now well-positioned to strengthen its competitive advantage significantly. In order to meet the growth objective of the newly merged company, Maxxam has decided to commission a study to create a performance measurement system. Hence, this project will discuss and assess the use of a balanced scorecard, and collect real company data to create the metric system.

This section will present an overview of the company's services and operations followed by a description of the company's recent merger and acquisition strategy, and the project objectives.

1.1 An Overview of Services at Maxxam Analytics, BC

Maxxam Analytics is a national company that offers diverse laboratory testing services. Maxxam is composed of nine speciality lines of business: (1) Acid Rock Drainage, (2) Air Services, (3) DNA, Paternity and Drugs of Abuse, (4) Ecotoxicology, (5) Equine Sport Testing, (6) Food Sciences, (7) Environmental Services, (8) Petroleum Services, and (9) Pharmaceutical Services. Maxxam's geographical scope is truly national, extending from coast to coast in Canada, with a laboratory presence in Alberta, British Columbia, Saskatchewan, Manitoba, Quebec, Ontario, Nova Scotia, Newfoundland, and NWT.

Maxxam was founded in 1972, and, historically, company founders and Callisto Capital[1] have held the company privately. However, on September 10, 2008, OMERS Administration Corporation acquired Maxxam and brought the company into a private equity portfolio containing approximately $4 billion of investments. OMERS is one of Canada's largest pension plans, with assets of more than $50 billion invested world-wide in real estate, private equity, and infrastructure. Under OMERS, Maxxam's owners have a long-term hold position on the

[1] http://www.callistocapital.ca/investment_profile.html

company, and seek to see it develop both through future organic growth and acquisitions. Maxxam's growth strategy is to maintain a leadership position in environmental, petroleum, food safety and DNA analytical services[2].

The average number of business lines covered by a typical Maxxam laboratory varies by location, with several laboratories focusing on specific client needs as a business model. For example, the laboratory in Guelph, Ontario is customized to work solely on paternity, immigration, DNA and forensic biology testing services. Most laboratories are not customized to a specific science and operate the three main lines of business: (1) Environmental and Microbiology, (2) Food Safety, and (3) Industrial Hygiene and Air Toxics. Due to the acquisition of Cantest Ltd., Maxxam operations in Burnaby also include two lines of business unique to BC: (1) Pharmaceutical Operations, and (2) Forensic Equine Drug Testing.

Table 1.1 Geographical Scope of Maxxam's Laboratory Facilities in Canada.

Eastern Facilities are Located in:	Western Facilities are located in:
St. Laurent, Quebec	Calgary, Alberta
Quebec, Quebec	Edmonton, Alberta (2 Facilities)
Mississauga, Ontario	Fort McMurray, Alberta
London, Ontario	Grande Prairie, Alberta
Burlington, Ontario	Red Deer, Alberta
Guelph, Ontario	Regina Service Centre, Saskatchewan
Waterloo, Ontario	Burnaby, British Columbia (3 Facilities)
Ottawa, Ontario	Ft. St. John, British Columbia
Bedford, Nova Scotia	Yellowknife, NWT
Sydney, Nova Scotia	Victoria, British Columbia
St John's, Newfoundland	Prince George, British Columbia
Winnipeg, Manitoba	

Source: www.maxxam.ca

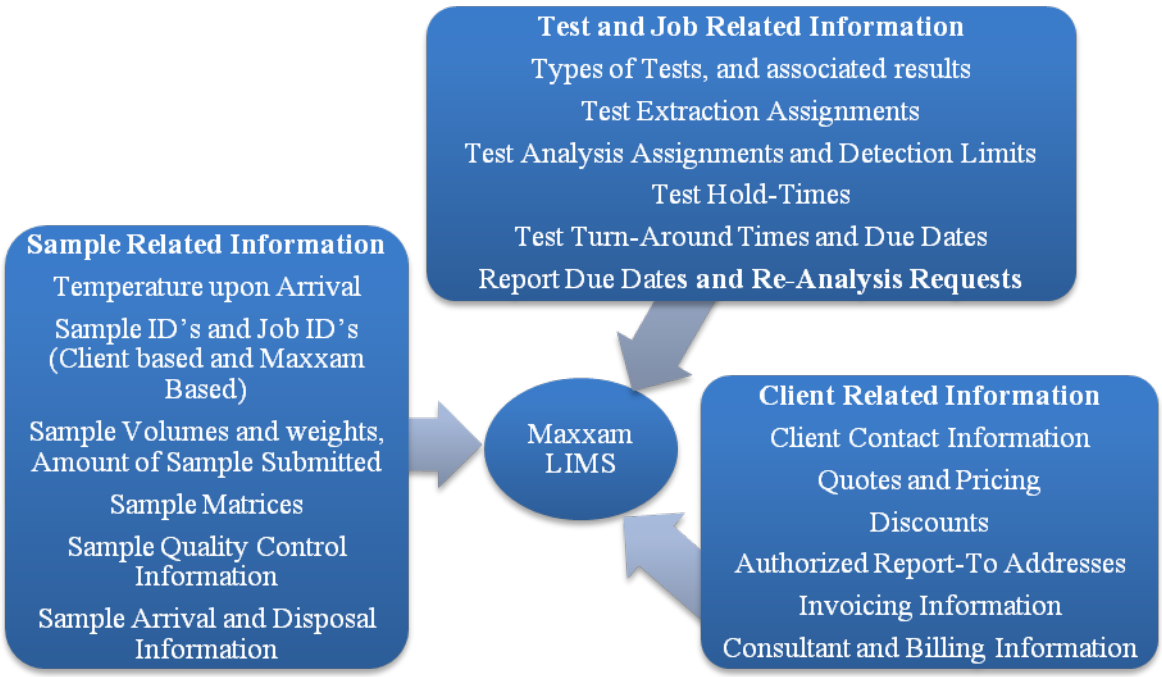
1.2 How the Laboratory Functions in British Columbia

Maxxam has three laboratory locations in Burnaby, British Columbia. In order to manage the complex process of transporting, locating, and tracking samples between multiple locations, a Laboratory Information Management System (LIMS) is used. The LIMS was designed by in-

[2] http://maxxam.ca/services

house developers and is able to create automatic workflows for chemists and scientists throughout the company. The LIMS also allows Project Managers to track the progress of jobs and samples on behalf of Maxxam's clients, ensure holding times are met, and create reports for senior management. The unique ability of the LIMS to download key pieces of data to Microsoft Excel and enable Project Managers to upload subcontracted files in pdf format allows for flexibility and versatility in daily business operations, and ensures sample history requirements are accurately documented. The Maxxam LIMS is referred to as MaxxLIMS. The legacy Cantest LIMS was known as the Laboratory Information and Knowledge System (LINKS).

Figure 1.1 *Diagram of the Connectivities of the Laboratory Information Management System at the Maxxam Analytics Laboratory in Burnaby, B.C.*

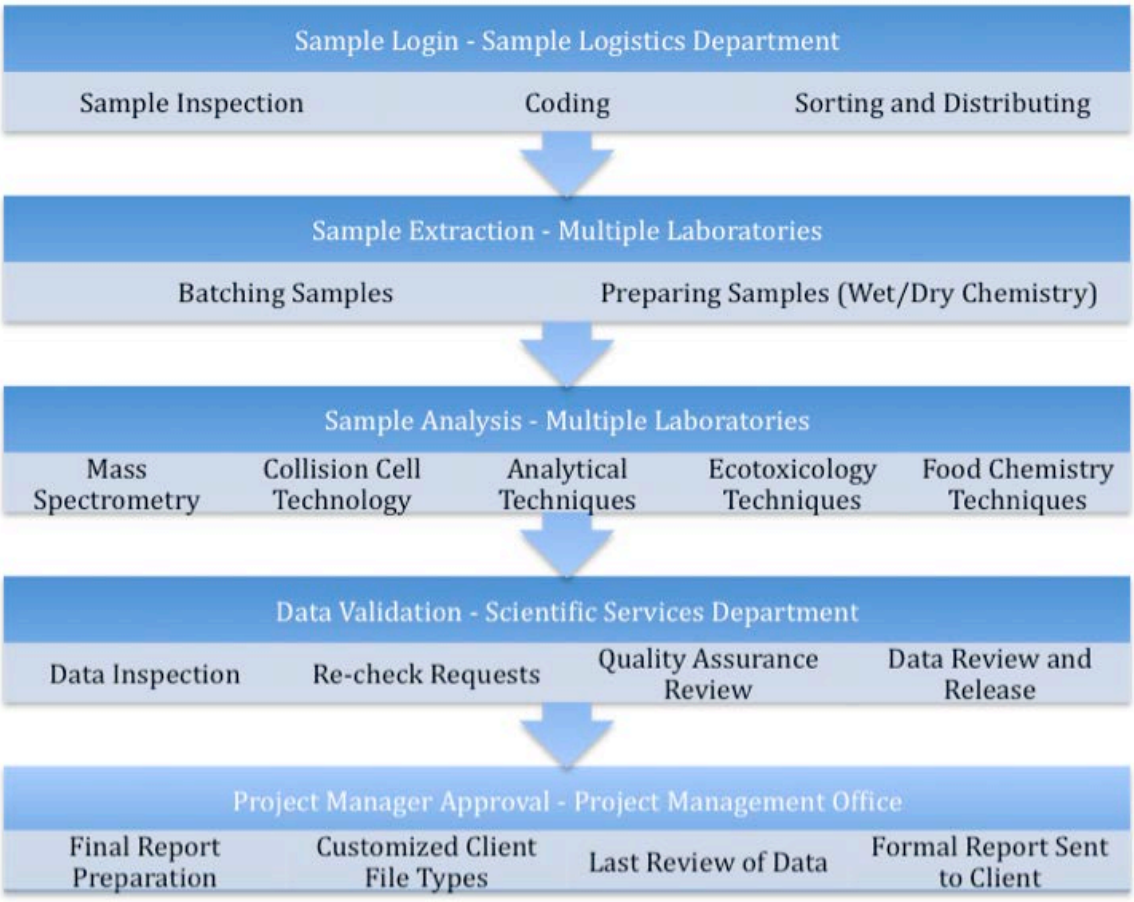


Source: Adapted from Personal Experience as a Project Manager, Maxxam Analytics

Although there are multiple workflow paths within the laboratories, a common theme of sample flow-through exists thanks to the LIMS. These workflow processes track turn-around-time surcharges, completed work, and estimated report due dates. A sample flow scheme is presented Figure 1.2. As illustrated in Figure 1.2, the standard report cycle from start to finish is five business days.

The three main bottlenecks of the flow-through process for all clients are: (1) sample reception and test login, (2) sample extraction, and (3) sample analysis. The sample reception and sample login process is the primary bottleneck due to three factors. Firstly, the detailed nature of the sample triage required – each bottle is individually inspected and streamed by reception staff. Consequently, upon arrival, considerable time is spent on detailed inspection of samples. Secondly, clarification of requests from the client requires time and patience. The client may not always be immediately available to clear up ambiguities in test and project details. Lastly, accurate capture of requests in the LIMS requires significant manual data entry by sample logistics staff. During busy periods, there can be a backlog of samples waiting for entry into the LIMS.

Figure 1.2 Diagram of Sample Flow-Through at Maxxam Analytics, Burnaby, BC



Source: Adapted from personal experience as a Project Manager, Maxxam Analytics

As can be seen from Figure 1.2, sample flow-through at Maxxam Burnaby is a complicated series of workflow steps leading to a final written report. Analytical processes and data validation steps are adapted to ensure that the LIMS can track the progress of each individual sample and test in the laboratory. Furthermore, there are checks and balances at each stage of the data generation process to ensure that stringent quality assurance and quality control processes are implemented. Individual work routines are guided by standard operating procedures (SOPs). The company's independent quality assurance unit (QAU) routinely revises and edits the SOPs, and maintains the company's Quality Manual. Moreover, the QAU also ensures Maxxam is a proficiency testing participant, and maintains communication with proficiency testing providers.

1.3 How Maxxam is Regulated in Canada

Regulations are becoming increasingly stringent in Canada, particularly with respect to environmental legislation and monitoring. Maxxam Analytics maintains membership in multiple environmental associations to ensure internal procedures and tests remain current and relevant. Maxxam is leading development in analytical capabilities in the areas of environmental testing services, control and risk mitigation.

Table 1.2 Environmental Associations in which Maxxam Maintains Membership [3].

ESAA	Environmental Services Association of Alberta
AWWA	American Water Works Association
GRAC	Groundwater Research Association of California
ACWA	Association of California Water Agencies
ACPO	Association of the Chemical Profession of Ontario (Executive Council)
CCIL	Canadian Council of Independent Laboratories
ISO	International Standards Organization (Water Quality Technical Committee
CEIA	Canadian Environmental Industry Association
ONEIA	Ontario Environment Industry Association
SEIMA	Saskatchewan Environmental Industry and Managers Association
MEIA	Manitoba Environmental Industries Association
MWWA	Manitoba Water and Wastewater Association

Source: Employee Interviews at Maxxam Analytics, May 2010.

[3] http://maxxam.ca/services/environmental-testing-services

Historically, an independent non-profit national laboratory accreditation bureau, known as the Canadian Association of Laboratory Accreditation (CALA), has regulated both Maxxam Analytics and Cantest Ltd., along with other firms in the industry. CALA has served the entire industry as a source of proficiency testing samples and as an external inspector to help objectively ensure that laboratories in Canada comply with ISO/IEC[4] 17025:2005 regulations. Maxxam also maintains accreditation with the Standards Council of Canada (SCC) to ensure that its food safety divisions are operating within appropriate regulations.

1.4 Competitors in British Columbia

Competition in the industry is primarily based on the cost of an analytical test. Of the five largest firms in British Columbia (Maxxam, ALS, Exova, Agat, and Caro), Maxxam and ALS both compete on cost and quality, while Exova, Agat, and Caro compete on cost. The environmental analytical services industry is structured as an oligopoly, with speed of service and quality being the main factors influencing the price sensitivity of customers. The market size in the province of British Columbia is estimated at $70 million[5]. Up until 2009, and prior to Maxxam's acquisition of Cantest Ltd., Cantest was also a direct competitor. Caro is currently the smallest of the five laboratories. It is located in Richmond, BC and focuses on drinking water and air (Soil Vapour/TD Tube) analysis[6]. Historically, the primary competition for Maxxam has been the ALS Laboratory Group and Exova. Both of these firms have significantly strong relationships within the environmental consulting industry and are able to bid on large contracts. ALS, Exova, Agat and Caro all compete on price for contractual work through consultants working in mining, agriculture, environmental risk assessment, site remediation, and drinking water monitoring. ALS and Exova also compete for work from municipalities and cities.

1.5 The Growth Platform of Maxxam Analytics and the Acquisition of Cantest Ltd.

In 2009, Maxxam acquired Cantest Ltd., which, at the time, was British Columbia's largest privately owned laboratory. Following the acquisition, Maxxam began a year-long process to merge multiple lines of business within three laboratory locations in the Lower Mainland as well as multiple service depots and satellite laboratories across the province.

[4] International Organization for Standardization (ISO) and International Electrotechnical Commission (IEC)

[5] http://www.ceicdata.com

[6] http://www.caro.ca/services.html

1.5.1 The Acquisition of Cantest Ltd.

The acquisition of Cantest Ltd. began before the final quarter of 2009. The merger process for the new lines of business will extend into the second quarter of 2010. This will involve the physical migration of laboratories, re-structuring of multiple internal operational processes, and identifying and achieving new synergistic relationships, both externally with clients and internally through operations best practices. This paper develops a balanced scorecard to measure how the acquisition of Cantest Ltd. affects key Maxxam Analytics stakeholders.

Maxxam's strategic intent in acquiring Cantest Ltd. was to secure complementary lines of business that would amplify Maxxam's presence in British Columbia, and simultaneously secure additional production capabilities in laboratory operations central to meeting the company's future corporate growth and client service targets. Cantest Ltd. had three main lines of business: (1) Environmental, (2) Food Safety, (3) Forensic Equine Drug and operated laboratories based out of Burnaby and Victoria in British Columbia, and Winnipeg, Manitoba. The company served clientele in mining, agriculture, biologics, equine sport, oil and gas, and pulp and paper industries. Moreover, Cantest Ltd. possessed working relationships with food manufacturers, environmental remediation consultants, and seafood importers. Each of these relationships would ensure that Maxxam's future growth would be based on a diversified clientele portfolio.

The acquisition of Cantest Ltd. resulted in a corporate decision to move Maxxam's main laboratory from 8577 Commerce Court, Burnaby, BC to a Cantest location at 4606 Canada Way, also in Burnaby. This decision was taken in order to identify and benefit from synergies associated with harmonizing complementary tasks related to test methods and analytical processes common to both companies. The amalgamation of similar laboratory processes also allowed approximately 80 scientists and support staff to join the 280 scientists and support staff already working at the Canada Way location.

Post-merger locations for Maxxam Analytics include multiple sites across British Columbia that, in many cases, were used for different purposes prior to 2009, as illustrated in Table 1.3.

Table 1.3 Locations of Maxxam Analytics Facilities in British Columbia (Post 2010 Merger)

Post-2009 Merger Site Use	Pre-2009 Merger Site Use	Change Process	Physical Address of Site
Maxxam BC Head Office	Former Cantest Head Office	Maxxam Head Office moved to Cantest Head Office in July 2010	4606 Canada Way Burnaby, BC Canada V5G 1K5 Tel: (604) 734-7276 Toll free: (800) 665-8566 Fax: (604) 731-2386
Maxxam BC Pharmaceutical Operations and Speciality Services	Former Cantest Pharmaceutical Operations	Cantest Pharmaceutical Operations begins operations as Maxxam in 2010	3033 Beta Ave Burnaby, BC V5G 4M9 Tel: (604) 734-7276 Fax: (604) 638-0500
Maxxam BC Forensic Equine Drug Testing	Former Maxxam BC Operations (Main Lab)	FEDT Laboratory re-located in April 2010.	8577 Commerce Court Burnaby, BC V5A 4N5 Tel: (604) 734-7276 Toll free: (800) 665-8566
Maxxam BC Fort St. John Industrial & Environmental	Maxxam BC Operations (No Change)	No Change	9504 – Bay B, 102 Street, Fort St. John, BC V1J 6L4 Tel: (250) 262-0041 Fax: (250) 262- 5050
Maxxam BC Kelowna Office	Former Cantest Operations in Kelowna, BC.	Maxxam Acquires Office in Kelowna in 2009	915 Ellis Street Kelowna, BC V1Y 1Y9 Tel: (250) 765-7501
Maxxam BC Victoria Laboratory	Former Cantest Operations in Victoria, BC.	Maxxam Acquires Laboratory in Victoria in 2009	Vancouver Island Technology Park 1104 – 4464 Markham Street Victoria, BC V8Z 7X8 Tel: (250) 385-6112 Fax: (250) 382-6364

Source: www.maxxam.ca

1.5.2 Mutual Clients of Cantest Ltd. and Maxxam Analytics

One of the benefits of acquiring Cantest Ltd. was the transfer of Cantest's relationships with a diverse client base. Personnel at Cantest Ltd. possessed relationships with multiple government and industry partners, and consultants. Cantest Ltd. also performed diverse analytical tests that will benefit from Maxxam's exceptional ability to streamline laboratory processes. This will allow both companies' clients to enjoy quick turn-around times.

Examination of Maxxam and Cantest's environmental divisions identified several common clients. It is anticipated that the acquisition will help strengthen client relationships, particularly in cases where projects were typically split between the two companies. Historically,

to take advantage of each company's expertise, a client would work with Maxxam Analytics on the first half of a project and with Cantest Ltd. on the second half. Going forward, Maxxam's goal is to unify client relationships and harmonize projects across lines of business using the MaxxLIMS, Maxxam's in-house LIMS. This will enable clients to interact seamlessly with the multiple parts of the company previously owned by the two pre-merged entities. As will be described later, the MaxxLIMS allows for multiple client-related processes to be harmonized. These harmonized processes will help the company form new connections between client-related pricing, mutual client accounts, sales account managers' territorial relationships, and project managers' account ownership.

1.6 The Objectives of this Project

In 2010, as a merged company, Maxxam is in a position to offer diverse services spanning multiple industries and to act in consulting roles on a variety of client projects. Competitively, Maxxam is well-positioned to develop and implement synergies associated with the unification of a variety of complex laboratory processes by capitalizing on efficiencies of scale and greater resource utilization. The increase in diversity of operations, through the numerous lines of business added in 2010, will allow Maxxam to strengthen existing client relationships and seek new industry partners. Moreover, Maxxam has invested a large percentage of its financial resources to ensure that the company has expertise and instrumentation to provide some of the lowest detection limits available in the environmental laboratory industry. These steps, coupled with the added resource capacity that the merger has facilitated, will ensure Maxxam remains a competitive force.

The objective of this project is to develop the metrics for the fourth perspective of Kaplan and Norton's balanced scorecard, i.e. learning and growth. This will help evaluate the merger of Cantest Ltd. and Maxxam, and identify strategic recommendations related to learning and growth from the new larger employee base. Firstly, pertinent balanced scorecard metrics will be identified and grouped into a balanced scorecard interview questionnaire. Secondly, the balanced scorecard questionnaire will be applied to the 2010 acquisition of Cantest Ltd. to determine the feasibility of its use as an analytical tool. If it proves an effective tool, the learning and growth section of the balanced scorecard will be available to Maxxam to objectively assess and evaluate the success of future acquisitions.

As the company continues to grow, systematic methods of evaluating acquisition success can be developed to help ensure that the assets of newly acquired lines of business align

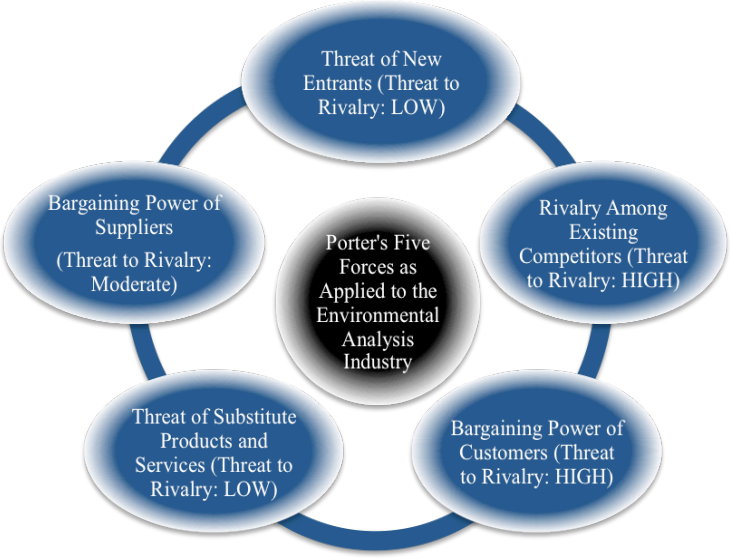
strategically with existing lines of business. Ultimately, this will enable Maxxam to capitalize on synergies and efficiencies of scale associated with its merger and acquisition (M&A) activities. The balanced scorecard questionnaire developed in this project serves to address part of this need. Using the data from the post-acquisition employee interviews, conducted during May and June 2010, the project will summarize several recommendations for growth and ideas for improving overall laboratory operations in Maxxam.

2: Industry Analysis of the Environmental Analytical Services Field

Chapter 2 contains an analysis of the environmental analytical laboratory industry based on Porter's Five Forces Framework. This chapter sets the context for the laboratory analysis needs of clients in British Columbia, and provides details regarding the competitive reasoning behind the importance of a successful acquisition of Cantest Ltd. by Maxxam Analytics. For this chapter, the environmental analytical laboratory industry has been chosen because it represents Maxxam BC's largest strategic focus, largest current source of revenue, and largest business line. The industry is composed of consultants, oil and gas companies, cities, municipalities, and analytical testing laboratories. The environmental analytical laboratory industry is subject to market fluctuations due to internal competition and external regulatory oversight. The factors discussed in this chapter are illustrated in Figure 2.1 below.

2.1 Porter's Five Forces – How the Five Competitive Forces Influence the Environmental Analysis Industry

Figure 2.1 Diagram of Porter's Five Forces Applicable to the Environmental Analysis Industry[7].



[7] Porter, M. E. (1980).

Source: Adapted for the Environmental Analysis Industry from Porter, M.E. (1980).

Porter's Five Forces are influencial in determining the role competitive forces play in the environmental analytical laboratory marketplace. Of key importance in this analysis are the bargaining power of customers and the existing rivalry among competitors. Of less importance are the threat of substitute products and the threat of new entrants to the industry.

2.2 The Bargaining Power of Suppliers

Suppliers hold a moderate amount of bargaining power in the environmental analytical industry because a constant supply of consumable goods is required for the ongoing functioning of laboratories. Most laboratories have learned to circumvent product shortages by creating stockpiles of essential materials. However, these stockpiles often inflate inventory levels of non-finished goods and can increase risk if a test is not requested for a prolonged period.

Analytical standards and reagents pose a special problem for laboratories, as chemical reagents are high cost-low volume products that are often required in great urgency when a client requests a unique chemical test. Moreover, suppliers of such custom chemical standardized reagents often require a significant amount of time to prepare and incur a significant financial cost for rush delivery. The laboratory is placed in an awkward position when a promise to deliver a test result is hindered by a missing specific standard. This situation forces the laboratory to pay a premium to a supplier for rush service that, potentially, is not entirely offset by the rush service fee that can be charged back to Maxxam's client.

Table 2.1 Summary of Supplier Relationships for Laboratories in the Analytical Chemistry Industry

Supplier	Hardware, Equipment, and Consumables	Software	Custom Standards and Reagents	Office Supplies / Consulting Services	Consulting Services	Bargaining Power
Mills Basic	NO	NO	NO	YES	NO	Very Low
Sigma-Aldrich	YES	NO	YES	YES	NO	High
IBM	YES	YES	NO	NO	YES	High
Agilent	YES	YES	NO	NO	YES	Medium
Restek Corporation	YES	YES	NO	NO	NO	Low
Chromspec	YES	NO	NO	NO	NO	Low
Anachemia Science	NO	NO	YES	NO	NO	High (Proximity Effects)

Source: Employee Interviews at Maxxam Analytics, May 17, 2010

2.3 The Bargaining Power of Customers

Based on Porter's Five Forces analysis, the bargaining power of customers is high. The main reason for customers' high bargaining power is the high level of accountability to which customers hold laboratories and the customers' high level of education. Clients will negotiate aggressively on behalf of their companies for complex product offerings. Often, the laboratory is willing to bundle complex expensive analyses, such as pesticide analysis and other routine analyses, with lower margin procedures, such as tests common to drinking water packages (pH, alkalinity, basic microbiological parameters, and basic inorganic parameters). Bundling of high margin tests with lower margin tests in custom quotations can help secure sales and new customers; however, it does lead to price erosion.

Furthermore, clients operating consultancies at a provincial level often hold laboratories accountable for the data they produce with respect to high-cost samples. The cost of obtaining a sample in remote and complex conditions (especially in Northern British Columbia) can far outweigh the cost of analysis at the laboratory. Thus, if, after spending a considerable amount of time and money obtaining a sample, a client finds that the laboratory has either lost or ruined the sample, or produces bad or unusable data, the client often holds the laboratory liable for both the re-sampling and the cost of re-analysis. This type of informal insurance increases the bargaining power of customers in relation to the laboratory.

Lastly, the bargaining power of customers remains high because clients have the ability to affect rush turn-around-times. A client that requires a sample to be completed in 24 or 48 hours

will contact successive laboratories until they find one that is willing to perform the work in the required time. This ability to shop around, combined with the known fact that laboratories do not always operate at 100% capacity, allows clients to negotiate turn-around-times that often put considerable pressure on laboratories. Analysts are forced to balance rush work with routine work at the expense of added overtime costs.

2.4 The Threat of New Entrants

New entrants are a low threat in the environmental services industry particularly due to the large sunk costs required in capital investment for analytical equipment. Sunk costs in capital equipment present a relatively high barrier to entry in this industry. For example, gas chromatographic equipment purchases for laboratories accrue in the several hundred thousand dollar range, especially if paired with expensive mass-spectroscopic analyzers. As industry standards continue to raise the bar for quality with respect to analytical chemistry testing equipment, equipment producers respond by developing faster and better equipment. Laboratories that fail to keep up with the capital costs associated with new innovative equipment soon find themselves unable to meet the basic regulatory requirements of the industry's auditors. New entrants to this industry are expected not only to possess up-to-date equipment but also to have performed in-house validation of this equipment using standard operating procedures sourced from first principles[8]. Laboratories that fail to produce such validation documentation for bi-annual inspections by assessment agencies face heavy penalties including the removal of tests from their respective scopes of accreditation. There is a severe financial penalty for not having a test listed on a scope of accreditation because that service cannot be offered to any client.

An analytical data provider's reputation is key to securing new work. Developing and maintaining their reputation takes considerable time and effort on the part of the laboratory. Clients are simply unwilling to hand over time-sensitive and cost-sensitive projects to laboratories that have not earned their trust. The business model of each of the main laboratories includes a force of sales managers who continuously seek to build reputation and relationships with top clientele. A tactic used to ensure a competitor loses market share is the intentional destruction of that competitor's reputation.

[8] Commonly the British Columbia Laboratory Manual, a publication of the BC Ministry of Environment, is used for this purpose.

2.5 The Threat of Substitutes

Porter's Five Forces analysis shows the threat of substitutes to be low in the environmental analytical testing industry. The threat of substitutes is low because there are considerably high barriers to entry due to the capital costs involved in setting up functioning laboratories. Furthermore, the capital cost of purchasing up-to-date equipment that can meet clients' demanding turn-around time requirements can be economically prohibitive for a new entrant.

As well, substitutes are almost non-existent due to another barrier to entry – the high cost of test validation. Methods used within laboratories require external inspection from an accreditation agency as well as routine internal inspection. Furthermore, the tests must be validated against a known source method for which there is considerable scientific evidence of data integrity. These validation packages require considerable time and money to prepare and are often a requirement to conduct business with large corporate clients. The development of custom method validation packages can be cost-prohibitive for a new entrant that has already spent a large amount of capital to acquire the basic testing equipment for analyzing samples.

Accreditation costs are a final barrier to entry. Industry requirements dictate that individual laboratories possess accreditation from independent accreditation bodies governing the work of laboratories across Canada. As described in Section 1.3, the two main accreditation-granting agencies are the SCC and the CALA. Member laboratories are required to participate in inter-laboratory comparisons and on-site assessments based on international standards (often ISO/IEC 17025). The annual capital expense to maintain ongoing accreditation for an operating laboratory can be cost prohibitive for a new entrant. The maintenance of accreditation and detailed accreditation requirements will be described in detail in Chapter 6.

2.6 The Competitive Rivalry between Existing Companies

The competitive rivalry between analytical laboratories in British Columbia is fierce, and includes price-wars, undercutting pricing, and attempts to outbid competitors for both large and small contracts. Of particular importance to Maxxam Analytics are the four competitors mentioned in Chapter 1. The ALS Laboratory Group, Exova Laboratories, Agat Laboratories and Caro Analytical Services form the main competition that seeks to erode Maxxam's market share. This section explains the differences in the service offerings of each competitor in relation to Maxxam Analytics.

2.6.1 ALS Laboratory Group

The ALS Laboratory Group (formerly ASL Analytical Services Laboratory Ltd.) is a global environmental laboratory network with a strong presence in British Columbia. Headquartered in Australia, this company has a growth strategy similar to Maxxam's. Acquisition is their primary mode of growth[9]. The company has significant capital assets, a strong reputation, and the minimum efficient scale to bid against Maxxam for large regional contracts. In relation to ALS, a current primary threat arises from the fact that several local consultancies employ samplers who are responsible for collecting and submitting samples to laboratories. Samplers are often consultants who also have responsibility for data interpretation on behalf of their consultancy's clientele. Overall, the estimated number of consultant level samplers in the BC market is approximately one hundred and fifty. Of this total, it is estimated that 60-65% recommend Maxxam, 25-30% recommend ALS, and 15-20% recommend other companies in the market. Samplers who are historically loyal to ALS, and are responsible for day-to-day sample analysis decision-making, will be a concern for Maxxam. Convincing a loyal sampler or consultant to switch laboratories can prove difficult due to personal relationships built over time.

2.6.2 Exova Laboratories

Exova Laboratories[10] is an international company with over 130 locations around the world. The company has relatively new ownership. In 2008, Clayton, Dubilier and Rice (CBR) bought Bodycote Testing Group. CBR is a global private equity firm whose strategy is to build a testing services company. Rebranded as Exova in 2009, Bodycote Testing Group continues to grow through acquisitions and strategic partnerships. Exova offers environmental analytical services identical to Maxxam for a wide variety of matrices, including drinking water, groundwater, surface and waste water, soil, sediments, solid waste, drilling waste, air samples, breathable gases and swabs. Furthermore, the company has expertise in waste classification services and groundwater well installation and soil sampling services. Similar to Maxxam, Exova possesses expertise in air quality analyses procedures, asbestos testing management, and environmental toxicology. Such a diverse suite of expertise makes Exova a direct competitor and threat to Maxxam in terms of market share. The company is headquartered in Edinburgh, Scotland in the United Kingdom and employs approximately 4000 people.

[9] http://www.alsglobal.com/enviroServicesOverview.aspx
[10] http://www.exova.com/Services/Pages/EnvironmentalTestingandMonitoring.aspx

2.6.3 Agat Laboratories

AGAT Laboratories performs analysis for environmental applications, such as organic chemical analysis of water, groundwater, wastewater, soil, sediment sludge and solid waste[11]. Agat possesses Ultra Trace Toxicology capability and accreditation. Agat's high-resolution gas chromatography division provides extraction and analysis of samples for dioxins, furans, polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs) in varying environmental matrices. These tests are similar to tests carried out at Maxxam, making Agat Laboratories a direct competitor. Agat also provides services, ranging from basic fertilizer recommendations to full soil profiling, not provided by Maxxam. In addition, Agat helps their clients assess oil and tar sand deposits. To determine the quality of deposits, Agat's laboratories test the parameters of porosity, permeability, fluid saturation and distribution of particle size. Furthermore, Agat possesses tribiology services, including the ability to perform chemical analysis of coolants, lubricants, hydraulic and transmission fluids.

Agat competes directly with Maxxam in the area of sub-ppb[12] detection for metals used in geological mapping and sub-ppb level metals analysis required in mineralization grade studies and purity analysis. Maxxam does not compete with Agat in geology and petrology services. Geological and petrology data at Agat is obtained through electron microscope and x-ray diffraction analysis for drilling deposits and mineralogy studies. Moreover, Agat competes directly with Maxxam with respect to food testing. Food chemistry tests and microbiology detection tests are offered at Agat to help their clients meet the needs of agro-food, food producers, restaurant suppliers and various government agencies. The range and diversity of Agat's multiple lines of business make it a direct competitive threat to Maxxam's future growth. Recent competitive intelligence indicates that Agat Laboratories will be opening a large facility in Burnaby, BC in the fall of 2010 to compete directly with Maxxam for work within the local market.

2.6.4 Caro Analytical Services

Caro Analytical Services is the smallest of Maxxam's competitors. The company is based in Richmond, BC and has a satellite operation in Kelowna, BC. Caro offers a suite of analytical services for drinking water quality testing, wastewater chemistry, heavy metals testing, general

[11] http://www.agatlabs.com/content/about.htm
[12] ppb – parts per billion

chemistry testing for soils, and organic testing[13]. The company also competes with Maxxam Analytics on a relatively new form of testing known as soil vapour analysis. Caro appears to be gaining market share and expertise with this particular analysis suite and, as a result, is a direct threat to Maxxam's Industrial Hygiene department, which offers similar analysis to the same pool of regional clients. Although Caro is a small company, it is a full service analytical laboratory that can compete with tests similar to those offered at Maxxam. Currently, the main threat to Maxxam is that Caro can strengthen its expertise in soil vapour analysis to the point where it offers the turn-around times and quality of service of a market leader.

2.6.5 Competitive Landscape

Overall, Maxxam, ALS Environmental, Exova, Agat, and Caro represent the full spectrum of environmental analytical services offered in British Columbia. Each company is subject to international laboratory regulation governed by ISO/IEC 17025:2005[14], and each company strives to compete on price while maintaining quality and efficient turn-around times. At the time of publication, the market breakdown is an oligopoly with Maxxam and ALS being the two larger companies within the lower mainland. Caro seeks to expand its market share in the lower mainland, and both Exova and Agat seek to increase their market share in Northern British Columbia, particularly in the heavily active oil and gas area around Ft. St. John. Each of these market penetration strategies is a direct threat to the market share held by Maxxam Analytics.

2.7 Critique of Porter's Framework Given Regulatory Governance

Porters' Five Forces Model assumes a classical perfect market, unhampered by government policies or government regulations. The regulatory governance of the environmental analytical services industry imposed by CALA requires analytical testing laboratories to maintain ongoing proficiency testing, conduct internal inspections and submit to external inspections. A market that is subject to such stringent regulation makes insights from Porter's model less meaningful. Governments impose new legislation on the industry that requires laboratories to meet new regulatory limits. These regulations have the effect of tempering competition. Laboratories unable to meet the capital investments required to keep pace with changes in regulations are forced to exit the market.

[13] http://www.caro.ca/services.html

[14] ISO/IEC 17025: 2005, General Requirements for the Competence of Testing and Calibration Laboratories, CASCO Committee on Conformity Assessment, International Organization of Standardization, 2005. http://www.iso.org/iso/catalogue_detail.htm?csnumber=39883

As an incumbent, Maxxam is concerned with regulatory governance. Incumbents are uniquely positioned to influence regulatory change. Consequently, regulatory changes can potentially strengthen their position in the market. Furthermore, quicker adaptation to economies of scale and structural changes to the firm can allow an incumbent to become increasingly efficient during periods of regulatory change. Maxxam expects future environmental regulation to become increasingly stringent as political leaders become more aware of the industry's impact on the environment. Strategically positioning Maxxam to be able to test for key parameters important to environmental sustainability will allow Maxxam to capture emerging markets driven by regulatory governance.

2.8 Summary

In comparison to its competitors, Maxxam has diversified its lines of business to capitalize on the breadth of scientific testing expertise available in multiple industries. To this extent, the company is positioned to expand in multiple directions in relation to its competitors, which often choose to focus on a single line of business. Of greatest threat to Maxxam are competitors that choose to adopt a similar growth strategy of simultaneously pursuing acquisitions and developing multiple lines of business. Competitors, such as Agat Laboratories, which is currently in the process of opening up a large testing facility in Burnaby, BC, pose a significant threat. With minimal differentiation, such a competitor can erode Maxxam's market share in an already price-competitive market. To illustrate the relative breadth of each competitor in relation to Maxxam, current lines of business have been summarized below in Table 2.2.

Table 2.2 Summary of Service Offerings in British Columbia of Competitor Laboratories in Comparison to Maxxam Analytics

Source: Corporate Websites of Listed Companies and Employee Interviews at Maxxam Analytics, June 2010.

Maxxam Line of Business	Maxxam Analytics	ALS Laboratory Group	Agat Laboratories	Caro Analytical Services	Exova Laboratories
Environmental: Groundwater, Wastewater, and Soil Analysis	YES	YES	YES	YES	YES
Sludge and Solid Waste Analysis	NO	NO	NO	NO	YES
Forensic Equine Drug Testing	YES	NO	NO	NO	NO
Speciality Services (Custom Design)	YES	NO	NO	NO	NO
Industrial Hygiene and Soil Vapour Testing	YES	YES	YES	YES	NO
Forensic DNA	YES	NO	NO	NO	NO
Paternity and Immigration DNA	YES	NO	NO	NO	NO

3: Internal Analysis of the New Combined Firm

The acquisition of Cantest Ltd. allowed Maxxam Analytics to secure several new lines of business in 2010 that have increased both the sales scope and the product scope of the combined firm. As well, relationships with clients, staff, and the British Columbia Government Employees' Union (BCGEU) have changed because of the acquisition. Changes in lines of business have altered the risk profile of the firm, and added service offerings have generated opportunities for growth for staff members from both Maxxam and the former Cantest Ltd. These changes are relevant to an internal analysis of the firm and will be discussed in detail in this chapter.

In addition, academic theory on how firms learn and grow applies. One of the key distinctions in firm-level learning is whether a firm is being explorative or exploitative. Henri A. Schildt's 2005 defining paper on explorative and exploitative learning[15] indicates that during an acquisition, the intent, transparency, and receptivity of the parties involved are important influences on learning in relationships. Changes in the competitive environment also create a constant need to adapt and learn new skills. Yet, at the same time, an acquisition can shorten the time available to exploit previously built skills and capabilities. This time constraint forces the organization to strike a quick balance between maintaining stability and efficiency while adapting to rapid and unpredictable change associated with the newly acquired lines of business. The acquisition of Cantest Ltd. in 2010 forced Maxxam to adapt rapidly to new lines of business, maintain stability within current lines of business, cope with the unpredictable challenges of bringing on new clients, staff and laboratories, and, at the same time, maintain the efficiency of fast turn-around times required by demanding long-term clients.

To summarize the relevant ideas of Schildt's research, the less integrated the venture's governance mode, the more explorative the learning. In alliances and joint ventures, companies are likely to be less constrained by existing corporate agendas compared to acquisitions that integrate the venture closely into the corporation. According to Schildt's study, managers willing to maximize explorative learning should prefer alliances and joint ventures with unrelated companies. To balance exploration and exploitation, Schildt suggests maintaining a set of organizational activities, each of which contributes to a particular type of corporate renewal in the

[15] Schildt, H. et. al. (2005).

exploration-exploitation continuum. The acquisition of Cantest Ltd. brings these issues of learning to the forefront because both Cantest Ltd. and Maxxam Analytics operate in an industry where ongoing scientific learning and development is critical to business success and continuity. As well, not only do Cantest and Maxxam share identical clients, they also share similar operational processes and core values. According to academic literature, industry relatedness is negatively related to explorative learning, and thus, according to Schildt et al. (2005), Maxxam's acquisition of Cantest Ltd. would result in exploitative learning. As summarized in Table 3.1, Schildt's paper studies how different relationship characteristics relate to explorative or exploitative learning.

Table 3.1 Summary of Explorative and Exploitative Learning

Exploration Activities	Explorative Learning	Exploitation Activities	Exploitative Learning
Search, Variation, Risk Taking, Experimentation, Play, Flexibility, Discovery, Innovation	Explorative Learning emphasizes Learning by Generating Variation. Knowledge generated by exploration activities is distant from the existing knowledge of the firm	Refinement, Choice, Production, Efficiency, Selection, Implementation, Execution	Exploitative learning is a directed search emphasizing limiting variety and building closely on the existing knowledge base.
Factors affecting Explorative and Exploitative Learning: Inter-organizational learning, tech-relatedness, exploration, corporate venture capital, alliances, joint ventures, acquisitions, downstream vertical relatedness, patent scopes, previous citations to patents, and target patents.			

Source: Adapted from Schildt, Henri, A., 2005.

Maxxam has taken on both experimentation and risk-taking as exploration activities to help train its project management department. The company has also elected to partake in exploitation activities in implementing, selecting, and making its ecotoxicology, inorganic chemistry, and soil-preparation departments more efficient. These undertakings will be discussed in more detail later in this chapter.

3.1 Sales Scope of the New Firm

The sales scope of the new firm has increased considerably thanks to the newly acquired Cantest lines of business. Of particular importance are Maxxam's new forensic equine drug testing and food safety business lines. Both lines of business stand independently within the

company's structure and are not subject to significant operational interference from the larger, resource-intensive environmental line of business. Through this acquisition, Maxxam has gained considerable expertise in food chemistry. The newly acquired scope of testing services in the food chemistry domain is outlined in Table 3.2.

Table 3.2 Summary of Acquired Scope of Vitamin and Food Chemistry Testing Services Due to the Acquisition of Cantest Ltd.

Vitamin Testing		Basic Food Chemistry	
Vitamin A (IU /RE)	C (Ascorbic Acid)	Sugar Profile	Proteins
Vitamin B1 (Thiamine)	D (IU / 100g & mg / 100g)	Sugar Alcohols	Calcium
Vitamin B2 (Riboflavin)	E	Nutritional Labelling	Cholesterol
Vitamin B3 (Niacin) (IU & NE)	K	13 Core Nutrients	Saturated Fats (Trans)
Vitamin B5 (Panthothenic Acid)	Folic Acid	Calories	Fibre Sugars
Vitamin B6	Biotin	Fat	Iron
Vitamin B12		Sodium	Starch Solids
		Carbohydrates	Allergens

Source: Adapted from http://palcan.scc.ca/specs/pdf/43_e.pdf

Of particular interest to Maxxam is the protein analysis and carbohydrate analysis that can now be conducted within the firm to aid clients in the development of their nutritional labels. The multiple forms of proteins, carbohydrates and acids that are now subject to complementary analysis at Maxxam has grown to encompass specific types of proteins. The ability to test the inorganic elements within food, and complement that with fat, protein, and carbohydrate analysis, allows clients to obtain a comprehensive spectrum analysis of their food products. A select list of analyses now offered by Maxxam's Food Chemistry department for protein and carbohydrate analysis is presented in Table 3.3.

Table 3.3 Summary of Acquired Scope of Protein and Carbohydrate Chemistry Testing Services Due to the Acquisition of Cantest Ltd.

Proteins and Screening		Carbohydrates and Acids	
Allergens	Veterinary Drugs	Sugar Alcohols	Hexanal
Peanut Protein	Fatty Acid Profiles	Nutritional Labelling	Sorbic Acid
Milk Protein	Omega - 3	Fat	Benzoic Acid
Soy Protein	Omega - 6	Sodium	Viscosity
Gluten Protein	Mycotoxin Testing	Carbohydrates	BHA / BHT
Meat Protein	Aflatoxin	Proteins	Nitrite/ Nitrates
Egg Protein	Vomitoxin	Starch Solids	Acidity
Almond Protein	Zearalenone	Beef/ Pork/ Poultry	Chloride
Ash Residue	Ochratoxin	Ruminants	Iodine
Pesticide	Fumonisin	Rancidity	Iodine Value
Herbicide		Peroxide Values	Minerals (Metals)

Source: Adapted from http://palcan.scc.ca/specs/pdf/43_e.pdf

3.2 New Product Offerings as a Result of Acquisition

Maxxam's newest product offering in British Columbia is a simulated nutritional facts table that includes percent daily values. These tables demonstrate a client's ability to meet government-sanctioned metrics for nutritional value. This suite of products has strategic value to the firm because Maxxam is now able to create a list of potential "Nutrient Content Claims" to assist clients in marketing programs. This suite of products allows clients to select from multiple formats when choosing how to communicate the nutritional value of their food products to consumers.

Furthermore, because Maxxam is ISO/IEC 17025 certified and accredited by the SCC, it is now able to provide both Canadian and US "Nutrition Tables" directly from sample analysis conducted within the company. Maxxam can provide nutrient evaluation services and consultation services to help support products in development meet nutritional claims. Moreover, Maxxam is also able to offer clients a total label review. The company's scientific experts evaluate food packaging design and non-compliance with respect to regulations. They also review

regulatory citations and offer corrective action plans to help clients meet US Food and Drug regulations and Canadian Consumer Packaging regulations. In terms of tactics, this suite of products allows the company to provide nutritional labelling services across the country to a wide variety of food manufacturers, thus allowing for strategic growth of a new base of clientele.

Another exciting new product offering for Maxxam BC is known as Speciality Services. Housed in one of Maxxam's new facilities (the Beta Avenue facility), this suite of products is truly innovative and reflects the ingenuity and creativity of Maxxam's scientists. Comprised of 10 sub-products, the Specialty Services products are described in detail in Table 3.4. Together, these products combine to offer the pharmaceutical industry an interesting collaborative mix of tests that can be used during drug development throughout the various phases of clinical trials. Of particular importance are the stability testing products, trace impurity analysis products, and residual solvent testing products. Each of these key pieces of data is required for regulatory approval in most countries. Data of this strategic nature becomes an integral piece of the formal clinical trials held to bring patented drugs to worldwide markets. Like the nutritional analysis products, the suite of specialty services presents opportunities to attract additional new clients.

Table 3.4 Summary of Acquired Suite of Products for Maxxam Speciality Services (10 New Products)[16]

Name of the new Maxxam Product	Summary Description of the New Maxxam Product
Bioanalysis of Metallo-Drugs	Maxxam provides bioanalytical support and characterization of platinum based therapeutics such as cisplatin, carboplatin and oxaliplatin.
Biologics Analysis	Antifoam agents, divalent metal cation and impurities are often associated with the manufacturing and formulation process of biologics. Maxxam has developed a number of analytical procedures required for in-process monitoring as well as bulk and final product release testing.
USP Compendial Testing	Maxxam uses United States Pharmacopeia/ National Formulary (USP/NF) compendial testing methods for raw material and final product testing.
Ultra-Trace Elemental Analysis	Maxxam provides custom method development and elemental analysis services in a clean room environment to minimize sample-handling contamination.
Elemental Impurities	Maxxam offers heavy and other trace metals analysis in pharmaceutical drug products and dietary supplements of various types ranging from proteins and cytotoxic compounds to peptides and oligomers.
Leachable Stability Studies	Maxxam has accumulated expertise in designing studies and developing methods to measure extractables in short term stress tests or leachables in long-term stability studies.
Melamine Testing	Maxxam offers melamine testing for clients in the pharmaceuticals market who face the possibility of working with at-risk components.
Residual Solvent Testing	Maxxam utilizes state-of-the-art analytical instrumentation to identify, confirm and quantify residual solvents in pharmaceuticals.
Stability Testing	Maxxam's facilities are equipped with various stability chambers required for accelerated and long-term stability testing for active pharmaceutical ingredients and other test articles.
Trace Impurity Analysis	Trace impurities in active pharmaceutical ingredients and excipients originate from a number of sources such as manufacturing equipment, packaging and handing as well as from chemicals and reagents use in processing.

Source: Employee Interviews, Maxxam Analytics, May 2010.

[16] http://maxxam.ca/services/pharmaceutical-services/specialty-services

As can be seen from Table 3.4, Maxxam's sales scope and product scope are now strategically stronger. The diversity of products add breadth to Maxxam's service offerings and position the company to offer a variety of consultancy level engagements where project scientists are able to work with clients to help develop custom testing and monitoring programs encompassing multiple parameters and analyses. Such an increase in scope of services will naturally require an increase in the number of project managers staffed to manage ongoing projects.

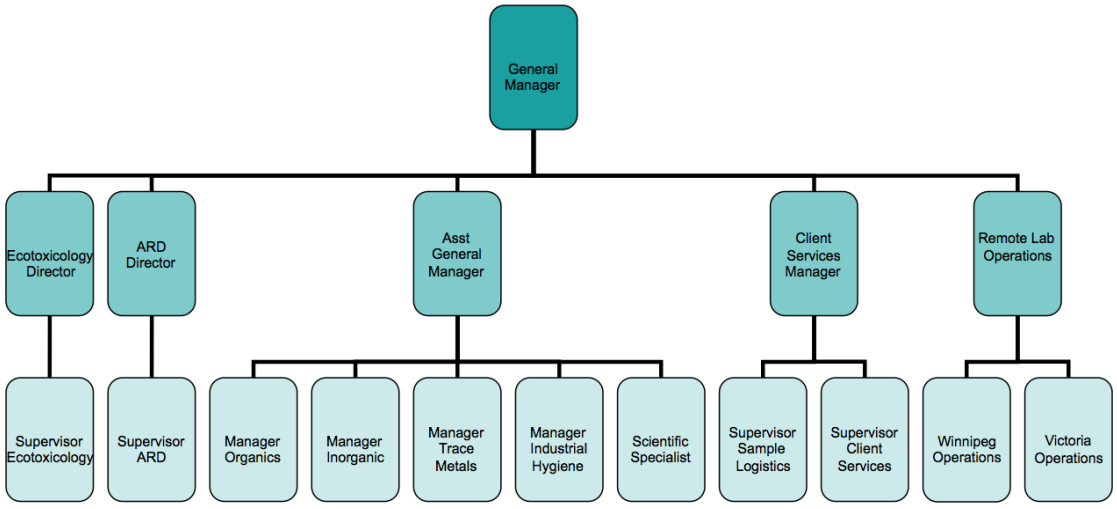
Lastly, a suite of products known as Organic Volatile Impurities, commonly referred to as residual solvents, is of strategic importance to Maxxam. This new suite of products incorporates analysis of trace level chemical residues that are by-products of manufacturing in drug substances and drug products. Maxxam is now able to utilize analytical instrumentation to identify, confirm and quantify residual solvents in pharmaceuticals, allowing for a strategic expansion into a new market. Maxxam scientists are able to consult with clients on how to develop projects and custom testing packages for their drug candidate of choice.

3.3 Management Structure and Decision Making in the New Environmental Business Unit

In 2010, as managers from Cantest's environmental line of business were amalgamated into Maxxam's new corporate structure, the management and decision making structure of Maxxam BC's new Environmental Business Unit was re-designed. The review and design process was conducted from February – April 2010, and involved creating divisions to house the company's new Acid Rock Drainage department, Ecotoxicology department, and Scientific Services department.

Furthermore, prior to 2010, a single individual within the company held scientific services responsibilities. Growth and a substantial increase in analysis volume necessitated that this set of responsibilities be spun-off into its own department. This newly formed department now serves as quality assurance scientific oversight for all data generated from Maxxam's laboratories in British Columbia. It should also be noted that prior to 2010, Maxxam BC did not have satellite operations in Victoria and Winnipeg. Newly acquired Cantest Ltd. laboratories now allow for the formation of synergistic relationships between Burnaby, Victoria, and Winnipeg. Analyses can be subcontracted to various locations as capacity, demand and planning dictate. Maxxam's new post-acquisition 2010 management structure is represented in Figure 3.1.

Figure 3.1 Environmental Laboratory Operations for Maxxam in British Columbia, 2010[17].



Source: Adapted from Corporate Template, Maxxam Analytics

While Maxxam's head office remains in Mississauga, Ontario, the organizational structure for Maxxam BC, illustrated above, oversees more than two hundred and fifty scientists and technicians working in British Columbia. A project management office composed of fourteen project managers and seven administration support staff complements the work of scientists, analysts, and technicians. An Information Technology department and Human Resources department also provide support services for staff at the multiple laboratories in BC. Under the current structure, the growth potential of remote laboratory operations will allow for increased capacity planning and an increase in the ability to serve remote regional client bases.

3.4 Risk Profile of the New Firm

Historically, the risk profile of Maxxam has been conservative. Capital purchases have been made only when necessary, and new ventures only occur after considerable research to ensure that the amalgamated line of business will be able to return a profit to the firm. The acquisition of Cantest Ltd. changed the risk profile of Maxxam in British Columbia on multiple fronts. The main risk of a firm taking on an acquisition of this size is the unfortunate reality that the focus of employees and senior management shifts (albeit temporarily) from an external focus on clients to an internal focus on their own operations and processes. The loss of focus on clients could be extremely costly in terms of future lost contracts and business potential. Maxxam shared many clients with Cantest Ltd., and, from the outset, the acquisition was designed to provide a

[17] Maxxam Analytics – Corporate Organizational Structure, Environmental Laboratory Operations 2010.

single unified voice to the customer while laboratories and lines of businesses were re-organized internally. This risk has also been mitigated effectively through a strong communications department that provided targeted and relevant messages to clients during the course of the acquisition. The mitigation of this risk was important because of the extreme competitive nature of the environmental analytical industry in British Columbia. Competitors were expecting Maxxam to fail, and, as Maxxam is the incumbent, were seeking to use the acquisition of Cantest as a legitimate excuse to steal business away from the firm on the grounds of an anticipated decrease in quality and service.

A second significant risk associated with the acquisition is a human resources risk. Acquisitions often result in employees feeling out-of-place in the new organization, or being unable to see the development of their career path within the larger organization. This is compounded by the fact that many team leaders and lab supervisors are in positions of authority because they are excellent chemists with technical skills. These individuals often do not possess the human resources training necessary to help guide the career paths of the employees who report to them. Mitigating the risk of the loss of talented employees will continue to be an ongoing agenda item for Maxxam Analytics in 2010.

3.5 Labour Relations and the BCGEU Union

Labour relations with the BCGEU present an interesting set of circumstances for Maxxam in 2010. In 2009, unionized staff worked at the Commerce Court facility. In 2010, unionized staff from the Commerce Court facility were relocated to the Canada Way facility and joined several non-union employees who performed similar work. In the environmental laboratory analysis industry, the labour force can be categorized as skilled and non-skilled. Of particular concern is the fact that the industry has a shortage of senior personnel with specific instrumentation experience simply because of the failure of universities to keep up with the pace of technological instrumentation change. A deficit of highly skilled analysts exists because colleges and universities do not teach the skills necessary to optimize analytical instrumentation. Since this knowledge is developed on the job, a skilled analyst with the ability to organize his or her own workload, to assist colleagues, and to service and troubleshoot instrumentation commands a relatively high salary.

In contrast, the industry also hires non-skilled and entry-level workers. This group of employees is composed of co-operative education students, new graduates, and entry-level technicians. These employees are easy to obtain but relatively transient in nature. The value to the

firm of this employee group increases with the scope of training provided. Training allows for the performance of increasingly complicated tasks within laboratories and, as such, this group of employees can be relied on in the event of absences and illnesses of skilled staff members. The BCGEU Union unionizes both skilled and non-skilled employees and raises the overall salary level slightly in comparison to non-unionized firms. A concern for Maxxam is their ability to attract talented senior level analysts with unique skill-sets. Because of the existence of salary windows established in the collective agreement, management is unable to offer compensation exceptions in unique cases where a prospective senior analyst's technical skill set may warrant offering a higher starting salary.

3.6 Developing and Training a New Generation at Maxxam

The amalgamation of Cantest's standard operating procedures with Maxxam's suite of procedures has provided several new learning opportunities for both former Cantest staff and Maxxam staff from various laboratory facilities. Laboratories at the head office in Burnaby now provide cross-training at the analyst, technician, and supervisor level. Moreover, a sub-supervisor position, known as a 'team leader', was created to foster stronger teams within the company and to develop more staff with supervisory training and skills. The team leader position allows individuals to obtain the skills necessary to accommodate division-wide succession planning for key leadership positions. Through this role, technically superior analysts can transition into positions with greater supervisory responsibility by learning how to manage a small group's workload, report back to senior managers and project managers, and serve as a scientific liaison for their team whenever a client has a technical question requiring procedural bench-level knowledge. The position allows for greater company-wide operational flexibility. The team leader often has the same access level privileges as the supervisor and can act as a back up in cases of emergency, vacation time-off, or illness of the supervisor.

3.6.1 Explorative Learning –How Experimentation Drives Learning

An excellent example of explorative learning came from the work of a colleague in the Project Management department. In March of 2010, a project manager was chosen by the department's supervisor to move to the new facility ahead of all other Maxxam project managers. Overall, the goal of this advanced move was to help facilitate the transition of Cantest's project management staff to MaxxLIMS, Maxxam's LIMS. Secondarily, it positioned this individual to answer questions one-on-one and to help facilitate explorative learning by allowing the Cantest

project managers to learn through experimentation, play, discovery, innovation and safe risk-taking. Creating this environment during the course of the acquisition allowed for flexibility in the learning process. The transition successfully trained Cantest's project management staff on 12 new LIM system modules. Table 3.5 lists the modules that were a part of this training. Within a month, each project manager was able to grasp the detailed operational intricacies of these modules and is now able to use these tools to help navigate their projects through any of Maxxam's multiple laboratories in the province.

Table 3.5 Case Review: Explorative Learning of Maxxam's Project Managers on Maxxam's Laboratory Information Management System – Key Modules of the LIMS

New Maxxam Module	New Skill Learned by a Cantest Project Manager
Shipreck	Provides Maxxam Project Managers with the ability to instruct shipping and receiving staff
Operations	Allows Maxxam Project Managers with the ability to track samples and summarize the status of projects to clients
Statchek	Provides Quality Assurance Data Overview of Maxxam Projects by allowing Scientific Services to Review Data
Job	Allows Maxxam Project Managers to manage job level details of the suite of Maxxam Products
Invoice	Billing and Invoicing System for Maxxam's Project Management and administration staff.
Client	Allows Maxxam Project Managers to manage global client level overviews via quotes, contact information, consultant relationships and communication preferences

The LIMS tools listed in Table 3.5 now serve to make each project managers' task of managing laboratory projects throughout the company more streamlined and effective. The modules also allow each of the former Cantest project managers to reach a greater level of efficiency in tracking samples across the company.

3.6.2 Exploitative Learning – Streamlining Operational Methods

Maxxam's decisions to move ecotoxicology work in house and to take advantage of Cantest's arrival-tracking system within the sample reception department were both strategic decisions made this year thanks to exploitative learning. Previously, ecotoxicology work was sub-

contracted to a local company in Vancouver, as Maxxam did not possess the expertise in house to conduct this suite of analyses. However, the acquisition allowed the new firm to exploit knowledge resident within Cantest and build on a knowledge base of ecotoxicology tests. The result is that the company now offers a full suite of streamlined ecotoxicology procedures using Maxxam's client services and quality assurance procedures. Maxxam now houses an Ecotoxicology department headed by a director with over 15 years of experience in the ecotoxicology industry.

Adopting and implementing Cantest's arrival tracking system was also strategic in nature. Prior to the acquisition, Maxxam used a non-searchable database that required the project manager to examine multiple pages of text in order to find out whether a client's samples had arrived at Maxxam. This system was adequate when there were only five project managers and the scope of analysis was small. With the acquisition of Cantest Ltd., the scope has increased considerably. There are now pressing customer service needs to ensure clients are reassured that their samples have arrived safely and are being logged in for analysis. Compounding this need for reassurance is a distrust of courier companies on the part of several clients. Clients will call Maxxam to ensure that various courier companies have not lost samples during transit. Cantest's solution to this problem was a searchable arrival database capable of tracking project identification numbers, chain of custody numbers, client information, and the date and time samples were received. This tool is extremely valuable for Maxxam's project management staff, and is now utilized in the department's workflow process for dealing with clients. To summarize, in both of the cases described above, exploitative learning has allowed for greater operational efficiency and has led to greater client satisfaction levels.

3.6.3 Changes in Learning Culture –How Business Drives Operations Management

One of the best examples of how learning culture has developed during the course of the acquisition comes from the Senior Director of Business Development for Maxxam. This is a story of how a project manager asked the right questions and, consequently, was able to get a test installed in the laboratory. For the sake of the example, we will use a test called the Free Cyanide test. Prior to Maxxam's acquisition, Cantest Ltd. did not conduct free cyanide analysis. After the acquisition, a client called a Cantest facility and requested 300 free cyanide analyses. The chemistry of this analysis requires the use of a unique chemically selective column along with an ion selective electrode. At the time, Cantest Ltd. did not own this particular column and was not prepared to conduct this analysis. However, rather than turning the client away entirely, the new

project manager contacted the Senior Director of Business Development hoping to obtain knowledge of an alternative laboratory capable of conducting the test for the client.

Rather than lose revenue, the Senior Director contacted the Inorganics Director and requested that Maxxam begin to perform this unique test. The Inorganics Director knew the firm did not perform this test, but was reminded by the Director of Business Development that 300 analyses justified the purchase of the unique column, and also justified the purchase of the relevant ion selective electrode required to perform this test. The Inorganics Director agreed, ordered the relevant hardware and supplies, and set operations in motion to conduct the analyses. Meanwhile, the Senior Director of Business Development contacted a rather surprised project manager and informed him that Maxxam was now able to perform the analysis. “How and what changed?” responded the Project Manager. The lesson in this case was that by securing the client’s business, Maxxam was able to alter internal operations within Cantest to enable an increase in its scope of analyses. As correctly identified by the Senior Director of Business Development, the economies of scale of performing 300 analyses justified the purchase of needed chemical and analytical testing equipment, and also presented a business case strong enough to convince laboratory operations to set up a new method for analysis.

3.7 Summary and Recommendations

Efficiencies of scale and product scope have increased at Maxxam as a result of the acquisition. Initiatives are also in place to facilitate cross-training of analytical procedures for employees. An analysis of the firm’s culture shows that both explorative and exploitative learning are in place, helping the firm take advantage of the creativity of its employees as well as capitalize on learned efficiencies and well-designed processes. However, a significant risk of employees leaving due to poor HR practices still needs to be mitigated. To alleviate this possibility, it is suggested that the firm provide human resources training for new team leaders and front-line supervisors responsible for laboratory employees. Soft-skills training would also aid supervisors to guide and help develop employees’ career paths.

4: Development of a Balanced Scorecard for the M&A Transaction

4.1 Use of Balanced Scorecards

The balanced scorecard is a performance measurement tool that is used to monitor a firm's performance against its strategic objectives for learning and growth. These objectives have been outlined in section 3.6. As a tool, the balanced scorecard measures four perspectives that are key to a company's success: a financial perspective, a customer perspective, an internal business perspective, and an innovation and learning perspective (Kaplan & Norton, 1991). Historically, most strategic frameworks adopted by companies have considered only financial measures (ratios, income statements, shareholder value) as strategically important. This narrow viewpoint has put companies at a disadvantage in terms of setting clear visions.

The balanced scorecard differentiates itself as a powerful tool by requiring that management evaluate the importance of softer perspectives, such as aligning with customer needs and having a successful employee-training program; ideas which are key to a modern company's success. As Kaplan states in his article, "the scorecard represents a fundamental change in the underlying assumptions about performance management" (Kaplan & Norton, 1991:79). The article notes that other systems that have attempted to develop into strategic management systems have had a financial starting point, and attempted to lock employees into a certain way of thinking and operating by having a "control bias" (Kaplan & Norton, 1991:79). The balanced scorecard does not have a "control bias" but instead requires management to take a multitude of different perspectives into account before making key decisions about a company's future.

4.1.1 The Value of a Balanced Scorecard in Relation to a Simple Balance Sheet

Historically, missing elements from previously developed tools include non-financial related perspectives, such as measuring customer related goals, and determining how learning takes place within the organization and how innovation is tracked and documented. However, these tools failed to show how to document for efficiencies within internal business processes or to assess how employees view the organization they work for, as well as a multitude of other perspectives not measurable from a balance sheet or cash flow statement.

There are several noteworthy advantages to the balanced scorecard. Perhaps most importantly, it allows management to envision a future for the company based on several perspectives. It provides a big picture projection in comparison to a simple balance sheet and cash flow statement ratio analysis. A company can obtain valuable insights not otherwise available via financial reporting measures by using the four key perspectives required in the scorecard assessment (Kaplan & Norton, 1991). The balanced scorecard connects the organization to strategy based on a theory called "Strategic Control Theory" (Wegmann, 2008). This theory describes how strategic choices affect the organization and the various components of strategic decision-making that affect the organization. The balanced scorecard approach is comprehensive because it provides "10-15 strategic objectives distributed among the four perspectives" and requires that "at least two indicators measure each strategic objective" (Wegmann, 2008: 24). In assessing the non-financial perspectives, an attempt is made to quantify each key indicator to facilitate management's decisions.

4.1.2 Criticisms of the Balanced Scorecard

Because the balanced scorecard approach asks management to define and measure metrics accurately and precisely, the tool is very useful for strategic planning (Wegmann, 2008). However, the disadvantages of balanced scorecard theory are many. Mintchikand and Blaskovich (2008) cite an example of how balanced scorecard reporting can be manipulated by middle management for personal financial profit when the scorecard is tied to bonus and incentive plans. It may be tempting for a new manager to alter key numbers in the scorecard so that he or she can gain a larger bonus by showing improved numbers in the following year (Mintchikand & Blaskovich, 2008). It is important to keep these shortcomings in mind when developing customized a balanced scorecard for a company.

Criticisms of combining the balanced scorecard with compensation and bonus plans are outlined in Chung-Jen Fu's paper on tampering with scorecards (Fu, 2008). Fu's article describes how agency theory and self-interested behaviours can severely skew nonfinancial measures in the balanced scorecard and cites six specific corollaries that he believes must be taken into account to set up a balanced scorecard in which non-financial measures cannot be tampered with for personal gain.

Table 4.1 Summary of Fu's Six Corollaries that must be taken into account when setting up a Balanced Scorecard

Corollary 1	Setting financial and multiple non-financial performance measures as the basis of compensation is only appropriate when a company has no market performance measure (such as a non-listing company or a non-profit organization)
Corollary 2	Additional signals are non-informative only for those companies the stock market performance provides a near-perfect measure of performance.
Corollary 3	For senior managers with much controlling power, the measure error of financial performance factors is relatively less. Therefore, the weight of financial measure for these senior managers should be higher. On the other hand, the middle-level managers have less controlling power, so the non-financial performance measure would reflect more effort they put to the organizations.
Corollary 4	With the different characteristic of department, the weights of non-financial performance measures should be different.
Corollary 5	When a company's BSC system is functioning well, the non-financial performance measure can be a good substitute for the market performance measure;
Corollary 6	An organization could consider the bonus stock plan if the efforts of executives or employees can not be well evaluated in the short-time, such as the R&D employees or managers of a new department.

Source: Adapted from Fu, 2008.

Moreover, Fu notes that it often is not easy to measure and document the non-financial components of the balanced scorecard (Fu, 2008). The difficulty of documenting key company information for use in a balanced scorecard is further emphasized in Paladino and Williams (2008). In particular, manual approaches often fail in accurately managing the data that populates a balanced scorecard's nonfinancial pieces (Paladino & Williams, 2008). Furthermore, the cost of accurately documenting, compiling, and summarizing the statistics required by a comprehensive balanced scorecard may be so prohibitive that a company may take shortcuts in compiling and reporting the data. Unreliable scorecard data and decisions based on poorly collected data both lead to poor strategy and visioning.

Despite these caveats, the balanced scorecard is a very powerful tool that can provide management with important insights missing from a balance sheet. However, management needs to be acutely aware that the data that go into the non-financial quadrants in a balanced scorecard can contain errors if an organization does not allocate sufficient resources to collect this data honestly and accurately. Decisions based on inaccurate data in the balanced scorecard can have negative organizational implications, including non-performing change management programs, loss of employee morale, and inefficient training systems.

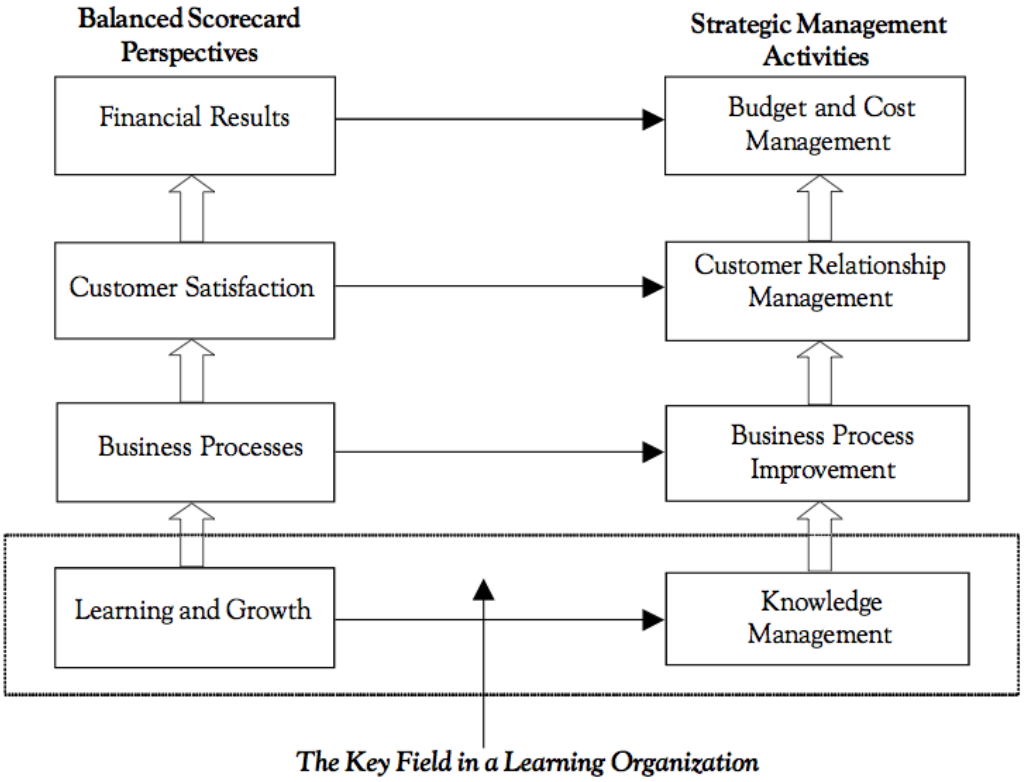
4.1.3 Summary of the use of a Balanced Scorecard

The four-quadrant perspective provided by the balanced scorecard is an excellent tool to help management see the bigger picture as it plans a company's future. As well, it allows for ideas not contained in a balance sheet and cash flow statement to influence managerial decision making. Keeping a sharper eye on the bigger picture will serve as a distinguishing strategic advantage for the future of any company.

4.2 Using Learning and Growth to Design Scorecard Criteria – The Development of Interview Questions for Maxxam

This project focuses on the linkages between balanced scorecard perspectives and the strategic management activities that involve inclusion, innovation, creativity, and employee support. Figure 4.1 illustrates the linkages between the activities tracked on a balanced scorecard and the strategic management activities that drive genuine company growth. Of importance is a key field in a learning organization: the ability of the organization to sustain the learning and growth of its employees by employing knowledge management programs and programs that support the growth and development of new knowledge through targeted and recorded employee activities. The acquisition of Cantest Ltd. required staff from the acquired company to undergo a training process whereby culture, software and procedures were re-learned. In order to use new software that is required in day-to-day Maxxam laboratory operations (i.e. the MaxxLIMS), an acculturation process was first required. Technical details could be mastered only after new employees became intimately familiar with the operational rhythms of the new processes. Employees' feelings with respect to the capability of in-house training programs are very important to ensure that employees feel nurtured and have a sense of purpose and career direction. Metrics involved in measuring these feelings are described in Section 4.3.

Figure 4.1 *Diagram of the Linkages Between Balanced Scorecard Perspectives and Strategic Management Activities*



Source: Adapted from the Balanced Scorecard Institute[18]

This paper focuses on the balanced scorecard measures of learning and growth. The other three processes (business processes, customer satisfaction, and financial results) are currently adequately addressed at Maxxam Analytics through financial systems and customer satisfaction surveys. Senior management at Maxxam will integrate the four perspectives. The considerations involved in this integration exercise will not be discussed in this project for confidentiality reasons.

[18] http://www.balancedscorecard.org

4.3 Data Collection Techniques and Research Planning

The primary research goal of this project is the measurement of the learning and growth of Maxxam's employees during the course of a company's transition to new facilities and the use of new systems and procedures due to the acquisition of Cantest Ltd. The learning and growth section of the balanced scorecard, illustrated in Figure 4.1, demonstrates the connection between learning, growth, and business strategy. This paper explores the relationship between (1.) employees' feelings of positivity in relation to the acquisition of Cantest Ltd., and (2.) Maxxam's ability to strategically innovate and provide creative career opportunities to staff from both legacy organizations. The research consists of seven one-on-one interviews followed by a written analysis completed by each interviewee. Standardized lists of questions used in the seven interviews are presented in appendix A.

4.3.1 Data Collection Methods

Given that the combined organization now employs close to four hundred individuals, the selection process for interview candidate identification enlisted the help of the most senior individual at Maxxam BC, the General Manager of the organization's provincial operations. Striking a balance between legacy Cantest individuals and Maxxam individuals was also of key importance in obtaining a reliable set of data from the interviews. Ultimately, the data set for this project was drawn from seven key individuals selected across the organization. The employees' roles at Maxxam Analytics and their designation of legacy organization membership are listed in Table 4.2.

Table 4.2 Selection of Interview Candidates at Maxxam Analytics, May 2010

Interview Candidate's Role at Maxxam	Legacy Organization Membership
Laboratory Manager – Metals Analysis Department	Legacy Cantest Employee- Canada Way Location
Laboratory Manager – Organics Analysis Department	Legacy Maxxam Employee- Commerce Court Location
Human Resources Manager	Legacy Cantest Employee- Canada Way Location
Project Manager	Legacy Maxxam Employee- Commerce Court Location
Analyst	Legacy Cantest Employee- Canada Way Location
Regional Sales Manager	Legacy Maxxam Employee- Commerce Court Location

As can be seen from Table 4.2, it was of key importance to select individuals who represented the senior level of management as well as the laboratory operations managers, project managers, and analyst levels. To minimize selection bias introduced into the samples, candidates were selected from: (1) Analyst Level, (2) Project Manager Level (3) Laboratory Manager Level, and (4) Senior Manager level. All individuals were solicited by selective invitation. Furthermore, to secure a breadth of perspectives, it was important to balance the legacy location in which the employee had worked. After review with Maxxam's senior management, it was decided to combine informal interviews with a set of formalized written-response questions in order to introduce a high level of consistency in candidate response. This also created an opportunity to quantify opinions related to innovation, company culture, and perceived level of employee support. A seven-point scale was used to quantify results between employees.

4.4 Data Analysis

Data analysis was conducted to obtain radar plots of each of the interview candidates with respect to their opinion on each of the four key metrics required on the balanced scorecard highlighted in Figure 4.1. The radar plots quantitatively summarize the following four indicators of learning and growth: (1) learning and growth in the combined firm, (2) overall opinion of Maxxam's acquisition of Cantest Ltd., (3) innovative capacity of the combined firm, and (4) strength of the combined firm. Individual radar plots are presented in appendices B-H.

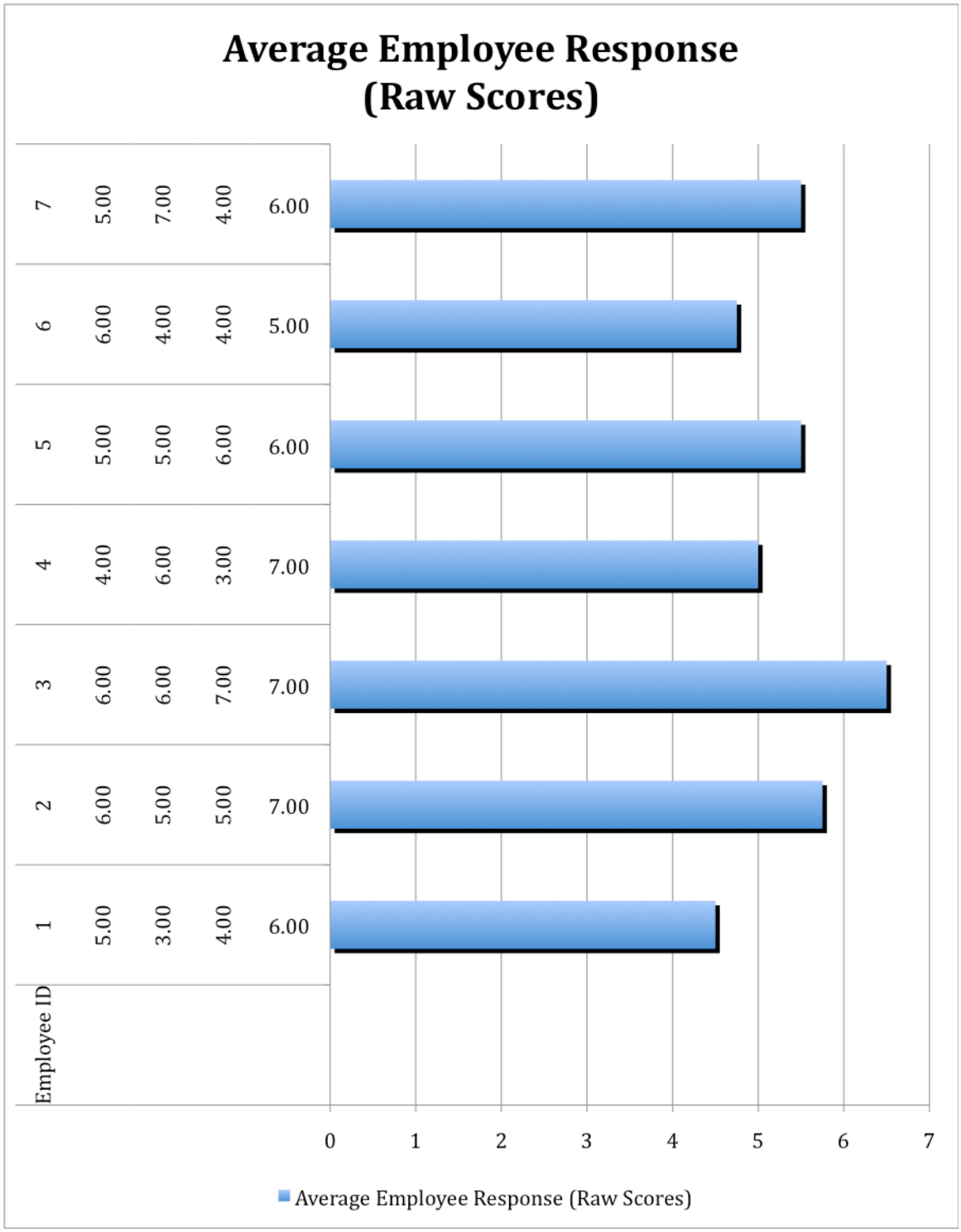
4.4.1 Data Analysis Methods

Data analysis generated graphical summaries of the seven-point scale used in questions 1, 3, 4 and 5. Questions 2, 6, and 7 are qualitative and seek open-ended opinions summarized in appendices B-H. Descriptive statistics such as frequency counts, descriptive statistics (mean, standard deviation, median), normality, and associations (correlations, scatter plots) are used to illustrate the overall score for each employee. Radar plots have been provided to summarize the data, and individual responses to the interview questions are presented in Appendices B-H.

4.5 Results

As can be seen from Figure 4.2, results from each of the seven interviews proved to be quite positive with respect to the future strength of Maxxam Analytics. The average response rating was 5.36/7.00, indicating a positive outlook on the future of the company when polling for innovation, learning, growth, and future potential. Figure 4.2 illustrates the relative differences between candidate responses on each of four key quantitative responses: (1) experience with acquisition, (2) opportunities for individual learning and growth, (3) innovative culture of post-acquisition organization, and (4) overall feeling towards post-acquisition organization. The vertical numbers in Figure 4.2 indicate the raw score for each of the four questions provided to each of the seven employees interviewed.

Figure 4.2 *Average Maxxam Employee Responses to Quantitative Interview Questions, Collected over In-Person Interviews Taken Post-Acquisition May-June 2010.*



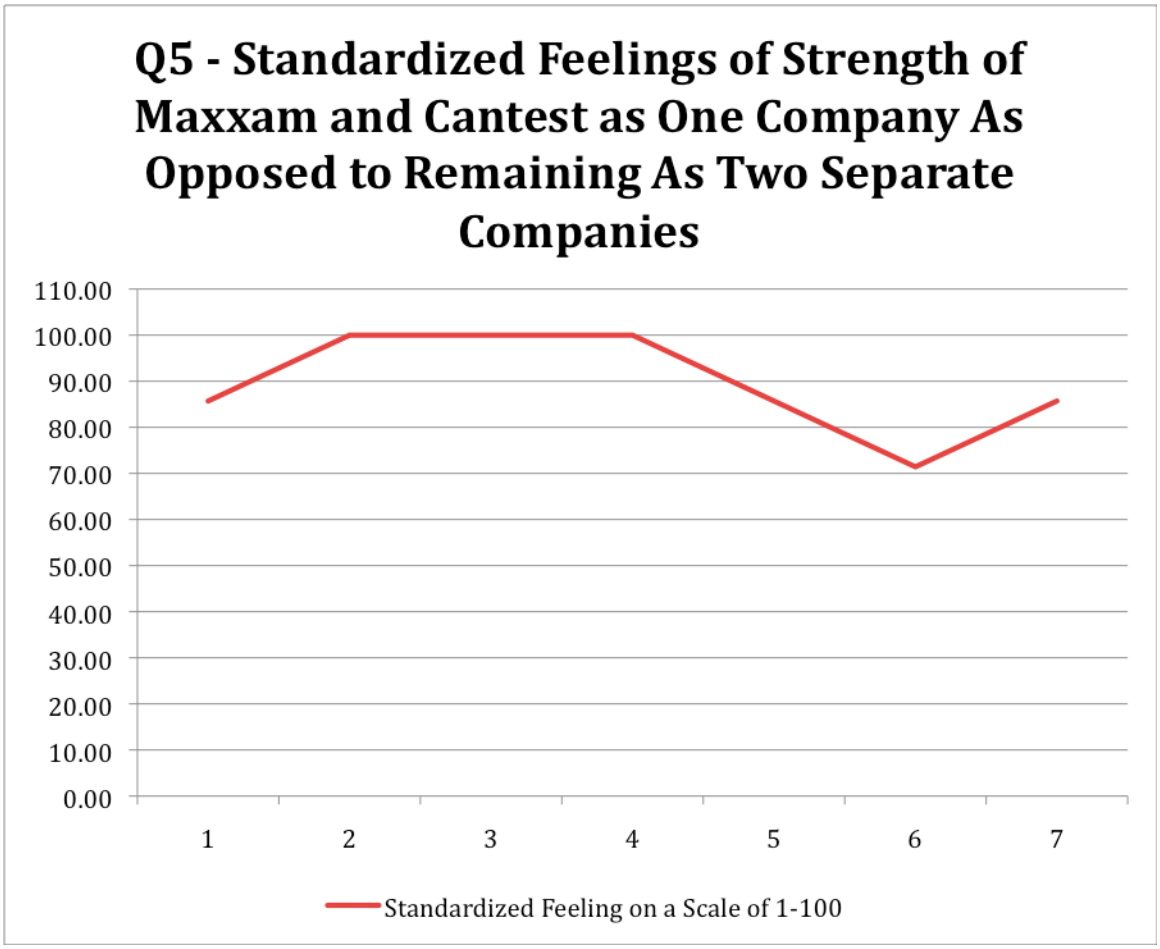
As can be seen from Figure 4.2, on a scale of 1-7, average employee response has a mean of 5.36 and a median of 5.30. The highest average response was 6.50 and the lowest average response

was 4.50. The median average response was 5.50. Detailed radar plots in appendices B-H highlight individual employee differences on each of the four responses.

4.6 Synergies and Best Practices

For all of the candidates interviewed, there appears a common theme: the overall strength of the company as integration efforts near completion. The highest response to any question during the interviews was to Question 5 (Standardized feelings of the strength of Maxxam and Cantest as one company as opposed to remaining as two separate companies). In their written responses, each candidate identified multiple benefits of the combined entity and was able to identify numerous synergies and best practices that could be implemented immediately within their own scope of work. All seven of the interviewees revealed procedural best practices; ideas that would improve laboratory efficiency and streamline operations.

Figure 4.3 *Summary of Responses to Interview Question 5 - Standardized Feelings of Strength of Maxxam and Cantest as one Company as Opposed to Remaining as Two Separate Companies.*



Source: One-On-One Employee Interviews, Maxxam Analytics, conducted June 2010.

The key message from interview candidates was that the merger of Maxxam and Cantest provided a fantastic learning opportunity to employees. Interviewees described elements of this opportunity as including exposure to a broader area of expertise, association with people from diverse backgrounds, the development of new work groups, and the acquisition of new technical skills. Furthermore, staff opinion showed that due to the merger, project managers could service clients better because of the larger variety of analytical tests that could now be packaged for clients.

All seven interviewed employees also believed that they grew immensely as a result of the merger by being asked to provide customer service training on MaxxLIMS and by helping to train former Cantest staff on MaxxLIMS and day-to-day operations prior to the merger. It was

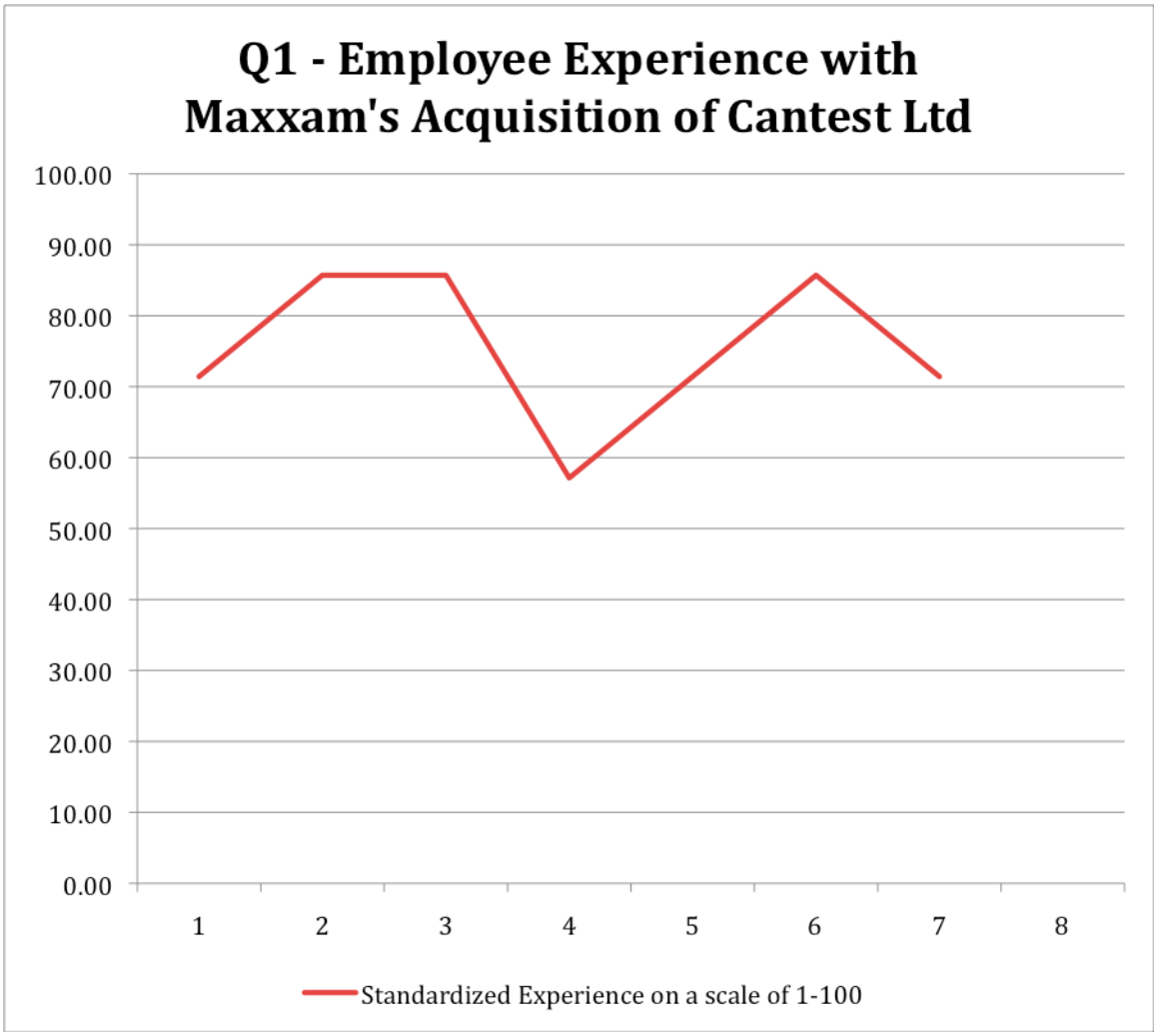
identified that the integration process helped reinforce existing knowledge and presented new opportunities by helping build lasting work relationships with new colleagues. The integration process was mapped out on a company website for all employees, and the company was systematic in keeping employees informed during the course of the integration. The company correctly identified the need for constant and consistent communication as a key requirement for a successful integration. This awareness will be key to the success of Maxxam's next M&A transaction.

As a result of successful integration, employees have been able to better communicate with clients, improve conflict resolution skills, and establish more and better relationships with lab staff. In many different ways, the merger also forced the project management group out of their comfort zone. Consequently, they realized new strengths. Generally, the interview candidates expressed gratitude for the new knowledge Maxxam was providing. Interviewees noted that, while the merger generally presented a fantastic learning opportunity, very little training was actually provided by superiors. A key concern was that managers were too busy to provide training. The large scope of work and level of responsibilities at the senior manager level were identified as a concern. Potentially this situation could cause senior managers to burn out, resulting in a cascade of problems as staff shifted to re-align responsibilities. Although the interviewees felt that they were able to provide training, it was also noted that their own growth was limited by a lack of available time with supervisors. This identified concern will be addressed in more detail in Chapter 5.

4.7 Summary and Recommendations

Based on the employee interviews, Maxxam's acquisition of Cantest Ltd. was generally regarded as a successful experience with respect to employees across the organization. The summary of responses to interview question 1 (Employee experience with Maxxam's acquisition of Cantest Ltd.) indicated a positive correlation between career growth and the acquisition. Seventy-four percent of interviewed employees rated their own experience as highly positive. Several candidates used the majority of the interview time to provide recommendations on how the company could move forward once the integration phases were completed.

Figure 4.4 *Summary of Responses to Interview Question 1 – Employee Experience with Maxxam's Acquisition of Cantest Ltd.*



Source: One-On-One Employee Interviews, Maxxam Analytics, conducted June 2010.

After completion of the quantitative portion of the interview questionnaire, several employees proceeded to provide recommendations to the firm. The recommendations, summarized in Table 4.3, will be discussed in greater depth in Chapter 5.

Table 4.3 Recommendations for the New Combined Firm from Maxxam Employees and Ranked In Order of Importance by Project Managers

Recommendations for the new combined firm from Maxxam Employees
Differentiation of Clientele Base into new industries (targeted expansion of client bases in mining and food safety).
Development of a centralized training budget with direct access to corporate funding for managers needing to train employees on technical concepts and operations. Funding for a training coordinator in Maxxam British Columbia to facilitate orientation seminars for new employees.
Addition of staffing and resource allocation for centralized storage for metals samples – allowing for the removal of all completed samples to shipping depots across British Columbia to help access clientele bases in remote portions of the province.
Development of a Succession Plan linked to Maxxam's Strategic Plan
Introduction of human resources processes to ensure advancement is done on merit alone, and not on seniority. The idea here is to design processes so that aptitude facilitates quick advancement and helps combat any stagnancy implicit within a unionized environment.
Executive level training for senior managers, including employee coaching skills training, and employee relationship facilitation / conflict resolution training.
The strategic use of the speciality services department to explore and support new markets for the environmental division.
Design and resource allocation for centralized storage for metals samples – allowing for the development of a separate storage area for the metals department.
Adaptation of MaxxLIMS system throughout Ecotoxicology and Acid Rock Drainage Departments.
Meet and Greets in the downstairs lunch room with appetizers/drinks to increase employee-relationship building and socialization between former Commerce Court and former-Cantest employees, and Meet and Greets at Beta (Rix Forum) to increase employee-relationship building between Canada Way and Beta employees.

5: Balanced Scorecard Review of Maxxam Analytics

This chapter will review the qualitative findings derived from the interviews. It will focus on learning and growth but will also include discussions of other key concerns that arose during interviews with employees. Specifically, Chapter 5 will include a sample of interviewees' significant responses regarding new lines of business, acquisition synergies and innovation, and operational logistics. Sample employee responses regarding financial metrics, the development of an intellectual capital scorecard and the effect of acquisition synergies on employees are also included.

5.1 New Lines of Business and the Customer

A review of the responses to Question 4 (Standardized feelings of Maxxam's innovation potential) identified the mining industry and the food safety industry as two new customer bases that Maxxam should explore in British Columbia. Mining is believed to offer the greatest source of revenue gains for the firm. The BC mining sector currently contributes over $8 billion to the provincial economy, and, supported by demand for minerals and metals from emerging economies such as China and India, the long-term forecast for this industry is extremely strong. Over twenty mining projects are currently in the environmental review process in British Columbia, with several more planned for development in the next decade (Rock On, PWC Report, 2009). Appendices I and J summarize a list of target mines that Maxxam Analytics can approach to provide future metals and inorganic water analysis. One of the recommendations suggested by a Maxxam employee was to strategically allocate resources for shipping depots in Northern British Columbia. This would facilitate quick and efficient sample transport to Burnaby. Shipping depots would be an added selling feature to mines in Northern British Columbia that often have no alternative but to air-ship samples to Vancouver for analysis.

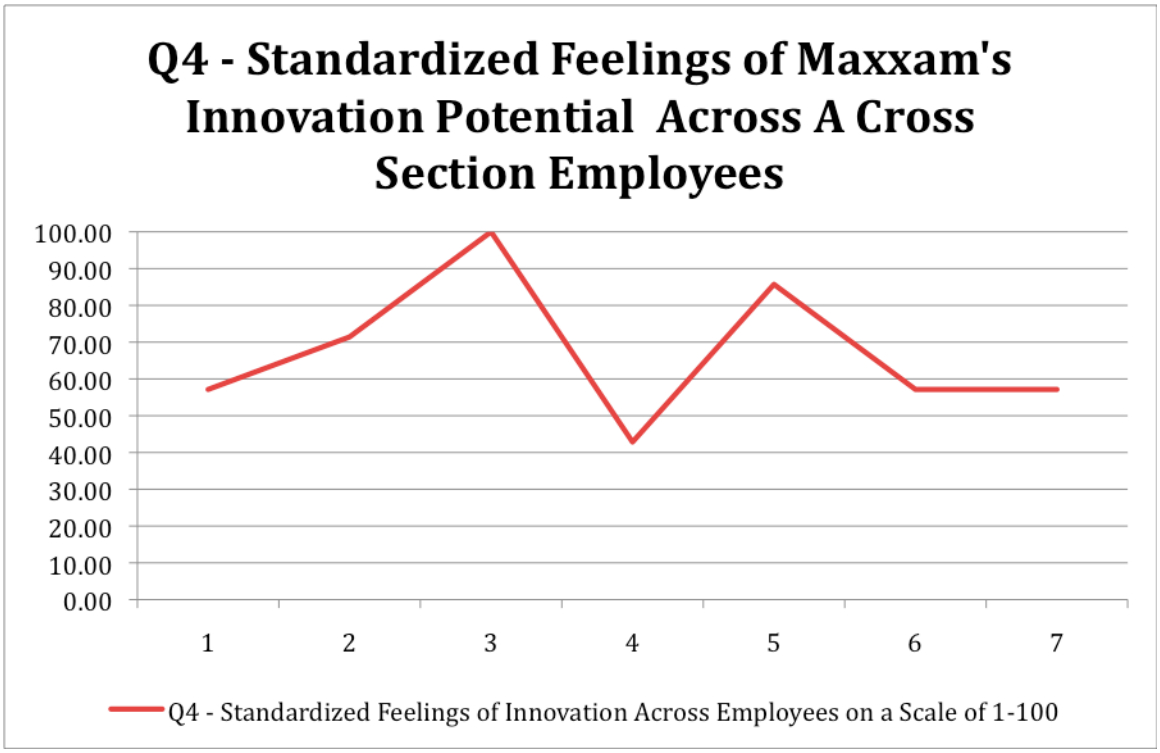
The second industry identified during employee interviews was the food safety industry. In this regard, Maxxam's contract with the Canadian Food Inspection Agency can be further explored as methods utilized for analysis potentially could be of interest to other companies in the industry. Given the customized nature of Maxxam's analytical methods within this line of business, utilizing the methods for multiple clients would yield greater economies of scale.

5.2 How Acquisition Synergies Affect Innovation

Acquisition synergies positively affect innovation in many respects. One of the best examples of resulting innovation at Maxxam, identified during an employee interview, was potential improvement to the LIMS. Project managers from Maxxam, who learned Cantest's "old" LINKS system and sample management process, were able to better identify improvements to the Maxxam LIMS because of the ability to see it from a new perspective. This was most notable with regard to Shiprec, Maxxam's shipping and receiving module. Recommendations are currently being collected in the Project Management Office to improve this module. Improvement ideas were generated by new project managers who identified weaknesses through a comparison with the operational abilities of Cantest's shipping and receiving systems. After collecting these recommendations, the Project Management Supervisor will present developers in the IT department with a list of changes that will successfully improve Maxxam's LIMS' shipping module.

Innovation potential was perceived to have increased due to the acquisition of Cantest Ltd. During interviews, employees noted that the ability of the company to decrease sample analysis times, increase sample extraction-time efficiencies, and troubleshoot instrumentation issues all increased because of the acquisition of talented new staff members. It was identified that analyst level cross-training was needed in order to capture this innovation potential more effectively. Several employees noted that the ability to change procedures and protocols required the concerted efforts of staff from the Quality Assurance Unit, analysts from the former Commerce Court and Canada Way facilities, and authorization from laboratory managers.

Figure 5.1 *Summary of Responses to Interview Question 4 – Standardized Feelings of Maxxam's Innovation Potential Across a Cross Section of Employee Groups.*



Source: One-On-One Employee Interviews, Maxxam Analytics, conducted June 2010.

As can be seen from Figure 5.1, the summary of responses from Question 4, yielded very positive feelings from multiple employee groups. Employees identified Maxxam as having a much stronger presence in the region, with the ability to attract capital, resources and talented employees to help facilitate innovation within multiple laboratories.

Also mentioned during employee interviews was Maxxam's ability to utilize newly acquired laboratories in Victoria to help secure additional regional clients on Vancouver Island. The potential for these satellite laboratories to innovate laboratory processes and methods that are applicable at certain effiency scales was also brought up. An interviewee pointed out that what may work well at head office may not work as well at a satellite laboratory location. He suggested that Maxxam would be wise to facilitate and encourage each satellite location to develop its own unique culture and to help each satellite location identify its own strengths in terms of production processes and method development. The possibility that an imposition of any head-office culture on satellite locations might be met with resistance was discussed. It was acknowledged that this could impede the innovation potential that these locations would be able to tap into if allowed to

operate relatively independently. The recommendation from employees was to help satellite laboratories create their own unique operations culture and to facilitate the transfer of resources and information when identified as a need by the individual satellite laboratory.

5.3 How Acquisition Synergies Affect Operational Logistics and Financial Metrics

In the opinion of the Maxxam employees surveyed, post-acquisition operational logistics have significantly improved at the Canada Way facility as evidenced by the positive scores on all employee interviews for a wide variety of metrics, as well as qualitative commentary. Of particular note are economies of scale for laboratory analyses, which have greatly improved due to capacity and operational efficiency increases in the Organics department. Efficient use of solvents, laboratory reagents, and consumables all now aid in a stronger contribution margin. Moreover, while employees brought up workload backlogs as a point of concern, plans are in place to reduce backlogs. Plans are also in place to increase instrumentation capacity and make fume-hood usage as efficient as possible.

A discussion of balanced scorecard theory would not be complete without mentioning the importance of the financial and operational arms of a scorecard. Maxxam does an effective job of tracking incremental progress on both the financial and operational logistics arms. As illustrated in the interview data, an improvement in operational logistics directly contributes to the financial bottom line by facilitating savings in laboratory consumables, chemicals, employee time, and analytical instrumentation run-time. Maxxam has Six-Sigma[19] projects in place nationally to ensure these two arms of the balanced scorecard continue to develop effectively. As well, a national bonus structure is in place to reward employees financially for developing innovative techniques that enhance the company's financial position.

5.4 How Acquisition Synergies Affect Learning and Growth

Maxxam employees identified learning and growth as being toughest to measure quantitatively. The interviewees correctly identified the increase in learning through opportunities for staff training, but also recognized a gap in leadership. As mentioned in Section 4.6, employees

[19] Six Sigma is a business management strategy originally developed by Motorola, USA in 1981. The strategy seeks to improve the quality of process outputs by identifying and removing the causes of defects (errors) and minimizing variability in manufacturing and business processes (Adams, 2003).

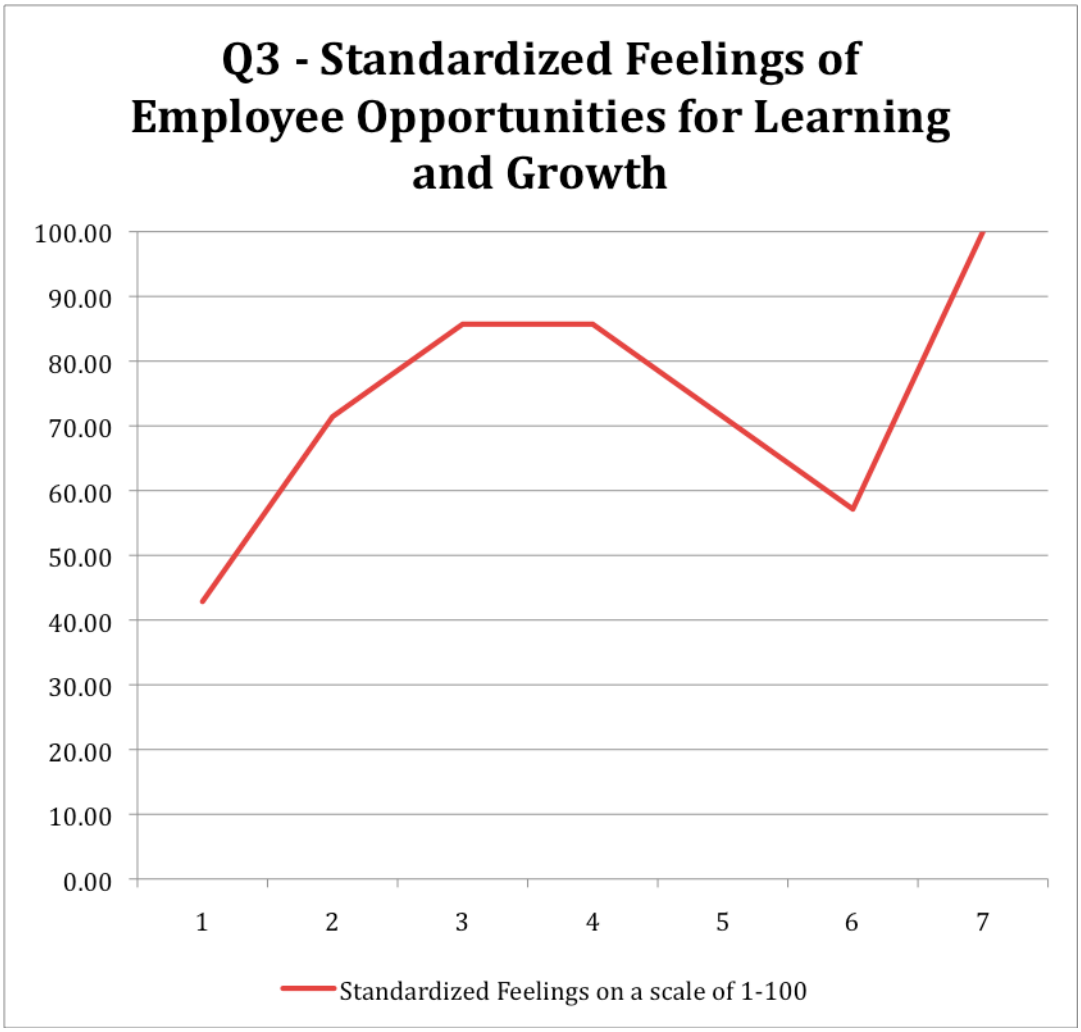
noted that supervisors often did not have enough time or the human resources skill to provide adequate guidance. This skill gap will be further addressed in Section 5.6, with a specific focus on the need for succession planning.

The primary focus of this project is the learning and growth portion of the balanced scorecard. All seven employees interviewed at Maxxam noted that their personal growth had improved because of the acquisition. One employee mentioned that a sense of optimism exists now that was not present prior to the acquisition. There is a general belief that, as post-integration activities end, a unified culture will develop with stronger teaching tools, cross-training programs, and one-on-one analyst education. Employees, who had had an opportunity to examine technician-level training programs, noted the strength of Maxxam's quality assurance system. This system includes a component that tracks the training records of technicians as they progress through a series of training exercises to master larger suites of extractions. Employees, new to Maxxam's Quality System Software (QSi[20]), have commended its paperless document control abilities. Also noted was its ability to streamline technician and analyst level training opportunities by sending alerts via the Microsoft Outlook email system.

Interview data shows that there is a large degree of variety in employee responses to Question 3 (Standardized feelings of employee opportunities for learning and growth). The extent of this variety is best explained by the general feeling that the company culture is changing slowly but extensively. In the post-acquisition environment, every day presents new learning opportunities. Entire operation systems and lines of business are changing. An individual, who previously may have stuck to a single analysis or extraction technique, now has opportunities to cross train within larger departments and work with individuals who expertise in a variety of scientific domains. Such learning opportunities were not possible with the old Cantest because a chronic shortage of qualified analysts required every trained analyst to work at maximum capacity to meet production demands. This employee shortage left minimal time for cross-training opportunities, and even less time for exploratory learning. As can be seen below in Figure 5.2, post-acquisition sentiment towards opportunities for learning and growth are high. The consensus among interview candidates indicates optimism across all departments and divisions polled.

[20] http://www.ibs-us.com/en/products/qsi_systems/index.html

Figure 5.2 *Summary of Responses to Interview Question 3 – Standardized Feelings of Employee Opportunities for Learning and Growth.*



Source: One-On-One Employee Interviews, Maxxam Analytics, conducted June 2010.

One of the interview candidates pointed out that the consolidation of chemists from the former Cantest and Commerce Court facilities at the Canada Way facility has resulted in a positive situation. Analysts and technicians are now benefiting from acquiring knowledge across different platforms and systems. The one-on-one discussion with this analyst provided key insight into the synergistic benefits of acquisition. This employee was able to learn MaxxLIMS within two months of the acquisition. Consequently, he was able to help transfer the positive aspects of LINKS, Cantest's legacy system, to the operational techniques that Maxxam put in place upon acquisition. This allowed his department to develop best practices from both legacy organizations. Moving forward, this department now benefits from having the software

efficiencies of MaxxLIMS and the ease of operations that employees had grown accustomed to with LINKS. As the employee described it, what the group was developing was more than a set of “work-arounds” but an entirely new set of hybrid processes that combined the best of what was offered in MaxxLIMS with the strongest legacy techniques. A high level of innovation was possible because employees took the time to learn what Maxxam’s operational systems were capable of achieving but did not abandon what previously had been operating well at Cantest Ltd.

In summary, the true synergistic benefit of acquisition comes not only from the realization of operational efficiencies of scale but in the nurtured growth of a strong, unified culture and the development of processes that build on older processes from both acquiring and target organizations. The investment of time and development assistance to enable analysts to review methods and processes, and create hybrid processes, which take advantage of both Maxxam and legacy Cantest laboratory methodologies and techniques, will undoubtedly yield both intangible and financial benefits to the firm.

5.5 Recommendation to Develop an Intellectual Capital Scorecard at Maxxam

After discussion with many Maxxam employees, it was determined that the balanced scorecard lacked many qualities highly valued by Maxxam’s employees. Of these, the top attribute mentioned was the idea of intellectual capital, or employee “know-how”. The employees expressed concern that Maxxam’s processes do not adequately measure or track the accumulation and scope of intellectual capital. The notion of an intellectual capital scorecard is a relatively new concept (Mouritsen, 2005). The balanced scorecard builds on competitive strategy (Porter, 1980) and is consistent with the industry and competitive analysis articulated in several of Michael Porter’s corporate strategy books (Kaplan and Norton, 1996b: 37). In contrast, intellectual capital scorecards are oriented towards competency-based strategy (Mouritsen, 2005) that generates value through knowledge, skills, talents and employee “know-how”. As illustrated in Table 5.1, there are several key differences between a balanced scorecard and an intellectual capital scorecard; however, the most important practical difference for Maxxam is how corporate strategy is directed by the information obtained from the two different scorecards. The balanced scorecard and the intellectual capital scorecard are not mutually exclusive. Both tools contain valuable information necessary to Maxxam’s ongoing strategy development. The recommendation here is to develop both scorecards in unison, and to use the information gathered

by these tools as one resource to help guide Maxxam's strategy development and budgeting processes.

Table 5.1 Key Differences between a Balanced Scorecard and an Intellectual Capital Scorecard

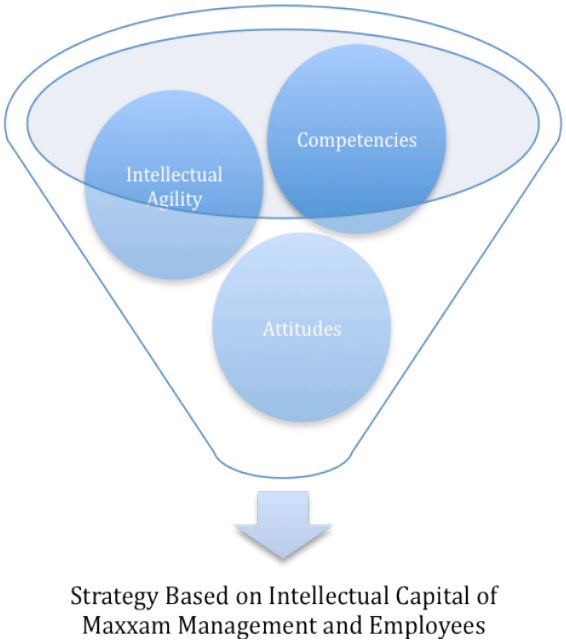
Difference	**Balanced Scorecard**	**Intellectual Capital Scorecard**
What is the central strategic management task?	Seeks to position the firm in the market and to construct the value chain	Seeks To build an organization that can develop products and meet customer needs which have not yet been recognized
What is the management responsible for?	Management controls the firm through the design of the value chain. Focus is on controlling pricing and production costs	Management controls the firm by supporting their own and employees' creativity and motivation and build collective assets that are combined and made to co-operate
How are competencies defined?	Competence is skill that is designed to fit current customers' demand	Competence is an organizational strength that shows up in any combination of markets and customers
How is competence developed?	Competence is necessary to fit people and internal processes to each other	Competence development is necessary to strengthen the realization of the ambition found in the knowledge narrative
What organizational and management effects are at play?	Through analytical considerations, management determines where the organization has to perform well. These considerations are translated to each and every individual through a series of personal scorecards	Management decides on knowledge, capabilities and competencies in which the company wishes to excel in the future. The translation into practice involves a large group of employees

Source: Adapted from Mouritsen, 2005.

Since the two tools measure and track organizational and management processes differently, the recommendation from Maxxam's employees was to develop a tool based on an intellectual capital scorecard that the firm can use to continuously build and develop collective

employee assets. This is coherent as building diverse scientific competencies is already a major part of Maxxam's strategy development. An additional recommendation was to add metrics for intellectual agility and attitudes that measure employee performance levels and can be used to help drive firm-level progress. Figure 5.3 illustrates how the development of an intellectual capital scorecard would change how Maxxam guides the development of firm-level strategy by formally measuring the attitudes and competencies of employees. It also incorporates a measure of employee intellectual agility.

Figure 5.3 Strategy Development for an Intellectual Capital Scorecard at Maxxam.



Source: Developed as a Result of Employee Interviews, Maxxam Analytics, June, 2010.

5.6 The Effect of Acquisition Synergies on Employees

Interview data shows that acquisition synergies have had a very positive overall effect on Maxxam's employee base. As illustrated by a company manager, formerly employed at Cantest, one of the best learning opportunities came from seeing the two companies' cultures coalescing after only six months into the acquisition. In the beginning, Cantest employees expressed a lot of uncertainty. Employees were unsure if they want to be part of Maxxam. As the interviewee's comments illustrated, employees are now becoming aware that there are no significant cultural differences between the two firms. Systems and processes may be slightly different. As well, the

overall human resources policies and group benefits are better at Maxxam than at Cantest. However, Maxxam's vision and values are similar to Cantest's.

5.6.1 Employee Training Programs

During the interviews, numerous employees brought forward ideas to improve Maxxam's employee training programs. Training programs are currently in place at both the technician and analyst level, and improvements to these training programs were discussed with multiple employees. In this regard, the recommendation from employees was to allow for incremental growth in a direction primarily determined by the employee. A related suggestion was to tie incentives (formal evaluation programs and bonuses) to individual milestones established by the employee and the manager. It was also recommended that a team leader participate in goal setting for both technician and analyst level employees to facilitate the development of the team leader's supervisory skills. During the interviews, it was suggested that Maxxam needs to create and implement an incentive system that recognizes small steps that indicate progress toward larger personal goals. The reasoning behind this suggestion recognized that during a culture shift of this scale, when faced with high workloads and the pressure of daily production requirements, an employee could often lose sight of their own personal training goals. A separate discussion around sustaining employee motivation in the midst of multiple sources of change also reinforced the need to recognize small personal milestones when evaluating employee progress.

5.6.2 Human Resources Training for Supervisors

A serious concern identified during the interviews was a need for soft-skills management training for laboratory managers responsible for front-line management of employees. Team leader roles were suggested as the target position level to initiate soft-skills training. An interviewee illustrated an unfortunate case where a team leader was too wrapped up in his day-to-day routine work. The result was a complete lack of training at the analyst level. This was compounded by a lack of any delegation of responsibility. The team leader was also perceived to be "dumping" responsibilities, which caused employees to attempt to deflect workloads to one another. The overall result was a decrease in employee morale.

The decrease in employee morale resulted in a fragmented team because some employees felt they were being taken advantage of. While it was acknowledged that the team leader was technically strong, it was also evident that he lacked the conceptual management skills required to manage interpersonal dynamics within the laboratory successfully. Interviewees suggested that

team leaders and laboratory supervisors would benefit from organizational training that could help them balance laboratory workloads among a limited number of available employees.

A second suggestion arose from a case where a manager assigned the full balance of an absent, sick employee's daily workload to another employee, effectively doubling her workload. The perception was that being forced to be twice as productive as normal was unreasonable and penalized the on-site employee. Management training would provide a team leader with a larger toolkit to help effectively balance employee workloads when employees are absent for any reason. In this case, better-planned use of the team's resources would result in an increase in employee morale.

5.6.3 Succession Planning

Multiple employees raised succession planning as an area of potential exploration for Maxxam Analytics. The concerns around succession planning were related to specific short-term considerations. "What will happen if I am away for three weeks or if I get injured and need to go on extended leave?" is the question employees often asked. Several interview candidates were apprehensive about work not being completed if key employees, responsible for mission critical tasks, were absent. This concern was amplified because the interviews occurred during a week when month-end finalization of projects required critical tasks to be completed in order to facilitate the release of invoices to clients.

In the short term, the risk of a lack of a succession plan can usually be mitigated relatively effectively by quick staff replacements. However, if a comprehensive succession plan is not in place, a more significant problem could occur through the loss of a key employee (by illness, retirement, relocation, or extended leave). This could result in an education or knowledge gap that is impossible for a new employee to fill without participating in a knowledge transfer from the leaving party. The loss of tacit knowledge is a risk to long-term strategy implementation, and remains an ongoing concern for all firms.

Addressing the issue of a comprehensive succession plan, one employee brought forward the idea of designing succession planning at Maxxam for manager-level, supervisor-level and team leader level positions. A discussion of succession planning with this employee resulted in a brainstorming session. The ideas generated are presented in Table 5.2. Issues raised by all interview candidates included a need for buy-in at the senior executive level and a requirement for support from human resources managers. As well, the need to align succession planning with Maxxam's strategic goals was identified by two employees as a future objective.

Table 5.2 What is Successful Succession Planning to Maxxam Analytics? – A Brainstorming Exercise With Maxxam Employees

What is Important in Succession Planning at Maxxam?	**How Can The Important Succession Planning Task be Achieved?**
Finding the most qualified candidates for succession planning	Willingness to hire between and across divisions and laboratories across the Maxxam Network (National Focus)
Dedicated Responsibility by Human Resources to the Development of Employees	Dedicated Succession Planning Funding required for training, courses, education, formal mentoring programs, education programs
Awareness of the Human Resources Manager	One-on-one interviews for candidates involved in succession planning
Relevance to the future growth of Maxxam	Succession planning can be built into the strategic plan for Maxxam along with a list of measureable and quantifiable goals
An Employee Focus	Plans are targeted towards the employee's desires, interests, goals, and knowledge.
Buy-In from Senior Executives	Participation at the CEO and VP Levels with responsive feedback from Maxxam's Board of Directors
Organized – Positions involved in Succession Planning need to be determined logically	Positions involved in succession planning can be determined by the strategic plan

Source: Employee Brainstorming Exercise, Maxxam Analytics, June 2010.

As illustrated in Table 5.2, to mitigate the loss of tacit knowledge successfully, a succession plan must be aligned with the corporate strategic plan. A conclusion that may be drawn from the employees suggestions is that Maxxam should begin to frame a plan that can be adopted not only in British Columbia, but also adapted nationally across the network, with appropriate buy-in and approval from Maxxam's Board of Directors.

5.7 Post-Acquisition Summary and Recommendations following Culture Awareness

Maxxam's employees identified employee training programs, supervisor training and succession planning as future areas of growth. Although feelings about learning and growth were recorded as very optimistic, it was noted that employees would like more training time with their supervisors. There was a general awareness of time and workload pressures at the manager level that prevents employees from adequately learning directly from manager level employees. To resolve this, Maxxam could facilitate a process whereby managers can implement a succession

plan, strategically connected to their department level training plan. This would allow for the growth of multiple team-lead employees who can help offset some of the department managers' time and production pressures. Such a plan would free up valuable time so that managers could spend more time on direct laboratory instruction, training and development for analysts and technicians.

Several employees also noted that the culture of the combined firm is currently in flux largely because new employee relationships are being developed. Therefore, this is an ideal time for the firm to begin calibrating and tracking metrics that would aid in the development of a corporate intellectual capital scorecard. The goal of this scorecard would be to help Maxxam develop metrics to identify products and customer needs not yet recognized by the firm. Such a tool would add a layer of evaluation that would build on the current metrics, which evaluate Maxxam's success through production and revenue measurements.

6: The Business of Quality Assurance – A Strategic Regulatory Overview of Maxxam Analytics

To provide context for the primarily operational recommendations that derived from the employee interviews, described in Chapter 5, and to lay the foundation for the strategic recommendations that will be made in Chapter 7, it is important to understand the regulatory environment in which Maxxam Analytics operates. Chapter 6 will describe the regulatory environment with particular emphasis on how the audit process relates to industry accreditation. The first goal of this chapter is to provide the reader with an understanding of the business impact of accreditation requirements and proficiency testing. The second goal is to provide the reader with a clear understanding of the connections between Maxxam's quality assurance policy and the recommendations that will follow in Chapter 7.

In terms of Wexler's Four Faces of Capitalism model[21], Maxxam operates in the Regulatory-Entrepreneurial position of "Wexler's Wheel". Maxxam falls within the regulatory sphere of operations because laboratory operations follow a set of routine structures that are revised on a schedule governed by accreditation requirements. Moreover, decision-making at Maxxam occurs in alignment with accreditation requirements from multiple agencies in Canada in compliance with over-arching international standards. Maxxam operates using a series of routines, and errors from these routines are documented. The entrepreneurial sphere of influence effectively describes the for-profit nature of the analytical laboratory services industry.

In Canada, large corporations, with assets sufficient to back the purchase of capital equipment in the several hundred thousand dollar range, own national and international laboratory networks. A private equity group, which holds investments on behalf of the Ontario Municipal Employees Retirement System, owns Maxxam Analytics International Corporation. This ownership structure allows for excellent long-term organizational support and ensures the availability of tools required to accredit the laboratory to ISO/IEC 17025 standards. ISO/IEC 71025 accreditation influences both the regulatory and entrepreneurial position of Maxxam

[21] Leadership in Context: The Four Faces of Capitalism Wexler, Mark N.; 2005, pp. ix, 237, New Horizons in Leadership Studies. Cheltenham, U.K. and Northampton, Mass.: Elgar AN: 0821723

because of the detailed influential nature of the accreditation requirements on laboratory operations.

6.1 The Impact of ISO/IEC 17025 Accreditation

ISO/IEC 17025 requires that Maxxam's laboratory processes be audited every two years by two external agencies: CALA and the SCC. Independent audits follow several sub-processes including a management audit, a trace of tests audit, and a quality system review. To maintain ISO/IEC 17025 accreditation, a firm must meet both management and technical requirements. The management requirements mandate several management system components. Companies must have systems in place that facilitate the development and maintenance of document controls, reviews of tenders and contracts, subcontract processes, complaints and service to the customer, corrective and preventive actions, internal audits and management reviews. The standard requires that a separate quality assurance group, responsible for the internal auditing functions of the laboratory, also monitor corrective and preventive actions.

Furthermore, the technical requirements are extremely specific and detailed. These involve existing processes for the selection of methods, control of data, measurement traceability, method validation, environmental conditions, laboratory accommodations, and test quality and calibration results assurance. Exceeding ISO/IEC 17025 requirements is key to Maxxam's business strategy, as several clients will not use a laboratory that does not have independent accreditation and quality verification via an independent auditing body. The following sections illustrate the importance of the four key sections of quality assurance auditing at Maxxam: (1) Management Auditing, (2) Trace of Tests Auditing, (3) Quality System Review Auditing, and (4) Audits of Corrective and Preventive Actions.

6.1.1 ISO/IEC 17025 Management Audit

A management audit at Maxxam involves a series of checks to ensure a comprehensive document control system is functioning to track versioning of SOPs adequately. In interviewing an employee from Maxxam's Quality Assurance Unit, it was determined that document approvals, document changes, and control of records are all maintained electronically through a centralized system. Moreover, a management audit reviews and assesses the overall purchasing services and supplies of the company in addition to reviewing the management review and internal audit process to ensure integrity in how company-wide processes are governed.

6.1.2 ISO/IEC 17025 Trace of Tests Audit

A trace of tests audit is the most focused of all audits, and is very powerful in pointing out system wide problems through the lens of a single sample. In this type of audit, a single sample is followed across the company as it travels from sample reception and login, to sort and distribute processes and finally to the appropriate sample extraction areas. Sample extraction requirements are checked concurrently as the sample travels towards the laboratory for analysis and data verification. Finally, data validation processes are also reviewed as the data is prepared for a final report to the customer.

A trace of tests audit is a powerful tool for a laboratory because the identification of a problem with a single sample can often be extrapolated to a system-wide issue that needs to be resolved. Trace of tests audits have been implemented in multiple environmental laboratories at Maxxam. In this regard, the recommendation derived from employee interviews is to increase the number of trace of tests in conjunction with internal auditor training programs. As a larger base of the employee population becomes familiar with the concept, this type of audit provides employees with a simple tool to identify systemic laboratory issues for correction quickly.

6.1.3 ISO/IEC 17025 Quality System Review Audit: Quality Assurance Unit

The quality system review audit targets the QAU directly. Master schedules and final report reviews are examined in conjunction with facility inspections and archived QAU reports and records. QAU file maintenance is audited as well as QAU personnel training. The audit also assesses how the quality system governs data collection, storage, and retrieval. Normally, this audit is conducted bi-annually by an independent auditing body and requires advance preparation to ensure documentation is readily available for review. The work of the QAU Auditor/Specialist is examined at this time. Therefore, it is important that an auditor be trained to perform inspections. This involves a thorough understanding of the standards being audited as well as the chemistry and quantitative analytical procedures in the laboratory. For this reason, under-qualified employees, who could potentially overlook serious problems, should never be placed in the role of a QAU Auditor/Specialist. This could result in a disruption of operations by raising unnecessary questions during the audit process.

From an interview with a QAU Auditor, it was evident that time was the single most valuable resource in terms of organizing company-wide audit schedules and training programs. The recommendation to Maxxam is to facilitate the development of QAU systems that maximize

the use of time on the part of QAU Auditors so that this group of employees can focus their time and resources to ensure that QA systems are optimally functioning.

6.1.4 Corrective and Preventive Actions

Corrective and preventive actions are unique in that each action is a small step in improving the larger quality system for the company. Corrective actions can be initiated at any point by any individual, and require the identification of the problem and a resolution to correct the issue. Each time a corrective action is implemented in any one of Maxxam's laboratories, a report is prepared. As part of follow-up procedures, the Project Management group and the Quality Assurance group at Maxxam are jointly responsible for ensuring that corrective action reports, prepared on behalf of Maxxam, are sent to the client. If a client is affected by a corrective action, follow up by a project manager also occurs to ensure key information is relayed back to the laboratory and the change management process is implemented if required. As well, control charts and any necessary uncertainty calculations are updated. Modification of laboratory processes need to take into account the vetting of quality assurance reports by individuals who know the clients best. This is an expertise of the project management group.

Preventive actions are actions that implemented in the laboratory to prevent deviations from ISO/IEC 17025 protocols. These actions often focus on measurement traceability and the specific requirements of reference standards and reference materials. They also involve the assurance of the quality of test and calibration results. If an entire sample batch is analyzed incorrectly, the mistake can cost several thousands of dollars. Therefore, processes that prevent errors from occurring and help safeguard against human error are often grounds for strong business cases due to overall laboratory cost savings.

The recommendation to Maxxam is to encourage employees to participate in the generation of preventive actions, and to continue to record items in a centralized database for audit review. An employee also suggested calculating the financial savings of each preventive action, and tallying these savings up for annual review. Such a project could be implemented as a database by a summer student and would involve the QAU, multiple laboratories, and senior management. This would be a pioneering effort that would demonstrate to CALA and the SCC that Maxxam had exceeded ISO/IEC 17025 requirements.

6.2 The Business Impact of Performance Testing Samples

Maxxam participates in several Proficiency Testing programs. The SCC/CAEAL Laboratory Accreditation Proficiency Testing (PT) Policies[22] are key to helping determine the accuracy and precision of a laboratory's analyses. PT samples are prepared at independent locations. They contain known amounts of target analytes and must be analyzed according to the test method specified in the lab's List of Registered Tests. The PT samples must be treated as routine samples along with regular samples received by the laboratory. PT samples should not be given special treatment in any way (i.e. analyzed an excessive number of times). Because PT programs cost several hundred thousand dollars, the programs require care in terms of data entry, review and reporting.

Strategically, PT sample data provides a competitive advantage when both accuracy and precision are measured. The firm can choose to release PT data selectively to a potential client, thereby demonstrating outstanding proficiency in a particular laboratory analysis. An employee recommended that Maxxam could potentially include PT data in bids for future projects. Highly accurate and precise PT data is an indication of the laboratory's high standards and such a level of accuracy and precision would be well regarded when multiple metrics are used to determine bid outcomes for large-scale projects.

6.3 Summary and Recommendations

Interviews with employees yielded several recommendations for Maxxam with respect to quality assurance. The ideas detailed in this chapter describe recommendations for incentivizing corrective and preventive actions and suggest providing sales employees with incentives to use proficiency data when bidding for projects. Training employees within each laboratory as trace-of-tests auditors also allows for quality assurance polices to be applied at a grassroots level, and facilitates quick and timely identification of systemic laboratory issues. Lastly, it is important to recognize that Maxxam's accreditations are a source of business relationships, especially with the Ontario and British Columbia Ministry of Environment, Health Canada, and the US Department of Health and Human Services. As an industry incumbent, it is important for Maxxam's future business relationships to maintain already held accreditation and to seek partnerships with accreditation governing bodies to help create a benchmark standard for laboratory analysis. Chapter 7 describes how to develop these partnerships through goal consensus at Maxxam.

[22] http://www.cepis.ops-oms.org/bvsalc/i/PTpolicies.pdf

7: Human Resources Recommendations

This chapter synthesizes and expands on the top three recommendations chosen from the pool of recommendations made by employees. It provides a series of strategic recommendations gathered from qualitative interview data to illustrate how developing employee training and change management processes would best position Maxxam in the future. The recommendations are firm specific, and are based on the opinions and insight gained from employees throughout the organization. The final series of recommendations included in this chapter were selected from the pool because they represent the ideas employees felt would best equip Maxxam to manage future change.

7.1 Delegation and Goal Consensus

A part of any acquisition is the need for employees to divide responsibilities within the newly formed organization. Aside from significant operational considerations, the most important strategic recommendation arising from this research is for Maxxam to balance short-term constraints with human resources policies and an overall strategy to ensure that both staff allocations and individual employee performance assessments foster innovation and organizational learning. In setting up performance assessments, line managers and team leaders require goal consensus so that individual employees participate in the formation of their own goals and in aligning the metrics of their next performance evaluation with these goals. During interviews for this project, the issue of time was raised repeatedly. While production routines are necessary to complete task requirements, stretch-goals, which expand upon the employee's skill set, require time to develop. As well, for employees to realize their goals, managers need to develop production schedules flexible enough to incorporate time for learning and growth. Flexibility management systems are required to create a culture where an employee feels supported in an environment stable enough for his or her outlined goal to be reached successfully.

7.1.1 Delegation of Decision-Making

Multiple Maxxam employees suggested that they would like increased autonomy in decision-making. Senior analysts most frequently made this suggestion. As part of the formation of a new Maxxam culture in British Columbia, it might be feasible to make senior analysts

responsible for a small budget allocation to ensure laboratory supplies for their particular department are adequately maintained. This action would also relieve the manager/team leader of a current responsibility and free up additional time that the manager could spend on employee development. There is a range of different organizational processes that the firm can explore to help develop cultural routines that would increase the responsibility levels of senior analysts and senior technicians and allow for a diffusion of decision-making authority throughout the organization. The "people" component of strategy was emphasized in several interviews as being important in creating a culture of sustained responsibility that, concomitantly, rewards senior employees for demonstrating foresight. It was noted that changing demographics and increased education levels not only affects Maxxam's clients but also how the company operates internally. The suggestion here was for Maxxam to provide financial support for long-term employees to refresh their educational toolkits and augment skill sets that may not be fully developed. The employee would explore educational opportunities with the manager to help the department remain in alignment with the firm's strategic goals.

7.1.2 Goal Consensus

In high-performing laboratories, all stakeholders – including managers, team leaders, analysts, technicians, and project managers – have a shared commitment to high-level outcomes for all laboratory data. Three main steps are required to attain goal consensus. The first step is mutually deciding on priority goals for tasks. There are always competing priorities in any laboratory. Several employees said that the lack of specific priorities caused stagnation in operations. When employees did not know how or what to prioritize, nothing got done. It is recommended that management ensure that competing priorities are recognized and a cogent list of priority goals is provided for every employee in the organization. The second step in attaining goal consensus is to develop agreement on methods to determine whether goals have been achieved. How success is measured may be very different for a manager and an employee. Consequently, the metrics for success need to be defined from the beginning of any task assignment. Metrics for success should be assigned at the same time as the list of priority goals is developed for the employee.

Finally, the last step in attaining goal consensus involves summary and closure for the employee and manager. Time is required for an employee and a manager to review a quarter's goals, critically evaluate whether priorities were adequately addressed, and determine to what extent priority goals have been achieved. Educating managers about these softer aspects of

strategy is critical to Maxxam's growth. For example, using tools and checklists to measure employee issues and behaviour will require Maxxam to encourage debate on the relationship between firm-level culture and the strategic direction of the firm. This debate should include a change agenda that accurately forecasts the time involved to resolve critical issues.

7.2 Positioning Maxxam for Future Growth

Maxxam is committed to developing an innovative and creative culture. Encouraging cultural and financial ownership in the firm by managers and employees will lead to more creativity and innovation in all laboratories. Furthermore, as economies of scope create efficiencies from diversification, identification of additional laboratory level economies of scope could generate immediate returns to each individual laboratory. Managing this change, however, is a concern for employees who are not aware of firm-level strategy. One recommendation from employees for managing change at Maxxam is to install a change control board. The section that follows describes how a change control board could be built.

7.2.1 Implementation of a Change Control Board at Maxxam Analytics

A change control board is composed of 5-7 employees who are aware of the resource limitations of the company and are accurately able to prioritize issues based on an awareness of client needs and internal resource demands. Maxxam's change control board should include an employee who understands the science, an employee who understands the customer, and an employee who understands team resources (allocation). Senior management would always chair the board and a client representative would always be present. The goal of the change control board is to determine "How big a problem is it, and who should fix it?" The purpose of a change control board at Maxxam would be to minimize the number of stakeholders with whom technical analysts have to deal. Another goal of a change control board is to ensure that response times for issues across the organization go down and that all issues are prioritized with the client, as well as with the firm's strategy, in mind. Moreover, the change control board requires project managers who know when to pull issues out of the company-wide process and address them immediately. Meetings would need to be short and efficient.

Appendix I contains notes from an interview with Ava Parissay from MDA Corporation. The interview focused on how to implement change control boards strategically within organizations. A conclusion drawn from this interview is that, in addition to addressing immediate problems, a change control board can also help organize priorities that may be

misaligned due to political relationships with both internal and external stakeholders; in effect neutralizing the need to evaluate company priorities constantly, and focusing the firm on the tasks at hand.

7.2.2 Product Planning and New Product Differentiation

With the acquisition of Cantest Ltd., Maxxam Analytics is now in a position to offer new product packages that differentiate the newly formed company from competitors. Combining packages that offer drinking water analysis and food analysis into a single comprehensive analysis package for large corporate clients would help address clients' customized needs. Moreover, industry-specific packages for mining clients, metallurgical clients, and food regulatory agencies could be custom designed at a client level to help clients solve custom problems on a project basis. It is recommended that Maxxam invest in sales employee education so that external sales staff are able to program and develop custom comprehensive analytical testing solutions for clients. Sales staff need to know how to draw from resources available within multiple lines of business. A key piece of this recommendation involves the use of the speciality services department to develop of unique methods that are currently not a part of Maxxam's scope of accreditations for high-volume analysis.

7.2.3 Competitive Pricing and Quality as the Incumbent

Price cutting has historically been an industry tactic to lure business away from a competitor. As the industry incumbent, Maxxam is now in a position to leverage its brand on quality and service to ensure that no further price erosion occurs in the industry. A focus on customers' appreciation of high quality analysis, combined with a high level of customer service and the largest scope of analytical services in the country, should be a target strategy for the firm. It is recommended that, in the future, Maxxam combine specific sales bids with presentations of the whole product solution instead of attempting to use price as the sole bid qualifier. It is also recommended that Maxxam undertake programs that develop strong brand recognition and generate word-of-mouth references from top tier clients.

7.3 Incentive Systems and Motivation Processes that Enable and Support Ongoing Change

In positioning Maxxam's for future growth, the ability to defend against imitation by competitors is central. The ease of imitation is a key element in the strategic development of high

performing firms (Oster, 1994). Because successful strategies are targets for imitation, Maxxam will need to understand the sources of its future advantage and have the ability to defend that future advantage. The importance of Maxxam's internal organization for strategic goal setting and performance cannot be overemphasized. The organizational climate and culture currently being developed will set the tone for encouraging future debate on the relationship between culture and strategic choices. A critical task for Maxxam is to recognize the presence of sub-goal pursuit within the firm and to manage conflicts between internal and external (client related) interests.

7.3.1 Improving Motivation through Line Managers and Team Leaders

As discussed earlier, a weakness in the managerial skills of team leaders has led to human resources issues at Maxxam. Although it is not realistic to expect team leaders to be proficient HR professionals, there was awareness that downsizing and de-layering have left the remaining managers too busy to cultivate employees. This is a recipe for mediocrity. Viewing team leaders as people who can undertake change themselves allows them to gain awareness of themselves as role models. It is recommended that Maxxam support and actively assist team leaders in understanding and adjusting to a role of mentor and coach. Team leaders need to have an in-depth understanding of Maxxam's corporate strategy and implementation plan. This would enable them to field questions and support ideas and initiatives from employees that are relevant to corporate strategy. Lastly, team leaders can better organize their own departments by helping employees adjust to change. This support would allow technical employees to carry out the tasks expected of them within individual laboratories more effectively.

7.3.2 Economic Incentives, Bonuses, and Cross-Training Programs

Interviews with Maxxam's employees resulted in several suggestions for performance-related compensation measures that would need to screen out factors unrelated to individual performance or that are outside of the individual's control. Because of the amount of change that is currently going on within the organization, there is concern that factors outside of an employee's control may unduly affect economic incentives. Some of the recommendations brought forward included flat project structures, job choice alternatives and freedom of choice with analytical work. While not always possible, due to the specific nature of analytical training involved, any opportunity to cross-train employees, or rotate them throughout Maxxam's departments, would create an employee base in tune with the larger issues of the organization.

Employees participating in cross-training programs would also increase their span of control – the degree of autonomy possessed by each employee in the organization – and generate goodwill among the employee base.

Employees at Maxxam noted that that cross-training generally increases job satisfaction as employees had a greater sense of responsibility when they felt they had mastered more standard operating procedures. To facilitate analyst and technician rotation, it is recommended that Maxxam institute cross-training programs between the Organic Department, Water Lab, and Metals Laboratory. Incentivizing the completion of cross-training programs could be facilitated by rewarding the employee financially for completing an installation of a new initiative after returning to the home department from a course of cross-training. A cross-training initiative could also be used to determine rewards and performance metrics for an employee's annual goals and objectives.

Finally, a discussion around bonuses for employees appeared to be quite positive. While content with the fact that Maxxam provided annual bonuses based on performance, employees wished to see smaller rewards allocated with greater frequency. The idea of quick recognition of a good deed, followed up with a small reward, appealed most to employees. Employees also noted that a reward did not necessarily have to be financial, but could be passes to movies, events, or paid time off to spend with family. Immediate recognition from a direct manager was thought to be the fastest way to motivate employees during periods of high stress or high workload.

7.3.3 Enabling Processes which Focus on Core Competencies and Facilitate Change

During interviews for this project, it was determined that several employees were unaware of Maxxam's core competencies. Oftentimes, this was not the fault of the employee, but a simple lack of awareness of corporate level strategy that, combined with a myopic, task oriented work situation, created a situation where core competencies were often ignored or simply left unexploited. Since core competencies underpin Maxxam's competitive advantage, three of the following employee suggestions may help ensure success for the firm:

(1) Strategically Advantageous Sales Initiative. The sales department should be encouraged to scan the business environment and the market for opportunities to gain a strategic advantage. This involves the sales department developing an ability to select projects that have a good strategic fit with Maxxam's business lines and not simply giving preference to incremental developments.

(2) Integrate Resources Effectively. Employees need to be able to pull resources together across the organization without falling prey to a silo effect that often occurs between departments. Asking how analyses can be conducted more efficiently and faster will allow the firm to grow. Following from this suggestion, it is recommended that managers be provided with tools and information that enable them to more fully understand and appreciate the relationship between resource management and strategic success.

(3) Development of Change Agents. Much like Maxxam has done successfully with regional safety coordinators, the installation of change agents is also recommended. Change agents usually effect strategic change, but also take the lead in effecting operational changes. Accordingly, laboratory analysts and technicians in every Maxxam division are prime candidates to volunteer for this role. Following from this observation, it is recommended that a reward and recognition system be established, whereby change agents are encouraged to follow through and document change processes at a team level, and then share successes and failures at a line of business level.

To summarize, it is recommended that the sales department carefully scrutinize incoming work so that it focuses on building core competencies, that managers be empowered with tools and information to understand links between resource management and strategic success, and that change agents be installed throughout each of the divisions of the company.

8: Conclusion

Maxxam is positioned to succeed in hypercompetitive conditions. By acquiring Cantest Ltd., the firm is now large enough to be able to compete on differentiation in multiple markets. Maxxam is also in a position to seek first-mover advantages in multiple markets by co-developing regulations and designing custom analytical products for clients. As well, the company has a resource-based advantage in that it now employees one of the most talented groups of chemists in the province. By supporting the creativity of its employees, the firm has proven that it can increase its innovation potential.

As this project has clearly illustrated, culture is in flux at Maxxam. The fluid nature of the development of Maxxam's post-acquisition culture has created an opportunity whereby the company is now in a position to build state-of-the-art laboratories and create employee expertise with depth of experience unparallel to that of any other firm in the industry. As the incumbent firm, Maxxam in British Columbia is now developing new organizational routines that will increase effective communication, help the firm manage new technology, and create value for its clients. At the heart of the development of these new routines are employees who now require new structures and roles to meet their short-term goals, and new and better incentives and motivation to align their long-term goals with that of the firm's corporate strategy. How Maxxam chooses to guide its employees' growth will vary, depending on a range of both external and internal issues. However, the acquisition of Cantest Ltd. has allowed for a tremendous amount of choice in terms of behaviours and styles from which the firm is able to select.

An acculturation process began in 2010 when employees from Maxxam Analytics began working with employees from the former Cantest Ltd. Cultural knowledge and procedural knowledge was transferred and continues to be modified as systems and processes build upon the ideas of the two parent organizations. As this project showed, employees' feelings fluctuated as many people attempted to seek out an identity in a newly forming organization. This project explored the feelings of Maxxam employees, from both legacy companies, with respect to how procedures were learned, the perception of the existence and effectiveness of training opportunities, and how acculturation was influenced by personal identities. The project explored the fourth dimension of Kaplan and Norton's Balanced Scorecard: Learning and Growth. Metrics for this balanced scorecard dimension were developed into an interview questionnaire, and

administered to Maxxam employees to both qualitatively and quantitatively measure the innovation potential of Maxxam. As illustrated in the interview summaries, feelings regarding opportunities for learning and growth for employees showed that Maxxam is quite successful in creating processes at the analyst and technician level. However, the company would benefit greatly from providing additional soft-skills support to managerial level employees.

Recommendations were synthesized from employee interviews with regard to how Maxxam could best capitalize on the synergies of acquisition through the ongoing development of a balanced scorecard and an intellectual capital scorecard, an employee cross-training program, and a change control board. As the roles of individuals and managers change at Maxxam, the firm is well-positioned to remain an industry incumbent due to the innovation potential of its talented workforce.

Appendices

Appendix A – Interview Questions for Employees at Maxxam Analytics

The following questions were provided to each candidate to generate a written response following an explanation of balanced scorecard theory and the relationship of the development of a balanced scorecard to corporate strategic development.

Question 1: On a scale of 1-7, which of the following categories best describes your experience with Maxxam's acquisition of Cantest Ltd.?

(Circle One Number) (7) (6) (5) (4) (3) (2) (1)

Where,
7 = Very Pleasant
4 = Neither Pleasant Nor Unpleasant (Neutral)
1 = Very Unpleasant

Question 2: Describe your reasoning for your answer in question 1.

Question 3: On a scale of 1-7, rate how you feel Maxxam's Acquisition of Cantest Ltd. has increased your opportunities for learning and growth (post-acquisition).

(Circle One Number) (7) (6) (5) (4) (3) (2) (1)

Where,
7 = Opportunity Level Increased Significantly
4 = Opportunity Level Remained the same (Neutral)
1 = Opportunity Level Decreased Significantly

Question 4: When thinking about Maxxam Analytics, do you believe that the word "innovative" aptly describes or poorly describes the company? On a scale of 1-7, how would you rank Maxxam according to the word "innovative"?

(Circle One Number) (7) (6) (5) (4) (3) (2) (1)

Where,
7 = Extremely Innovative
4 = Neutral
1 = Not Innovative

Question 5: On a scale of 1-7, rate how you feel the combined company (Maxxam Analytics) will be stronger as one company as opposed to remaining as two separate companies.

(Circle One Number) (7) (6) (5) (4) (3) (2) (1)

Where,
7 = Much Stronger as 1 Combined Company
4 = Neutral
1 = Much Stronger as 2 Separate Companies

Question 6: Give one example of your best experience of a learning opportunity or a growth opportunity. The experience does not have to be related to Maxxam.

Question 7: Give one example of your best idea of an innovative company or a situation that involves innovativeness. The situation does not have to be related to Maxxam.

Further, the following qualitative questions were provided to each candidate to generate written responses following a more detailed explanation of balanced scorecard theory, and the relationships of the development of a balanced scorecard to corporate strategic development.

1. How has Maxxam's acquisition of Cantest Ltd. increased your opportunities for learning and growth?

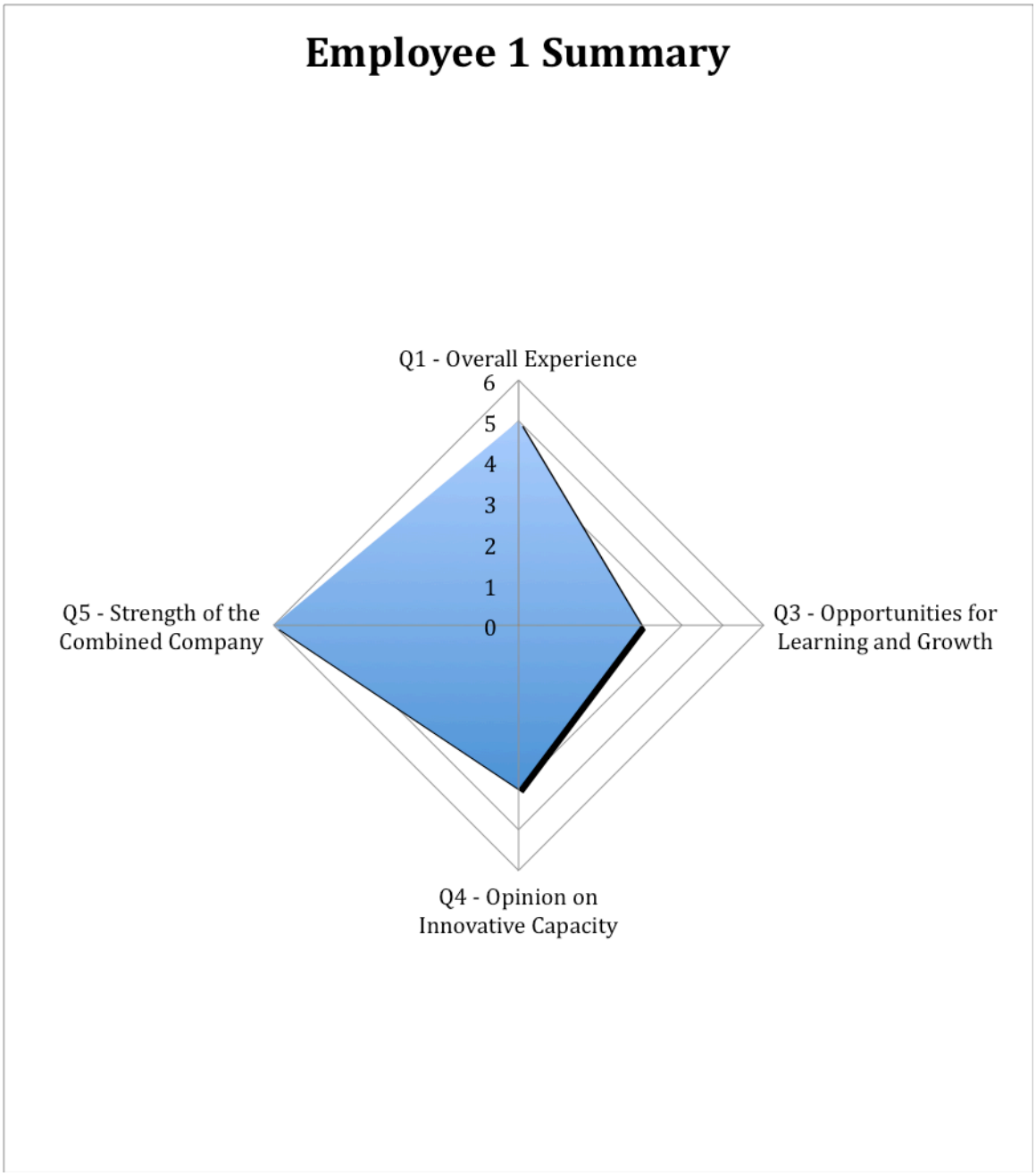
2. How has Maxxam's acquisition of Cantest Ltd. increased your training opportunities?

3. What do you feel you have learned that is new and innovative since Maxxam has acquired Cantest Ltd.?

4. How do you feel about the strength of the combined company's strength after acquisition as opposed to staying as two separate companies?

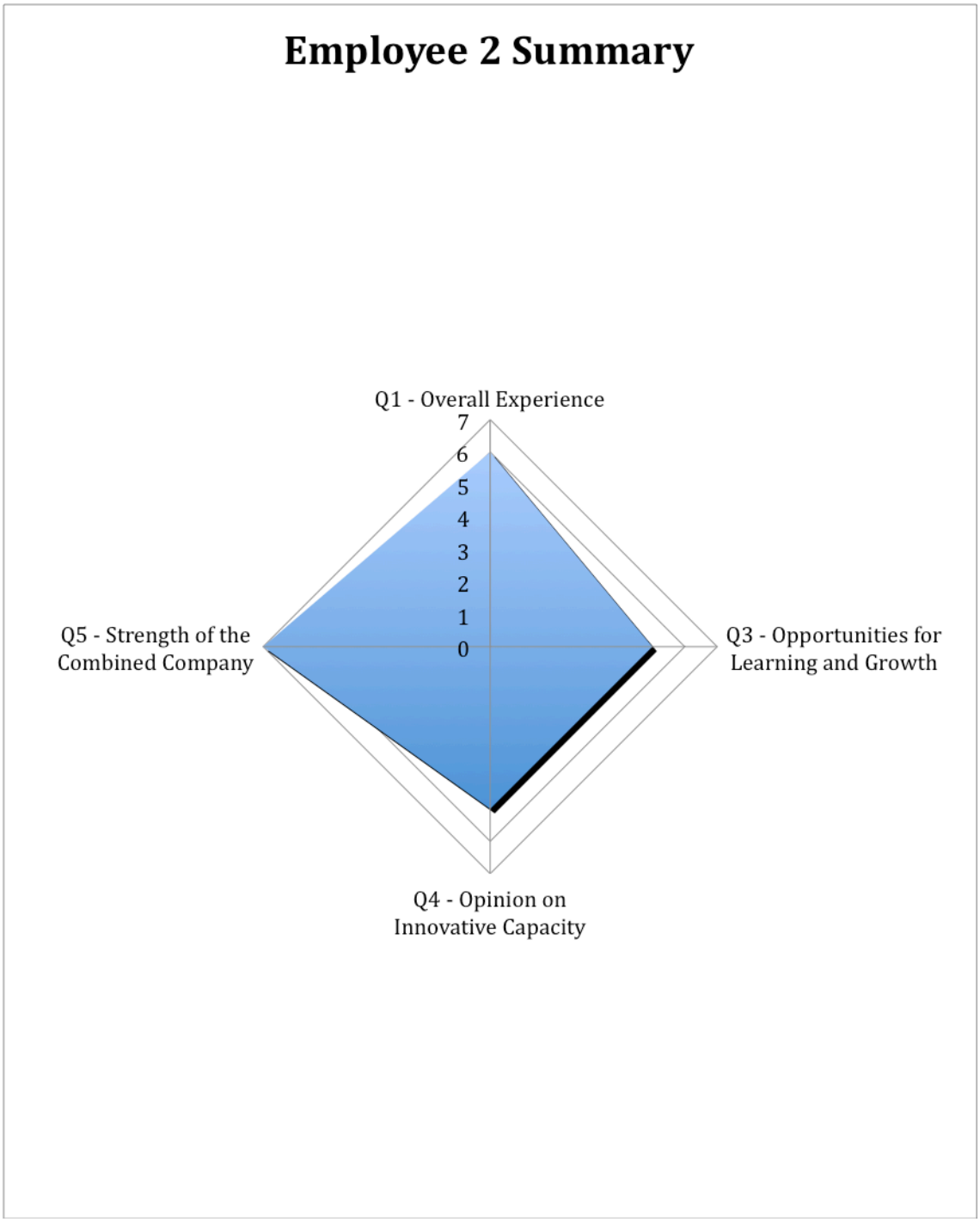
Appendix B – Interview Summary with Employee 1 – Maxxam Analytics.

Quantitative Question Rating Response: Q1: 5 Q3: 3 Q4: 4 Q5: 6



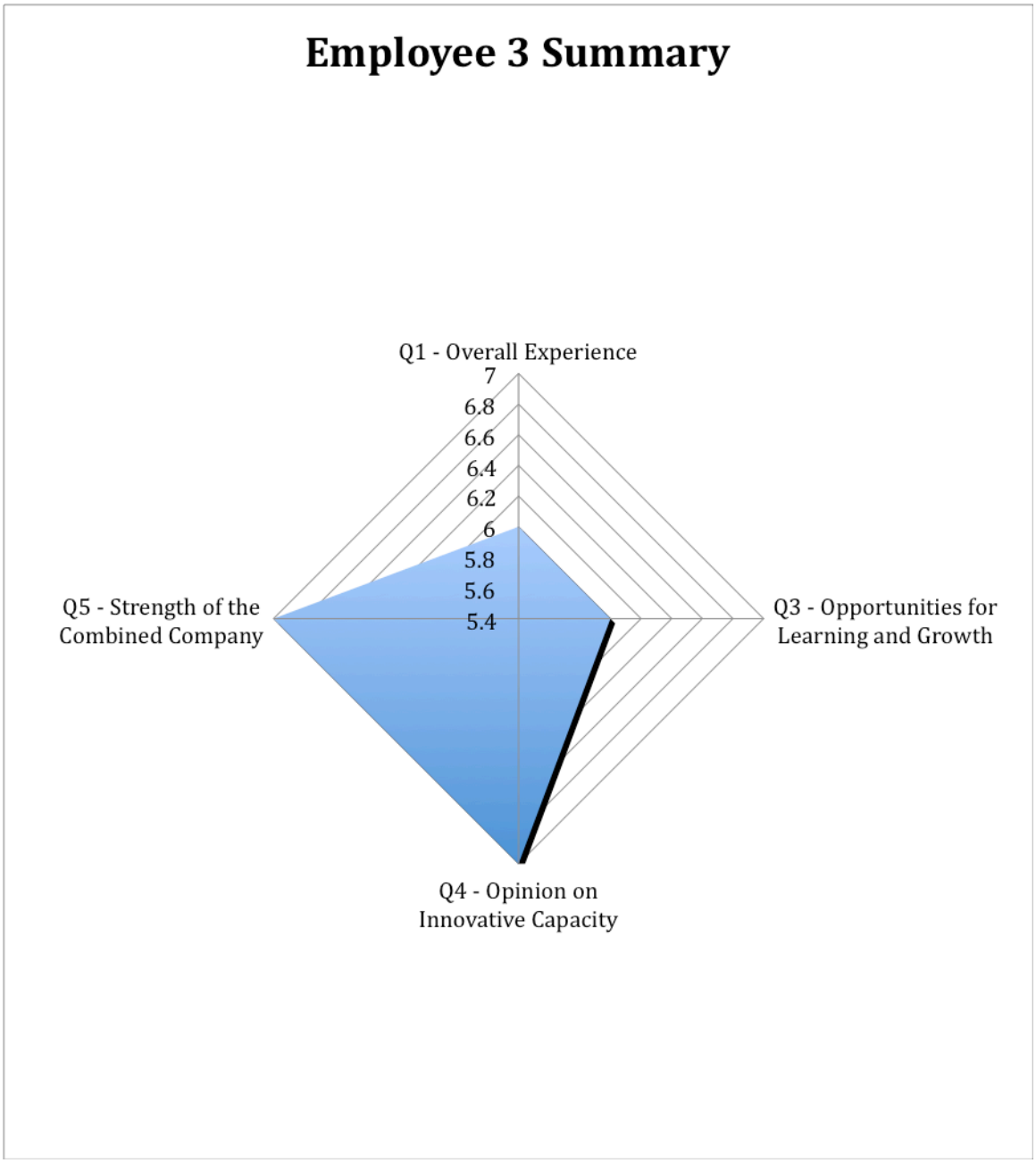
Appendix C – Interview Summary with Employee 2 – Maxxam Analytics.

Quantitative Question Rating Response: Q1: 6 Q3: 5 Q4: 5 Q5: 7



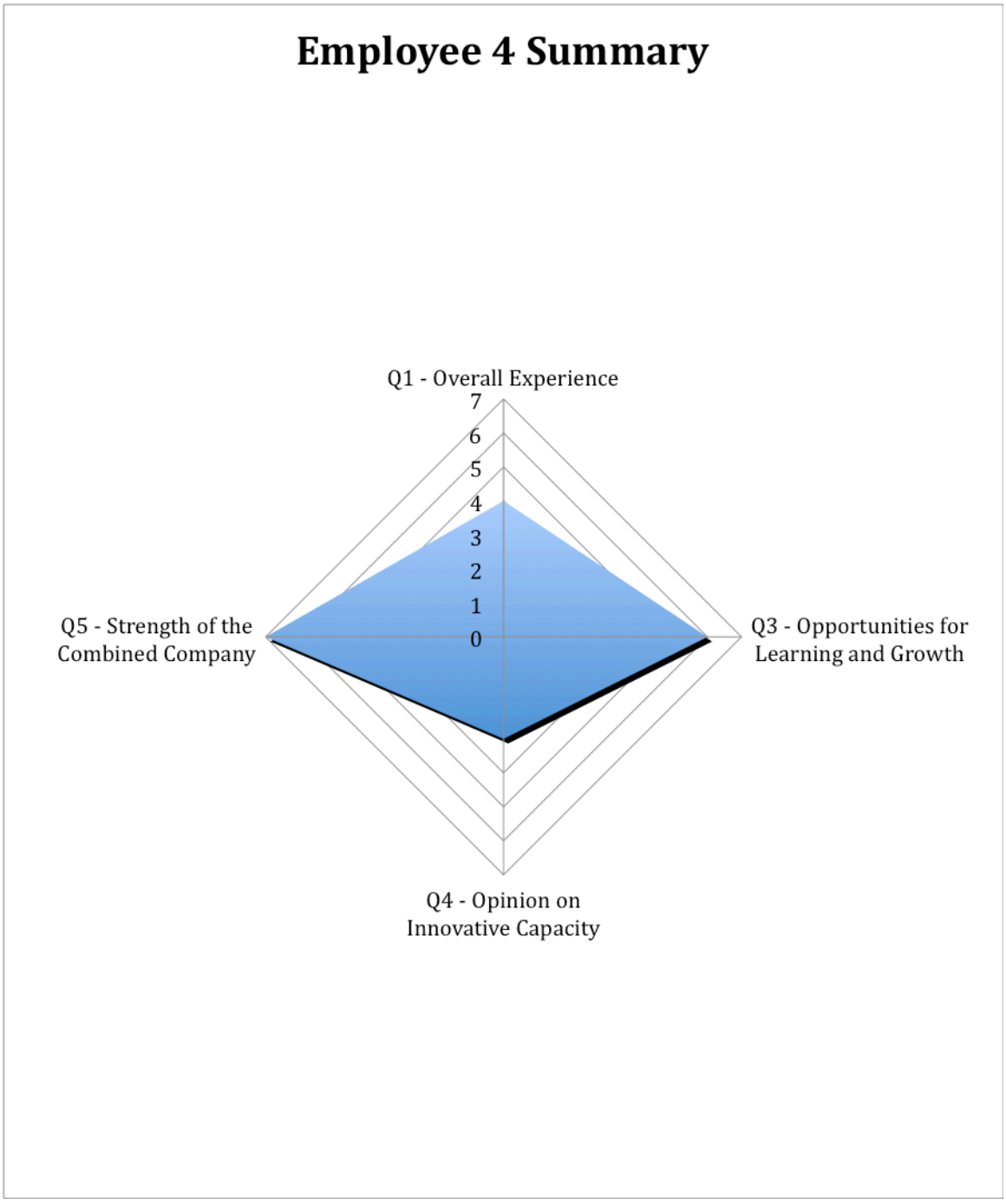
Appendix D – Interview Summary with Employee 3 – Maxxam Analytics.

Quantitative Question Rating Response: Q1: 6 Q3: 6 Q4: 7 Q5: 7



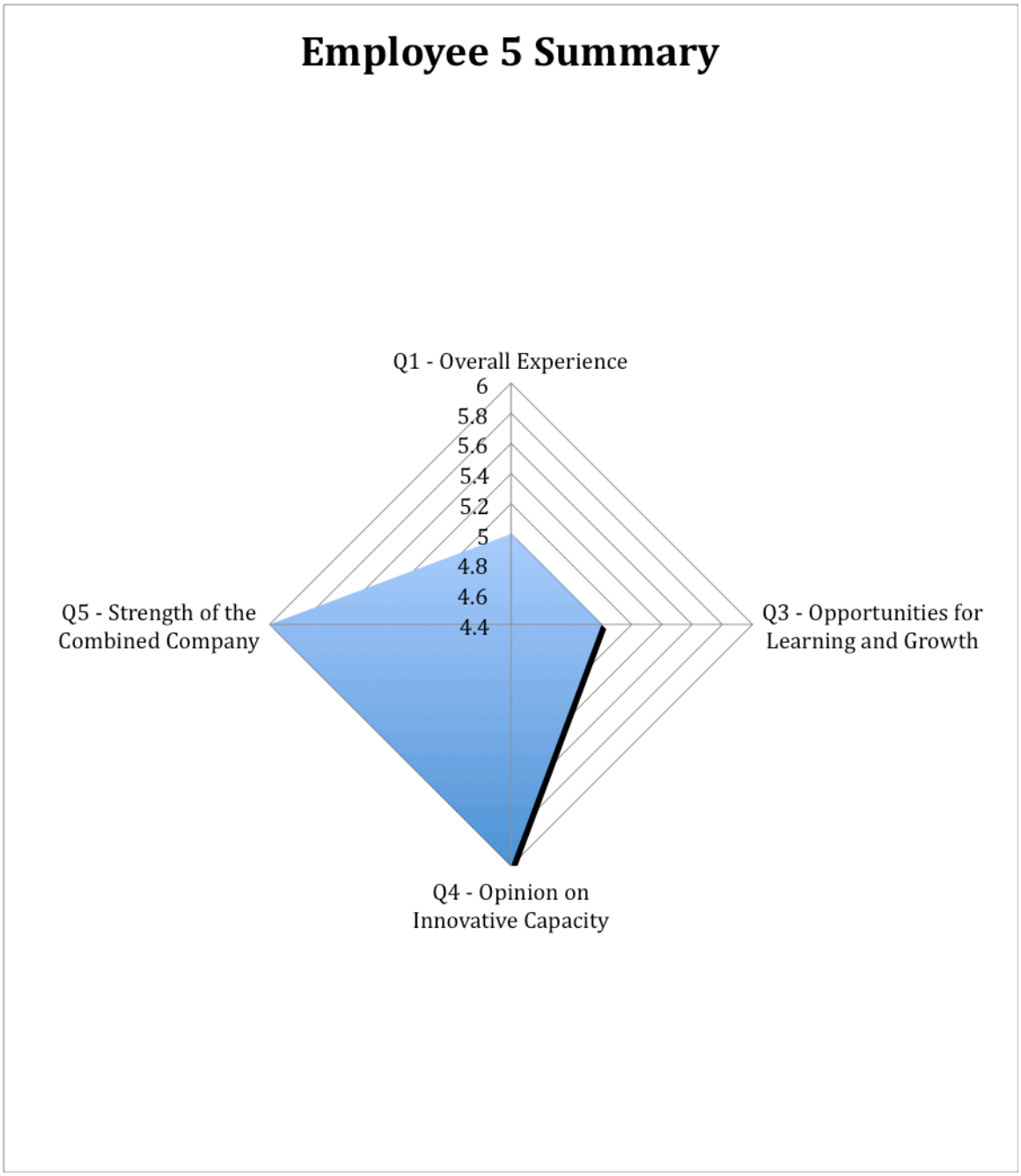
Appendix E – Interview Summary with Employee 4 – Maxxam Analytics.

Quantitative Question Rating Response: Q1: 4 Q3: 6 Q4: 3 Q5: 7



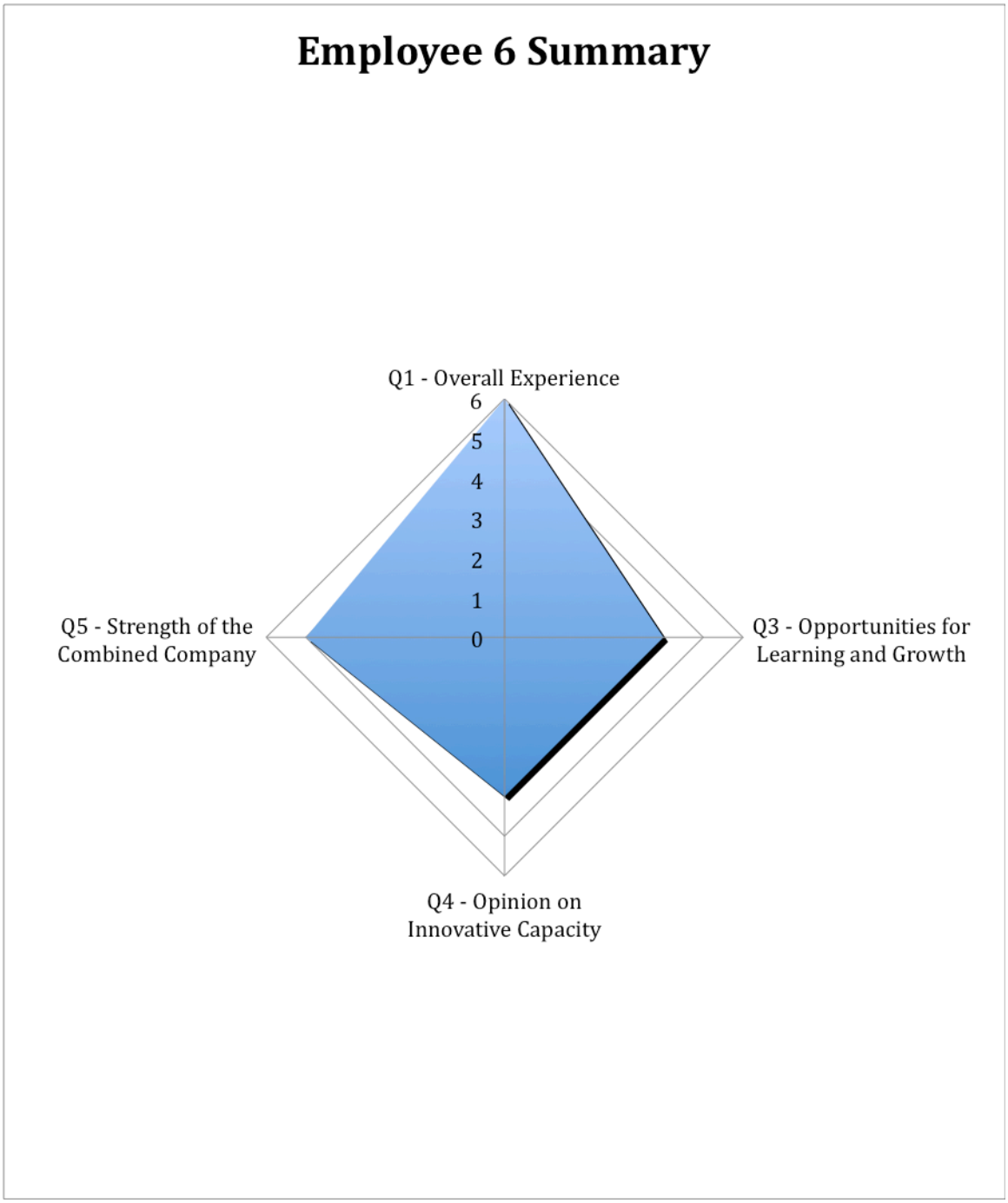
Appendix F – Interview Summary with Employee 5 – Maxxam Analytics.

Quantitative Question Rating Response: Q1: 5 Q3: 5 Q4: 6 Q5: 6



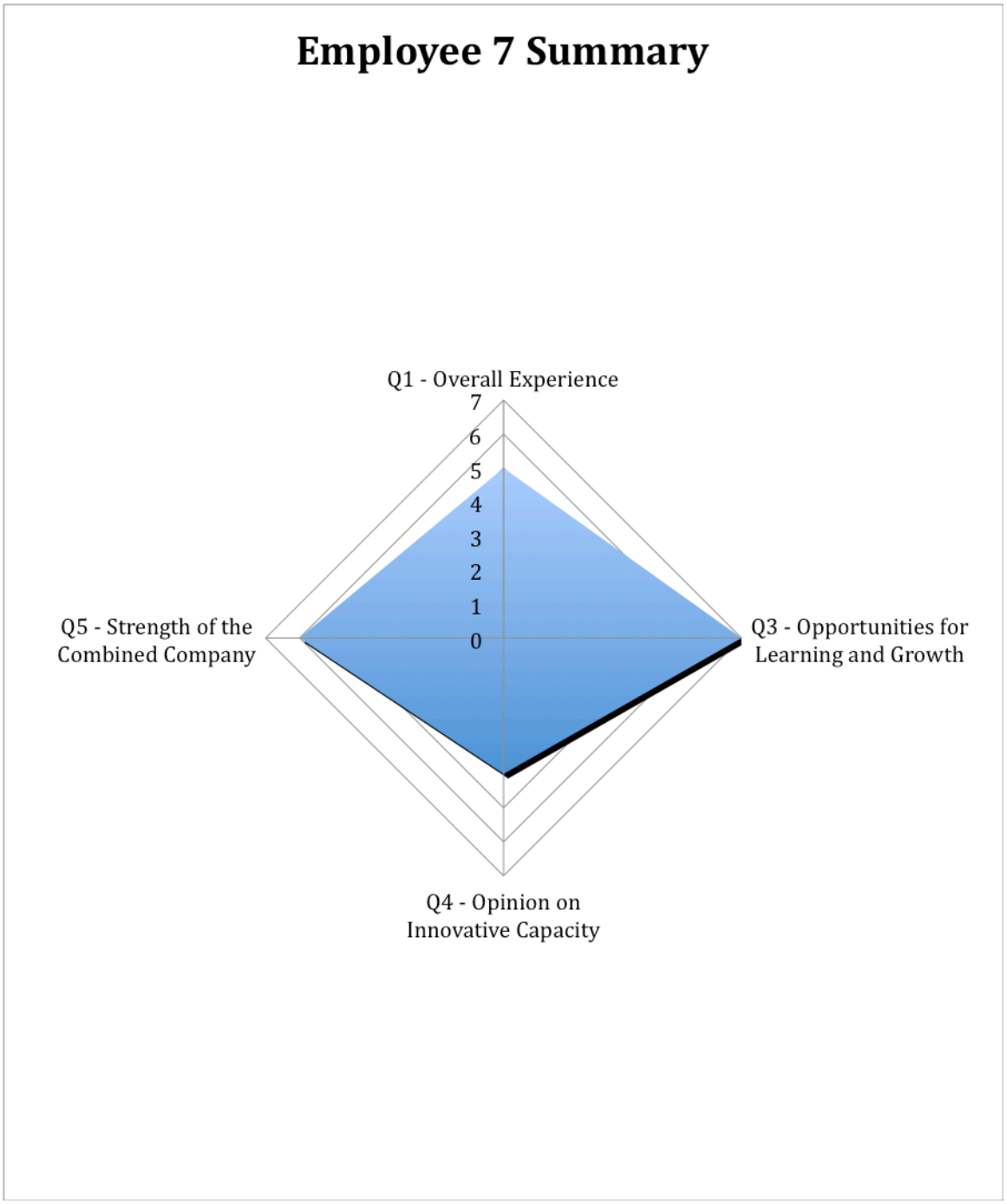
Appendix G – Interview Summary with Employee 6 – Maxxam Analytics.

Quantitative Question Rating Response: Q1: 6 Q3: 4 Q4: 4 Q5: 5



Appendix H – Interview Summary with Employee 7 – Maxxam Analytics.

Quantitative Question Rating Response: Q1: 5 Q3: 7 Q4: 4 Q5: 6



Appendix I – Summary of Potential New Maxxam BC Client Base – List of Operating and Permitting Mines in British Columbia

Operating Mines	**Development stage Mines — Permitted or Active Permitting**
Brule (Western Coal Corp.)	Copper Mountain (Copper Mountain Mining Corp.)
Coal Mountain (Teck Coal Limited)	Galore Creek (NovaGold Resources Inc.)
Elkview (Teck Coal Limited)	Hermann (Western Coal Corp.)
Endako (Thompson Creek Metals Company)	Mount Milligan (Terrane Metals Corp.)
Fording River (Teck Coal Limited)	Prosperity (Taseko Mines Limited)
Gibraltar (Taseko Mines Limited)	Turnagain Nickel Project (Hard Creek Nickel Corp.)
Greenhills (Teck Coal Limited)	Table Mountain (Hawthorne Gold Corp.)
Highland Valley Copper (Teck Highland Valley Copper Partnership)	Sustut Copper (Northgate Minerals Corporation)
Huckleberry (Huckleberry Mines Ltd.)	New Afton (New Gold Inc)
Kemess South (Northgate Minerals Corporation)	Red Chris (Imperial Metals Corp.)
Line Creek (Teck Coal Limited)	Kitsault (Avanti Mining Corp.)
Max Molybdenum (Roca Mines Inc.)	Harper Creek (Yellowhead Mining Inc)
Mount Polley (Imperial Metals Corp.)	Gething Coal Project (Canadian Dehua International Trading Ltd.)
Myra Falls (Breakwater Resources Ltd.)	
Quinsam Coal (Hillsborough Resources Ltd.)	
Trail Metal Smelter Operations (Teck Resources Limited)	
Willow Creek (Western Coal Corp.) Wolverine (Western Coal Corp.)	

Appendix J – Summary of Potential New Maxxam BC Client Base – List of Exploration and Reclamation Mines in British Columbia

Exploration Mines
Belcourt-Saxon (Western Coal Corp.)
Davidson Moly (Thompson Creek Metals Company)
Kutcho Creek (Capstone Mining Corp.)
Lillyburt (Western Coal Corp.)
Ruddock Creek (Imperial Metals Corp.)
Teck Resources Limited (Head Office)
Teck Resources Limited (Exploration)

Reclamation Mines
Bell (Xstrata Plc.)
Brenda (Xstrata Plc.)
Sullivan (Teck Resources Limited)

Appendix K – Summary of Issues with Change Controls Boards, Interview with Ava Parissay, MDA Corporation, June 14, 2010.

- Change control boards require customer domain experts and corporate resource knowledge (who has the technical resources, budget, time, scope?) and a minimum level of technical problem understanding. You need to know what the magnitude of any problem fix would be.
- ½ hour length meetings, stand-up, starts on time and ends on time.
- Don't book a meeting room – have them in someone's office. Always in the program managers office.
- Program Manager as chair of meeting.
- Invite all of the PM's but the PM's coordinate who needs to attend.
- Get really good at going through issues quickly – never discuss solutions.
- The purpose of this board is not to discuss solutions, just to discuss problems, the impact, the priority, and who is responsible for the solution, and by when (timeline delivery date).
- Before the meeting, send a list of all CCB problem issues to PM's. PM's will set attendance based on this list. If a PM can't attend, they can send email with their opinion on an issue.
- Always Set Priority, date, and time is set on each issue. If you need more information, assign a person to collect information and bring back to the next CCB meeting.
- After the meeting, send priority list to all invitees. Assign each issue to the PM CCB determined, and allow the PM to select technical lead who can then select resources.
- Only assign 2-3 issues per team leader. Do not over-assign issues to team leaders.
- A CCB doesn't determine final delivery date of issue. People will fix issues that get assigned to them and report back on delivery dates.

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