

**AN ANALYSIS OF THE SYSTEMS INTEGRATION INDUSTRY**

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### **Title of Thesis/Project/Extended Essay**

An Analysis of the Systems Integration Industry

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## Abstract

The information technology industry and the systems integration sector have grown tremendously over the last 40 years. Recently, however, this growth has stagnated due to economic cyclicality and a transition within the industry to a mature point in its lifecycle. As a result, the information technology industry and the systems integration sector have become increasingly hostile environments in which to conduct business: profits have decreased; price competition has increased; firms have sought to increase market share; merger and acquisition activities have increased significantly.

This report examines the issues faced by Sierra Systems Group Inc, a publicly held systems integration firm, as it responds to this increasingly hostile environment. In the medium term (the next five years), the most important initiative Sierra can take in this context is to decrease its cost structure. This will allow it to better execute its differentiation strategy, generate shareholder wealth, and produce cash flow from operations that will allow it to make progress towards the expansion of the business. This report concludes that the best way for Sierra to decrease its cost structure would be to pursue a Software Development Centre model in which the technical expertise of Sierra would be concentrated primarily in one location rather than having this expertise dispersed amongst its 14 branches. This Software Development Centre model represents a refinement of the 'build and hold' strategy that Sierra has used successfully in previous years. This model also supports the firm's strong communitarian culture, and branch centric approach to localized decision-making.

Sierra professes to follow a differentiation strategy in its approach to the marketplace. Over the next five years, Sierra should continue to execute such a strategy. Of note, however, this differentiation strategy is vulnerable to the extent to which integration services will be commoditized, and to the extent to which foreign-based competitors will enter the North American market and pursue a cost leadership strategy. Sierra needs to monitor these developments closely and consider the long-term sustainability of a differentiation strategy. Sierra should also seek to

develop deeper relationships with the clients in the niche markets that it enters. Service offerings outside of its core systems integration competency, such as outsourcing and management consulting, should only be undertaken as a strong supplement to its core systems integration business.

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## INTRODUCTION

Founded in 1966, Sierra Systems Group Inc. (Sierra) is a professional services firm that provides systems integration (SI) consulting services in the information technology (IT) industry. Sierra currently operates 14 branches across North America, employs 900 staff, and had fiscal 2002 revenues of \$130 million.<sup>1</sup> Sierra is seeking to significantly grow its revenue and operating income over the next few years,<sup>2</sup> and to become a more significant player in the mid and upper tiers of the SI market.

Chapter two of this paper quickly establishes that the competitive environment of the IT industry in general and the system integration sector in particular are currently hostile and are becoming increasingly so. Thankfully, there is some guidance that can be sought in this regard. In particular, this paper uses the combined guidance of Porter and Windemere as overarching key success factors that Sierra should attempt to meet or at least thoroughly consider to enhance its prospects for success in this increasingly hostile competitive environment. The evaluation of Sierra in connection to these key success factors is one of the main purposes of this paper. Concomitant to this goal is the identification of options that Sierra could pursue to better meet these key success factors.

In general, the presentation of these findings will be in two parts. Chapters one through three, will be primarily descriptive, than analytical, in nature to establish background on the SI industry and Sierra. In setting this context, issues will be identified and inferences drawn that relate to the key success factors for Sierra to address; these will be included in a summary at the end of each chapter and examined more thoroughly in chapter four.

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<sup>1</sup> All figures are in CAD unless otherwise specified.

<sup>2</sup> In 2000, Sierra set a number of operational goals to be achieved by its fiscal 2004 year-end including: revenues of \$300 million and employee head count of 1,500. This objective has now been extended to the future with no definite date attached to it. Current growth projections are more modest, including revenue of \$140 million for fiscal 2003.

In particular, in chapter one, overviews of the SI industry and Sierra will be presented. Chapter two will focus on the external environment and will include observations in connection to the IT industry in general, an analysis of the broad parameters affecting the SI industry using Porter's five forces model and presentation of the value chain for the SI industry. Chapter three will focus on the inner workings of Sierra and include an analysis of Sierra's culture, its internal value chain, an assessment of Sierra's strategic fit based on comparing its structure relative to its strategy, and a review of Sierra's financial condition. In chapter four, key issues facing Sierra will be analyzed. Finally, chapter five will present recommendations. Due to the breadth of issues covered, most observations will be general in nature; however, care will be taken to ensure that their generality does not dilute their relevance.

Sierra has been very successful over the last 37 years. It has grown from a handful of visionary entrepreneurs with no revenues to an entity with over 900 staff and revenues over \$140 million. What issues does Sierra need to address to ensure that it prospers for the next leg of its corporate journey? Clearly there will be many. This report seeks to make a modest contribution to identify and address these issues.

## 1. Background

### 1.1. Overview of the Systems Integration Industry

“Integration services involve the detailed design, implementation and management services to link applications (custom or pre-packaged) to each other or with existing or planned IT infrastructure. Specific activities include project planning, project management, detailed design or implementation of application programming interfaces.”<sup>3</sup>

Put simply, if interfaces are the ‘pipes’ that connect disparate IT ‘appliances’ together, systems integrators are the ‘plumbers’ of the IT industry.

Demand for IT solutions in the marketplace is founded on the simple fact that the benefits of such solutions hold the promise of greatly exceeding their cost. The implementation of an IT solution requires the specialized skill set of personnel trained in SI. After implementation, the ongoing use of the technology solution (known as ‘production’) requires a skill set that is much less specialized and can be carried out by IT operators rather than integration specialists. Given this implementation and production life cycle, the foundation of the SI consulting business is that most client firms cannot justify having their own integration specialists on staff beyond the implementation period. SI consulting firms, however, *can* maintain a permanent staff of implementation specialists by employing these individuals in a continuous string of integration engagements.

SI engagements can range from a few months in duration, involving fees of at least \$100,000, to multi-year contracts worth millions of dollars in fees. This revenue is recorded primarily through two revenue recognition models: Time and Materials (T&M), and Fixed Price. In the purest form of a T&M contract, the systems integrator charges for its services on an hourly rate basis plus out-of-pocket expenses, without guaranteeing that specific deliverables will be accomplished in a specific period of time. Alternatively, Fixed Price contracts involve providing a total solution (based on an agreed-upon scope) to a business problem, regardless of the amount of effort needed to deliver the solutions. In this context, gross margin can be maximized when the client solution is delivered as efficiently as possible. Many clients seek Fixed Price solutions to

limit the risk they bear when implementing new technologies. A hybrid of these two revenue models is called “T&M to a ceiling,” in which the client is charged on a T&M basis up to a set maximum.

T&M projects are often perceived as having little risk; however, this assumption is perilous because clients will usually still have a specific deliverable and budget in mind when they engage the integration firm. If the client’s budget runs out and the client’s expectations for the deliverable are not met, and if the integration firm wishes to maintain a long-term relationship with the client, a “low risk” T&M engagement can turn quickly into a high-risk fixed price contract on a de facto basis. Thus, project management is a key success factor for all SI engagements.

## **1.2. Overview of Sierra Systems Group Inc.**

Founded in Vancouver in 1966, Sierra is a professional services firm specializing in SI. Consistent with other firms in the SI industry, Sierra sells the expertise of its consultants to clients who are seeking to solve business problems with technology solutions. While some competitors, such as IBM Global Services, fully participate in multiple segments of the SI value chain (problem identification, solution identification, hardware and software procurement, systems integration, production support), Sierra participates primarily in the SI component. In this sense, Sierra can currently be considered a ‘pure play’ systems integrator.

Sierra expanded steadily but modestly from a handful of staff in the late 1960’s through to the mid 1990’s when the company began to grow at annual rates in excess of 40%. During the eight-year period from fiscal 1995 to fiscal 2002, revenues grew from \$32 million to \$130 million, and head count increased from 378 to 900. The company was privately held until 1998, when it raised \$31 million through an initial public offering (IPO) on the Toronto Stock Exchange.<sup>4</sup> Even in the post IPO era, Sierra continues to be closely held. Approximately 40% of Sierra’s

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<sup>3</sup> George Mason University School of Management - IT Industry Segment Study [online], 2003

<sup>4</sup> Based on net proceeds to the company after deducting net proceeds to the selling shareholders.

outstanding shares are owned by officers, directors, and employees of the firm. As well, approximately 40% of Sierra's current employees are shareholders.<sup>5</sup>

The company's corporate office is located in Vancouver; however, Sierra pursues a branch centric model in which branches operate as profit centres with branch managers exercising considerable autonomy. Sierra now has 14 branches across North America, as follows: Vancouver, Victoria, Edmonton, Calgary, Winnipeg, Toronto, Ottawa, Halifax, Seattle, Olympia, Los Angeles, Dallas, Washington DC, and Hartford. In fiscal 2002, 65% of the firm's revenue was derived from Canadian operations and 35% from the US. Founded in Vancouver, the bulk of Sierra's operations are based in western North America: 60% of fiscal 2002 revenues were earned in B.C., Alberta, Washington State and California. Sierra plans to expand in the future through organic growth and acquisitions, particularly in the US.

Sierra has primarily pursued a differentiation strategy, concentrating on market segments in which it holds a deep understanding of the functional issues. This has enabled Sierra to compete against market participants that may be much larger in size but less experienced in a particular area. Specific market segments are targeted in which the firm can experience a competitive advantage for at least five years. Currently, these market segments include: Enterprise Solutions, Health, Justice, Electronic Government, Financial Services and Insurance, Utilities, and Telecommunications. In 2002, specialty practices generated 76% of the firm's revenue, with the remaining 24% coming from general consulting services specific to the local area markets. Most recently, Sierra has chosen to focus on the first four of these specialty practices. Sierra targets mid-tier clients in these niche markets with annual IT budgets of at least \$10 million.

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<sup>5</sup> This estimate is based on employee participation in Sierra's Employee Share Ownership Plans (ESOP) and excludes employees who may not have participated in the ESOPs but instead purchased shares on the open market through brokers.

## 2. Industry Analysis

The purpose of this chapter is to present the context in which Sierra currently operates. The chapter is divided into three sections. The first section presents a review of the current state of the IT industry in general. Next, a detailed review of the SI sector using Porter's five forces model is presented. Finally, the overall value chain for the SI industry and Sierra's participation in it will be reviewed.

### 2.1. The IT Industry

The last 40 years have witnessed spectacular growth in the IT industry. Indeed, over this time period, IT spending as a percentage of capital expenditures by American companies has grown from less than 5% to almost 50%.<sup>6</sup> Currently, even with a soft global economy, worldwide IT spending by business is approximately \$2 trillion USD.<sup>7</sup>

In 2003, the SI segment of the IT industry is estimated to be \$3 billion in Canada, \$48 billion in the United States and \$107 billion worldwide<sup>8</sup> (all figures in USD). The SI segment represents approximately 20% of the entire IT consulting services market.<sup>9</sup> The remaining 80% consists of other services, including outsourcing, support services, training, and other professional services.

While overall IT spending remains significant, in the wake of the dot.com era and the 'tech wreck' that followed, the future of the industry is uncertain and is currently the subject of

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<sup>6</sup> Nicholas G. Carr, "IT Doesn't Matter," *Harvard Business Review*, (May 2003): 41.

<sup>7</sup> Nicholas G. Carr, "IT Doesn't Matter," *Harvard Business Review*, (May 2003): 41.

<sup>8</sup> Barbara Hall, Jason Bremner and Ned May, *Canadian Consulting and Integration Services Forecast and Analysis, 2000–2005*, (IDC, 2000) 36.

<sup>9</sup> Barbara Hall, Jason Bremner and Ned May, *Canadian Consulting and Integration Services Forecast and Analysis, 2000–2005*, (IDC, 2000) 19.



significant debate. What is of particular concern is the fact that IT spending for the period 2000-2003 has stagnated relative to the aggressive growth of the previous decade. The key question facing the IT industry is whether or not this stagnation in IT spending is simply cyclical, or if it is more structural in nature. The answer to this question has huge implications for companies participating in the IT industry, including those in the SI sector. These issues will be explored next.

### *2.1.1. Cyclicity in Demand for IT Services*

Proponents of the cyclicity position point out that cyclicity is not new to the IT industry. Vito Mabrucco, group vice-president of IDC Canada, provides some long term perspective to the current downturn: “Looking at the past 40 years and those things that impacted IT ... I find it reassuring because I’ve lived through those phases”... including demand driven by ...“mainframes, which led to departmental computing, which led to personal computing, which led to the current and future spate of wireless devices and other gadgets.”<sup>10</sup> Put this way, all it would take to regain stronger growth in the IT sector would be for the next ‘killer app’ to be developed and there would be a rush by many to acquire this new capability thereby spurring on greater IT spending.

If it were the case that such cyclicity would continue indefinitely into the future, participants in the IT industry, and in the systems integration sector in particular, would be well served to maintain business models that would generate enough profits in the boom years to ensure survival of the leaner years, and an overall adequate return over the long term. However, although it appears that there will always be a certain level of cyclicity in the IT sector, there is a growing body of evidence that indicates that the current stagnation is indicative of long term structural changes in the IT sector that imply that the halcyon days may be over.

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<sup>10</sup> Victoria Berry, “IDC Canada Lays It On The Line,” ComputerWorld Canada, 18, no. 24 (2002).

### 2.1.2. *Restructuring in the SI Sector*

Notwithstanding ongoing cyclical swings in the demand for IT services, the IT sector appears to have entered the maturation stage of the business lifecycle. Interestingly, six months after his above-noted comment, Mr. Mabrucco was less optimistic, saying that “IT is entering a ‘new reality’” - double-digit growth in the future is less likely now, since “the maturity of the industry is a factor - it’s getting bigger so growth rates will decline.”<sup>11</sup> This conclusion was further echoed by the Chairman and CEO of Gartner Inc, Michael Fleisher: “We may never return to the growth rates we experienced in the ‘90s. The IT industry must begin to accept 10% growth as the industry norm, rather than the traditional 25% or more that the market experienced over the last decade.”<sup>12</sup>

Indeed, in his recent and controversial article “IT Doesn’t Matter,” Nicholas G. Carr argues that a fundamental structural shift is taking place in the IT sector. Similar to the dynamics that occurred with the development of the railroad, telegraph, and electricity industries, Carr argues that IT has entered the ‘buildout’ phase and therefore no longer offers sustainable competitive advantage to individual firms; instead, IT is now simply a necessary part of the infrastructure needed to support all firms. Carr concludes:

*“While no one can say precisely when the buildout of an infrastructural technology has concluded, there are many signs that IT buildout is much closer to its end than its beginning. First, IT’s power is outstripping most of the business needs it fulfills. Second, the price of essential IT functionality has dropped to the point where it is more or less affordable to all. Third, the capacity of the universal distribution network (the Internet) has caught up with demand - indeed, we already have considerably more fiber-optic capacity than we need. Fourth, IT vendors are rushing to position themselves as commodity suppliers or even as utilities. Finally, and most definitively, the investment bubble has burst, which historically has been a clear indication that an infrastructure technology is reaching the end of its buildout.”<sup>13</sup>*

If a buildout point has been reached in the IT industry or even as progress is made towards a buildout, there are a number of implications for the IT industry, as follows.

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<sup>11</sup> Patrick B. Ryan , “Recovery: Sure But Slow. Analyst Firm Outlines Industry’s New Reality,” ComputerWorld Canada, 19, no. 11 (2003).

<sup>12</sup> Georgina Swan, “Half of Tech Brands to Vanish: Gartner,” Network Work Canada, 12, no. 23 (2002).

There will be greater standardization of technology based on wider acceptance of best practices. That is, companies will tend to replace customized applications with generic ones. Standardization and homogenization further imply commoditization of IT functionality.

With commoditization, there will be a greater emphasis on price competition. This, of course, implies that IT firms of all stripes will be less able to set prices and will become price takers in the market place. As a price taker, everything else being equal, profits can only be enhanced if firms reduce costs. Thus, firms will seek to aggressively reduce costs.

If the overall market pie is not increasing, individual firms will seek to increase profits by stealing market share from competitors. The recent spate of merger and acquisition activities can be seen in many ways as a drive for market share and scale. Gartner's Fleisher went as far as to conclude that "50% of all tech brands will disappear over the next two years."<sup>14</sup>

It is difficult to discern the exact extent to which the IT industry is being affected by cyclicity versus long-term structural change. It appears there is a mixture of both occurring; however, it also appears that this mixture is more heavily weighted towards long-term restructuring. For firms participating in the IT sector, it is prudent to assume that long term restructuring is taking place. The downside risk of assuming that the current stagnation is simply cyclical is too great. Accordingly, this paper assumes that long term restructuring is taking place, and that this will be the new environment that Sierra faces - an increasingly hostile business environment. The implications of this long term restructuring are considered throughout this paper; however, it is important to establish a baseline understanding of what the future may hold. Though the analogy is clearly speculative, the restructuring that has taken place in the automobile industry may be a helpful guide.

Some have indicated that the IT industry will follow the same general course of development as the auto industry over the last 80 years, only much more quickly. In the early 20<sup>th</sup>

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<sup>13</sup> Nicholas G. Carr, "IT Doesn't Matter," Harvard Business Review, (May 2003): 47.

<sup>14</sup> Georgina Swan, "Half of Tech Brands to Vanish: Gartner" Network Work Canada, 12, no. 23 (2002).

century, there were literally dozens of auto manufacturers. In the span of 30 years, however, this was reduced to a handful. In the course of this consolidation, the auto industry has grown dramatically. The survivors did very well; the losers were out of the game. While the number of original equipment manufactures has dropped, it is interesting to note that literally thousands of automotive after-market firms have sprung up and prospered very well. It appears that the key driver here has been the desire for customization and service. It also appears that this same driver is very strong in the IT realm. This is because while the number of hardware and software vendors may be dramatically reduced and their output may be relatively homogeneous, to support the diverse business needs of its users IT will still need to be customized to some degree. Also, while it is reasonable to assume that best practices in many industries will be standardized, there will still be a requirement for customization and integration work. Thus, it is in adapting and customizing standard software to sector and company specific requirements that a systems integrator can play a significant role. Thus, it appears that the role of the systems integrator is relatively secure for some time to come.

Extending the analogy with the automotive industry one step further, what is likely to be a factor is the forceful entrance of foreign-based SI firms into the North American markets. Again, these firms will likely have a significant cost advantage and the ability to maintain high quality.

The next section uses Porter's five forces model to identify additional drivers of the competitive environment in this sector.

## **2.2. Analysis of the SI Industry Using Porter's Five Forces Model**

Michael Porter introduced his five forces model as a tool through which the competitive environment of an industry can be decomposed.<sup>15</sup> Since its introduction, Porter's framework has been highly acclaimed and widely accepted. The five forces include:

- rivalry among existing firms;
- the threat of new entrants;

- the threat of substitutes;
- the bargaining power of clients;
- the bargaining power of suppliers.

Each of these five forces acts to increase or decrease the intensity of the competitive environment. For each force Porter has identified a variety of potential factors that together determine the degree to which the competitive environment is impacted. A summary of the results of applying this model to the SI industry is presented in Figure 1. Each of these forces is then further explained in the subsections that follow.

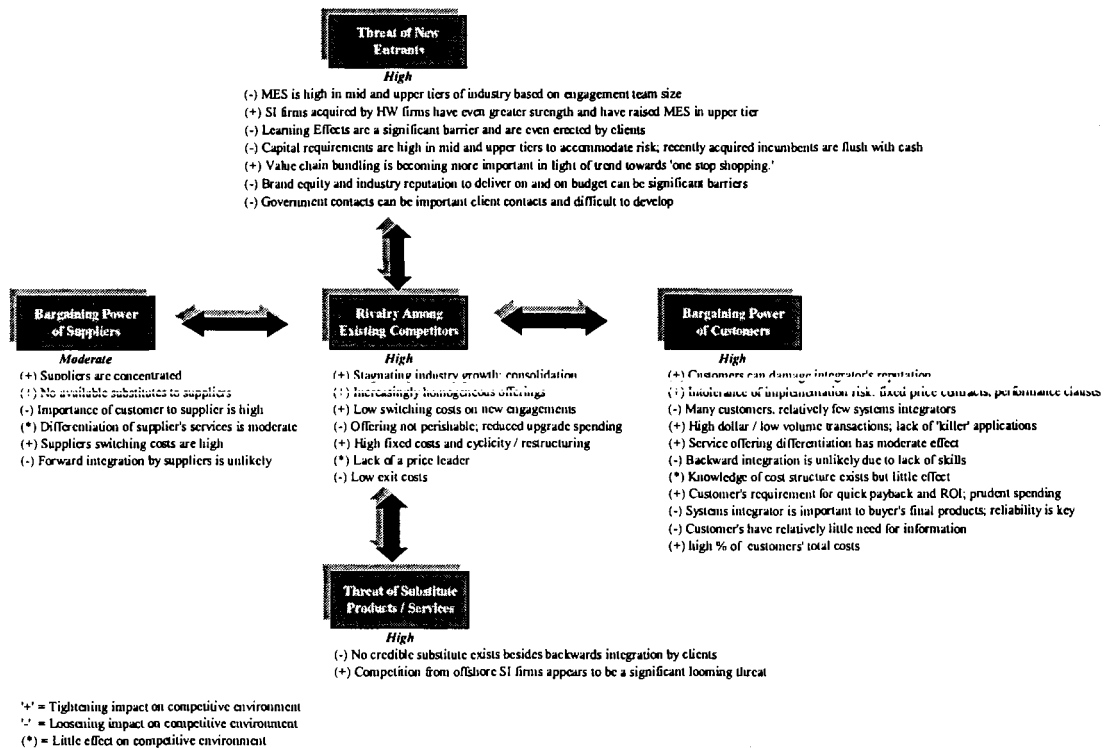


Figure 1 - Five Forces Analysis of the SI Industry

## **2.2.1. Rivalry Among Existing Competitors**

### **2.2.1.1. Industry Growth**

Industry growth rates directly affect rivalry amongst existing firms. For example, high rates of industry growth can provide profitable contracts for all firms and therefore reduces rivalry amongst competitors. Slow industry growth, on the other hand, implies that firms can increase only profits by stealing market share from other competitors (or by reducing their costs) - thus, rivalry increases.

The SI industry has grown rapidly over the past four decades; in recent years, however, consistent with the IT industry in general, the rate of growth of the entire market 'pie' has decreased significantly. Consistent with Porter's assessment, this has resulted in increased rivalry within the industry. More specifically, existing firms have therefore sought to enhance their profits by increasing market share. This is demonstrated by the increased acquisitions activity in the industry – the ultimate form of rivalry. For example, in recent years, Fujitsu has purchased DMR,<sup>16</sup> Cap Gemini SA has purchased Ernst & Young's IT consulting arm,<sup>17</sup> IBM has purchased LGS<sup>18</sup> and the IT consulting division of PriceWaterhouseCoopers LLP,<sup>19</sup> and CGI Group Inc has purchased Cognicase Inc.<sup>20</sup> It appears that this consolidation has also been fuelled by the divestiture of the consulting divisions of the major audit firms as forced by the US Securities and Exchange Commission. It is interesting to note that a number of acquisitions of SI firms have been made by hardware vendors. Dell has effectively commoditized the PC and server markets and as a result it appears that hardware firms have sought out the healthier margins of the IT services

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<sup>16</sup> Bryant Avery, "Info-Tech Fees Risky, Fujitsu Chief Says," Edmonton Journal, April 10, 2002.

<sup>17</sup> Deborah Seward, "French Buy Piece of Ernst & Young: Cap Gemini Pays \$11B to Get Consulting Arm," Edmonton Journal, March 1, 2000.

<sup>18</sup> Michael Lewis, "IBM Canada Snaps up LGS for \$275M," National Post, Feb 16, 2000.

<sup>19</sup> No Author Cited, "IBM to Invest \$1B to Expand Research," Calgary Herald, November 25, 2002.

<sup>20</sup> Kevin, Restivo, "CGI Says It Will Have Revenue of \$4B in Two Years," Financial Post, January 29, 2003.

markets, which have yet to be fully commoditized. At the mid-market level, Sierra has made six acquisitions since going public in 1998.<sup>21</sup>

In sum, the SI industry appears to have entered an intense consolidation phase of the business lifecycle, which has led to a significant increase in rivalry within the industry. When this consolidation phase has finished, however, there will likely be less rivalry among the remaining industry players since there will be fewer competitive pressures. Carr notes: “This war of scale, combined with the continuing transformation of IT into a commodity, will lead to further consolidation of many sectors of the IT industry ... and the establishment of lucrative monopolies and oligopolies. The winners will do very well; the losers will be gone.”<sup>21</sup>

#### 2.2.1.2. *Homogeneous Service Offerings and Low Switching Costs*

Rivalry amongst existing competitors is increased when the product or service offerings in an industry are homogeneous and switching costs are low. Calculating precisely where the SI industry is located on the homogeneous/heterogeneous continuum requires consideration of a number of complex factors.

Supporting an argument that the industry’s service offerings are homogeneous, many clients view the integration of legacy systems with new operating platforms to be something of a ‘black box’ - bluntly put, the client does not care how the system works from a technical standpoint, as long as the systems are appropriately integrated/connected and they are operating efficiently and effectively. In other words, the end result, not the means of arriving there, is what is valued by the client. Thus, from a client’s standpoint, a variety of integration solutions may be possible to achieve its desired end result. To the extent that a service provider is, in fact, *able* to offer multiple solutions to a client to achieve the end result desired, SI offerings are homogeneous.

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<sup>21</sup> Nicholas G. Carr, “IT Doesn’t Matter,” Harvard Business Review, (May 2003): 45.

However, other factors must be considered before concluding on the homogeneity of the SI industry's offerings. First and foremost, material differences exist between one service provider's proposed solution and another's. A service provider is not, in fact, generally able to offer multiple solutions to achieve a client's desired end result. In other words, the end result really does *not* justify the means of arriving there - for the integrated system to operate as efficiently and effectively as the client desires, a service provider will surely propose a unique, customized solution designed to meet the specific needs of that client; and the customization offered by one service provider will often be materially different from that offered by another service provider. Thus, in an industry where solutions are tailor-made to a client's needs, service offerings are considered to be heterogeneous.

Overall, while significant differentiation exists between solution offerings by SI firms, it appears that as best practices continue to be refined, there is an overall trend towards commoditization of SI services. Further supporting this view is the fact that historically, pricing has been a secondary issue to clients in the SI industry; more important to clients was the ability of the service provider to deliver the integrated solution on time and on budget. Thus, in the past, the typical price competition characteristic of an industry engaged in homogeneous service offering was not as prevalent in the SI industry. More recently, however, competitive pricing appears to have become more important.

With regard to switching costs, SI engagements are usually carried out over a period of time, defined by the completion of a specific deliverable. It is highly unusual for a client firm to switch systems integrators in the midst of an engagement, unless the client firm loses confidence in the service provider's ability to complete the assignment satisfactorily. This is because the client would incur significant additional costs if a replacement service provider had first to gain knowledge of the complexities of the current engagement before proceeding with the completion of the engagement. However, when *new* engagement opportunities arise with the same client, there is little difference in the cost of learning effects that would be incurred by an incumbent service provider versus a new service provider. Thus, achieving client satisfaction is necessary for a



systems integrator to secure repeat business. These dynamics result in increased rivalry among existing firms.

#### *2.2.1.3. Non Perishable Service Offering*

If the services that an industry provides are perishable, rivalry amongst competitors increases. “Sell it or smell it” is the adage.<sup>22</sup> In the case of the SI industry, the service offerings are relatively imperishable. In fact, IT upgrades tend to be discretionary in nature and form part of the capital budgets of most client entities. Thus, rivalry amongst existing firms in the SI industry is not increased due to perishable service offerings.

#### *2.2.1.4. High Costs and Cyclicity*

High fixed costs, accompanied by low variable costs, can lead to increased rivalry among existing firms in an industry especially in times of weakened demand. For example, firms will seek to cover fixed costs decreasing price to secure revenues from new business.

In the SI industry, labour is the biggest cost faced by SI service providers, often representing up to 75% of total costs. For firms like Sierra, that employ a ‘build and hold’ strategy of retaining key employees during times of economic downturn, labour costs are relatively fixed. In these times of downturn, such firms are forced to reduce their charge out rates to compete for new business and increase sales volume. Other firms that choose to lay off their workers when utilization declines do not need to compete for business by reducing charge out rates to cover their fixed costs. Thus, high fixed costs and cyclicity can increase firm rivalry in the SI business. This appears to be a material issue for Sierra, which will be addressed further, in later chapters of this report.

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<sup>22</sup> Ed Bukszar, Simon Fraser University EMBA 607 – Business Strategy, Classroom Notes, Spring 2003

#### 2.2.1.5. *Lack of a Price Leader*

When an industry has a price leader that other firms are compelled to follow, competition tends to be stifled due to retaliatory practices of the price leader. Of note, IBM is recognized as charging amongst the highest prices in the industry; however, it cannot be considered a price leader in the industry because it does not impose retaliatory practices against firms that do not follow its price-setting - thus other firms do not feel compelled to follow it. Accordingly, lack of a price leader does not appear to enhance rivalry among existing firms in the SI industry.

#### 2.2.1.6. *Exit Barriers*

Exit barriers can prevent competing service providers from exiting an industry and can therefore artificially increase competition. Occasionally a firm in the SI industry might be barred from exiting an industry because it has engaged in a long-term service contract that includes exit penalties. In general, however, if a firm is uneconomic, it can be shut down and its employees laid off; severance packages would be the only material cost of most such exits from the industry. Thus, competition within the SI industry is not intensified by the existence of exit barriers.

#### 2.2.1.7. *Conclusion on Rivalry Among Existing Competitors*

A number of factors appear to be significantly increasing the level of rivalry in the SI sector. In particular, price competition appears to have increased considerably due to a number of key factors. Growth in the IT industry has slowed considerably, which in turn has reduced spending on upgrades and new implementations requiring systems integration. This has led firms with high-fixed-cost, low variable cost operating models to reduce prices to cover their fixed costs. In addition, it appears that SI firms have been focusing on securing market share by means of being more price competitive. Finally, as best practices become more standardized, this is expected to result in an overall trend towards commoditization of SI services and more intense price competition.

In sum, the IT industry, including the SI sector, appears to have entered the maturation stage of the business lifecycle. The recent spate of merger and acquisition activity appears to be driven by firms seeking to secure market share and hardware firms seeking the relatively higher margins from service offerings.

In response, IT firms of all stripes are well advised to review the long term viability of their current operating models to ensure these are as financially flexible as possible to adapt to the long term restructuring that is taking place. This matter is major theme of this paper and is explored further in later chapters.

## **2.2.2. *Threat of New Entrants***

### **2.2.2.1. *Minimum Efficient Scale (MES)***

Threat of new entrants is increased when MES is low. In the SI industry, MES is driven not by a heavy investment in manufacturing facilities but by the size and geographic reach of the project team that is required to complete an engagement.

There is great variability in the size and scope of integration engagements. For example, projects can range from a relatively simple conversion of an accounting system of a medium-sized business that would require a small team at one location for a few weeks, to the implementation of a global Enterprise Resource Planning (ERP) system for a multi-national corporation such as an automotive original equipment manufacturer. At the low end of the market, MES is not a barrier to entry; however, as the project size and scope increases, MES becomes a formidable barrier to entry. In the mid market segment in which Sierra participates, projects are usually at least \$500,000 in size, and are staffed by teams of 10 to 30. While new entrants that are start-ups may be able to assemble such a team, they would likely find it challenging to gain traction in the mid-tier segments of the market. More likely, start-up entrants would enter the integration market at the

low end of the market and then ramp up in scale, likely over a number of years. Thus, MES is a significant barrier to entry for start up firms to enter the mid and upper tiers of the SI industry.

Another form of 'new entrant' is, however, a significant threat. This threat is the mid or upper tier SI firm that is significantly strengthened as a result of being acquired by a much larger entity. Such regenerated firms are able to have a much greater impact on the competitive landscape. Two examples make the point: in 1997, Fujitsu, primarily a hardware manufacturer, purchased DMR Consulting to broaden its total offering; likewise IBM purchased PriceWaterhouseCoopers' IT consulting group to enhance its ability to capture the entire SI value chain and become a 'one stop shop' for IT services. Both of these consulting firms now hold much stronger positions in the market due to a variety of synergies.

#### 2.2.2.2. *Learning Effects*

Success in the IT integration services business is dependent on many factors, not the least of which are the technical expertise and experience of the employee consultants assigned to the engagement, and the firms' project management skills. Strength in such factors dramatically reduces the learning effects, or learning curve, of a systems integrator engaged with a client. Unlike new firms entering the SI industry and hoping to compete, established firms with technically astute, experienced staff have a lower cost platform and are therefore able to bid a lower price for an engagement. The extent to which such learning effects are specific to niche markets in the SI industry and how they may be a barrier to entry to these markets is a very important issue for Sierra. This is because for the last number of years Sierra's strategy has involved targeting specialized market segments in which it can experience a competitive advantage for at least five years - in effect, to capitalize on the knowledge it already has in these market segments. The degree to which such a competitive advantage exists is difficult to measure; however, with the financial backing and greater in-house resources that newly acquired regenerated firms now have (such as PriceWaterhouseCoopers), it is reasonable to assume that the length of time that Sierra will be able to sustain any competitive advantage in its chosen market

segments will diminish. For example, IBM has developed expertise in 18 vertical markets and has over 60,000 employees; clearly, it has the internal capacity to quickly challenge the competitive advantage of most niche players.

In regard to learning curve effects and project management, most projects can be considered, either explicitly or implicitly, as fixed-price in nature. To succeed in this context, project management skills are absolutely essential. Again, these skills can require years of experience to develop. Thus, even if a new entrant firm were to hire experienced project managers, because these project managers would be working in the context of a *new* staff, a *new* client, and perhaps an *untested* firm specific methodology, there is a risk that the project will not be completed on a timely basis. In this context, an astute project manager would build a higher level of 'contingency' into the engagement budget to mitigate these risks. This, in turn, would result in a higher bid price on an engagement that would be unattractive to a potential client in a competitive bid context.

Further to this point, if a firm were to 'low ball' its bid to be competitive with more experienced firms, a prudent client would also know that the firm does not have the same level of experience as incumbent bidders, that the firm therefore faces higher risks (costs), and thus may not be able to cover these costs through engagement revenues. This, in the absence of large financial reserves held by the new entrant, will threaten the entrant's ability to complete the engagement. These facts would likely eliminate the entrant from the client's short list of potential service providers. Thus, clients' *knowledge* of learning effects can erect a barrier to entry on behalf of the incumbent SI firms. Overall, learning effects are a formidable barrier to entry to the SI industry for new entrants or for existing SI firms seeking to penetrate new market segments.

#### 2.2.2.3. *Capital Requirements*

The threat of new entrants into an industry increases when capital requirements are low. New firms entering into the SI industry at the low end of the market can be boot-strapped relatively

easily; however, entrance into the mid and upper tiers of the market can require substantial financial backing. This is because firms participating in these segments require the financial strength to be able to weather difficulties such as fixed price projects that incur significant cost overruns. In addition, firms seeking to develop a deep expertise in specific market segments will likely need take on a high fixed cost, low variable cost operating model based on retaining key staff. If so, this operating model requires financial strength to withstand downturns in the economy in which fixed labour costs will not be covered by operating margins.

New entrants that are start-ups in the SI industry will likely not have currency in the equity markets due to the lack of proven experience in the marketplace and also the lack of any 'blue sky' potential. Therefore, firms that enter into the SI business likely need to start small and increase their invested capital by retaining earnings over a number of years to develop financial strength. Once this has been done, and they have also proven themselves to be successful in the marketplace as minor players, equity markets may be open to supporting them through an IPO. Such was the case for Sierra. Thus, capital requirements are a significant barrier to entry for new firms entering the mid and upper tiers of the SI industry.

Newly acquired, regenerated firms are, however, a factor to consider, because in a number of cases their acquirers are flush with cash. IBM, for example, held \$5.2 billion in cash and marketable securities at its last year-end, and Accenture holds \$1.3 billion (USD). Such resources are obviously formidable.

#### 2.2.2.4. *Vertical Integration and Bundling*

Vertical integration refers to the extent to which a firm owns its upstream suppliers and downstream buyers.<sup>23</sup> The threat of new entrants is decreased when extensive vertical integration along the value chain is required to effectively compete in the industry. For example, the most successful firms in the oil business are vertically integrated; they explore, refine, ship, and retail

their own petroleum products. The end consumer is interested only in purchasing the end product, in this case gasoline.

As will be explained later in this chapter, the SI industry value chain can be broadly summarized as involving the following five steps:

- problem identification;
- solution identification;
- hardware and software procurement;
- integration services; and
- production support.

The SI value chain does not lend itself to vertical integration because each suppliers' product or service is consumed directly by the final customer, rather than by the next 'link' in the value chain. That is, the client is the end consumer of all components of the value chain, the sum of which result in a technology solution. Thus, each segment can be viewed as being relatively discrete in nature - firms can participate in just one segment or across all segments. For example, a client firm may already have chosen the software and hardware platform on which the solution will be based and may simply want to engage an experienced systems integrator to connect the new technology platform to its legacy systems. Thus, vertical integration is not a significant barrier to entry for new firms entering the SI industry.

An important and related notion, however, is bundling. Bundling occurs when various end products are packaged as a set. When each component is required by the purchaser, bundling becomes 'one-stop shopping.' The preference of clients for purchasing a complete solution is a significant recent trend in the SI industry. With its acquisition of PWC consulting, IBM can now boast that it can provide 'one-stop shopping' for the fulfillment of a broad spectrum of IT needs. Thus, it appears that bundling along the value chain has become more of a barrier to entry to SI

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<sup>23</sup> QuickMBA.com [online], 2003.

start-ups and also a significant issue for pure play SI incumbents to contend with. This will be reviewed in chapter four.

#### 2.2.2.5. *Patents, Trademarks, and Brand Equity*

Patents and trademarks are not a significant barrier to entry into the SI industry since no firm has an approach to SI engagements that is proprietary in nature and could not be copied by other firms in the industry.<sup>24</sup>

A related concept to trademarks and patents, however, is brand equity. Some firms in the industry definitely do have stronger brands that they can leverage to secure contracts. For example, 'IBM' is a well-known brand worldwide. It is also a popular adage that 'no one ever got fired for choosing IBM.' IBM's IT consulting arm benefits from this strong brand equity. That is, the strength of the brand gives the client a sense of security that IBM will deliver or, if IBM does not deliver, that those who chose to engage IBM would not suffer negative consequences for doing so. Firms without this brand equity do not enjoy such benefits.

Further to this point, even in the absence of brand equity, reputation in the SI industry is a significant barrier to entry. At best, only 30% of IT projects meet their initially-stated objectives.<sup>25</sup> Thus, a client firm will often choose the service provider that has the strongest reputation to deliver on time and on budget. A new entrant to the industry that does not have such a reputation would likely not be chosen over a firm that has a strong reputation in the industry. This high level of brand equity supports the premium pricing that IBM charges. Thus, brand equity and reputation in the SI industry are significant barriers to entry.

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<sup>24</sup> Note, however, that in February of 2003, IBM purchased Rational Software Inc., the firm that developed the Rational Unified Process (RUP), which has become an industry standard approach to SI engagements.

<sup>25</sup> The Standish Group, 1994 Chaos Report [online].



#### 2.2.2.6. *Government Regulation*

No government regulations exist that specifically restrict new entrants into the SI industry; however, government remains the biggest purchaser of integration services in all markets. Thus, if a new entrant is not registered with the government as an approved supplier or if it does not have key government contacts, successful entry can be effectively impaired.

Despite the absence of specific government regulations restricting new entrants, government regulation has played an important role in the SI industry. Some years ago, the Securities and Exchange Commission in the United States began to require major audit firms to divest themselves of their consulting groups (including IT) in an attempt to restore auditor independence. As a result, systems integrators that were previously associated with the major accounting firms are no longer able to benefit from cross selling leads supplied by their audit colleagues. On one hand this levelled the competitive playing field; however, as indicated, these firms are now fortified after having been acquired by major IT players. Again, it is interesting to note that many of the acquirers have been hardware firms.

#### 2.2.2.7. *Overall Assessment of Threat Of Entry*

Overall, threat of entry by start-up firms to the SI industry is highest at the lowest tier of the market. At the mid and upper tiers, threat of entry by start-ups is low. What is much more significant is the emergence of incumbent systems integrators who have been significantly strengthened as a result of being acquired by IT firms that have historically not participated in the integration segment of the SI value chain. These rejuvenated incumbents threaten to significantly change the SI industry playing field by becoming 'category killers' in many SI market segments.

#### 2.2.3. *Threat Of Substitutes*

No credible technical substitutes currently threaten the SI industry. This is because connecting legacy IT systems with new operating platforms continues to be based on the technical

expertise of integration consultants. One potential substitute in the future, however, may be artificial intelligence (AI). Under this scenario, AI could be used to 'think through' the most appropriate connections between old and new operating platforms. It appears, however, that the realization of this concept is still a number of years away. Coincidentally, IBM has for years been a pioneer in the development of AI, perhaps being best known for "Deep Blue," its sophisticated chess-playing computer. Moreover, IBM spent \$4.8 billion USD in research and development in fiscal 2002. With this history and continued research focus it would not be surprising for IBM to eventually develop some form of AI to assist with SI work. While it is interesting to consider AI as a technical substitute, at this point in time this is clearly speculative.

Note that the lack of a technical substitute implies that there will continue to be a high labour component in SI work for the foreseeable future (again, approximately 75% of the SI firm's revenues are required to fund labour costs). This, in turn, implies two things. First, if profits are to be materially improved, the reduction of costs - the cost of labour - is the first place to look. Second, even with the efficient use of labour, this cost will still be significant. Thus, SI firms, like all personal services firms that operate under a labour intensive delivery model in which revenues are earned on an hourly fee (T&M) basis, will be challenged to realize extraordinary 'blue sky' profits. That is, under a T&M revenue model, holding a franchise in the SI industry is *not* simply a license to print money. This conclusion can be relaxed to a degree, however, if a fixed price revenue model is used. This will be explored further in chapter four.

A noteworthy development in regard to substitutes involves the commoditization of use of off shore labour in connection to the code writing component of SI work. Code has become a commodity that can be supplied relatively cheaply by a number of vendors - especially by offshore suppliers. Knowing *what* code to write is where the SI firm can add significant value. While off shore labour is used primarily for code writing at this point in time, it is entirely plausible that in the future, larger and larger pieces of SI engagements could be delivered from remote locations. This, of course, poses a significant threat to the core business of systems integrators. Furthermore, it is also conceivable that SI firms that are based out of such off shore locations may enter the

North American markets directly. These firms would then be able to capture the full value integration component of the SI value chain (see chapter three).

The development of off shore IT services markets raises an important issue in the IT industry. While most North American based IT vendors are experiencing stagnation, IT firms in some developing countries are experiencing significant growth. For example, the IT services sector in India has grown from \$500 million to \$6.2 billion in 2002.<sup>26</sup> A key driver of this growth has been the ability of off shore firms to deliver high quality services at roughly 1/3 of the North American cost. In light of the current global economic malaise, client firms are focusing on cost reduction and consequently savings from such overseas sources offer a compelling value proposition. Notably, such IT stalwarts as IBM and EDS are looking to develop a substantial presence in India.

Overall, while no technical substitutes are available to take the place of labour intensive integration work, overseas vendors do pose a credible threat to the SI industry as a non-technical substitute.

#### **2.2.4. *Bargaining Power of Customers***

The power of customers relative to SI service providers significantly affects the dynamics in the SI industry.

##### **2.2.4.1. *Concentration of Clients Relative to Systems Integrators***

There are *many, many* customers of integration consulting services and relatively few SI firms. Almost every organization of size or scope, regardless of industry sector, requires an IT system to compete. Conversely, there are relatively *few* systems integrators in the market, given the specialized nature of the skill sets required. In times of strong demand for SI services, these

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<sup>26</sup> No Author Cited, "America's Pain, India's Gain," *The Economist*, 366, no. 8306 (2003): 57.

dynamics give systems integrators more power than their customers; consequently, SI firms are able to extract higher fees for their services. The longer term stagnation in IT, however, has significantly mitigated this effect, especially in light of firms being willing to reduce prices to win business to help cover fixed costs.

#### *2.2.4.2. Volume of Purchases*

The SI business is characterized by high dollar / low volume transactions. In addition, there appears to be a trend towards fixed price contracts. These dynamics imply that customers have more power in their relationship with a systems integrator, because each contract represents a significant amount of business for the systems integrator. Again, this dynamic has been accentuated in the stagnation in demand for SI services in recent years.

#### *2.2.4.3. Service Offering Differentiation*

As previously indicated, despite the competition for value added features, there appears to be at least some perceived homogeneity in the service offering. This implies that customers can obtain solutions from a variety of service providers. Also, as best practices become standardized there will be less ability to differentiate effectively. Overall, it appears that service offering differentiation has a moderate effect on the competitive environment.

#### *2.2.4.4. Threat of Backward Migration by Customers*

Backward migration implies that client firms would perform the integration involved in an IT solution themselves rather than engage an SI firm. Again, the SI business is founded on the fact that it is not economic for most client firms to maintain the highly specialized skill set of integration specialists once the production stage has been entered. Only very large entities, which are continually performing IT upgrades, could afford to maintain a roster of integration specialists.

Note, however, with the increased commoditization of IT, it is reasonable to assume that the indifference curve between outsourcing integration work and doing the work in house, will shift in favour of the 'do it yourself' approach.

At the current time, however, the threat of backward migration by customers appears to be relatively low.

#### 2.2.4.5. *Customers' Knowledge of System Integrators' Cost Structures*

Because the dominant costs of consulting firms are the salaries of their consulting staff, customers can quite easily calculate what the underlying cost of a consultant is relative to the rate that they are being charged on a T&M contract. Thus in this industry, customers' knowledge of the system integrators' cost structures is high. In some industries this knowledge would put more bargaining power into the hands of the client; however, this does not appear to have a significant effect in the SI industry, since the customer is focused on having the IT solution implemented on time and on budget. The customer is usually more interested in cost savings from the ongoing use of the solution in the 'production' phase.

In the case of a fixed price contract, it is much more difficult for client firms to estimate the SI firm's costs since while standard rates may be estimated, the hours needed for the SI firm to complete the deliverable would be unknown to the client.

Overall, it appears that customers' knowledge of system integrators' cost structures does not appear to play a significant role.

#### 2.2.4.6. *Customers' Profitability and Cost Savings from the System Integrators' Offering*

Everything else being equal, if customers' profitability is high, this gives power to the systems integrator since the systems integrator is more able to extract higher rents due to the

customer being less likely to demand price reductions. Moreover, most firms that undertake IT solutions are profitable. This can be inferred since IT upgrades tend to be capital in nature. For most entities, capital expenditures are usually only made if the firm is in a healthy (profitable) state. In addition to the client firms being profitable, the IT projects themselves are usually undertaken because they can greatly increase the profitability of the client organization.

On the other hand, the maturity of the technology appears to be catching up with the industry. Over the last 30 years, most discrete business functions have been computerized and upgraded a number of times. The value proposition in most of these initiatives was simple but compelling. Consistent with Carr's hypothesis regarding the buildout of IT, now that such basic functions have been 'wired,' more creative business cases are required to demonstrate a compelling value proposition in terms of functionality and return on investment to secure new SI business. Notably, perhaps one of the greatest opportunities before the IT industry is the integration of the discrete systems (information silos) and also the refinement of the client firm's value chain. In regard to information silos, many applications are 'narrow and deep' in terms of functionality. Moreover, those applications that are broad in terms of functional scope tend to offer only very shallow functional depth.

Note also that client firms are becoming more prudent in their deployment of IT. A number of studies have shown that higher IT spending does not imply greater financial returns.<sup>27</sup> In addition, firms that have suffered IT implementation failures are now more careful to be late adopters rather than early ones. They let their rivals suffer the high costs of being Beta clients. Withholding expenditures in this manner puts significant reduces demand for software and therefore reduces integration opportunities for SI firms. Moreover, when an upgrade or new application is installed, the client firm has higher expectations that the implementation will go smoothly.

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<sup>27</sup> Nicholas G. Carr, "IT Doesn't Matter," Harvard Business Review, (May 2003): 49.

#### 2.2.4.7. *Importance of the Systems Integrators' Inputs to Customers' Final Products*

Most firms undertake IT implementations because these investments are absolutely critical to the success of the firm. More and more, IT applications play an essential role supporting the execution of a firm's strategy. IT applications have moved from historically having an ancillary operational impact, to the point where they are now considered inseparable from an entity's overall strategy.<sup>28</sup> Thus, the importance of systems integrators' inputs to customers' final products is very high. This seemingly gives more power to the systems integrator. Mitigating this power in the future, however, is the trend towards increased commoditization of IT services and the possible development of a utility model. If such developments were to come to fruition, it appears that the roll of the systems integrator would be substantially reduced.

Borrowing from Carr again, IT has increasingly become an infrastructure item akin to a reliable electrical supply. Thus, while IT is important and still relatively costly, there is less and less sustainable competitive advantage that can be derived from it. IT is simply becoming another necessary cost of doing business, and not a competitive differentiator. Extending the analogy further, the client firm is developing similarly high expectations of their IT provider as they currently have of their electricity supplier. Reliability and cost effectiveness will increasingly be top of mind.

#### 2.2.4.8. *Customers' Needs for Information*

Beyond basic systems architecture information that is needed to operate the new IT system in the production phase, many customers ultimately care only whether or not the solution will work, not about the fine details of *how* it will work. Thus, clients have relatively little need for information beyond technical documentation, giving the systems integrator greater latitude and

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<sup>28</sup> Dan Burke and Alan Morrison. *Business At the Speed of Stupid*. (Cambridge: Perseus Publishing, 2001) 161.

power in the relationship. This will likely increase as commoditization of IT services develops further.

#### 2.2.4.9. *Percentage of Total Customers' Costs Spent on Systems' Integrators'*

##### *Inputs*

Over the last 40 years, IT spending has increased from less than 5% of the capital expenditures of American companies to almost 50% by the end of the 1990's.<sup>29</sup> Clearly, IT is a costly undertaking. Notwithstanding the earlier comments on client perception of 'black box' solutions, customers are *very* concerned that the solution meet their expectations for performance. The historically high failure rate of IT projects is becoming increasingly unacceptable to client firms. The increased use of fixed price contracts, penalty clauses for non-performance, and the requirement for engagement performance bonds are consistent with these heightened expectations.<sup>30</sup> Clearly, this puts tremendous pressure on the systems integrator to deliver an acceptable solution.

This pressure extends beyond individual engagements. More specifically, reputation in the SI industry is very important. An unsatisfactory engagement can be communicated informally throughout an industry and damage a firm's future prospects for work in that sector. Maintenance of the systems integrator's reputation is one of the most important long-term key success factors.

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<sup>29</sup> Nicholas G. Carr, "IT Doesn't Matter," Harvard Business Review, (May 2003): 41.

<sup>30</sup> Many large contracts will include performance bonds which the SI firm must post before the engagement starts. In this arrangement, the SI firm pays an insurance premium that obligate the bonding company to pay out a claim made by the SI firm's client in the case that deliverables are not met; however, the bonding company, in turn, usually has the right to reclaim up to 75% of the payout from the SI firm. Thus, this arrangement is highly punitive to the SI firm if it fails to deliver an acceptable solution. In other cases, the contract between the client and the SI firm sometimes includes a termination clause in which the client can terminate the contract for failure to perform and require the SI firm to pay for the costs incurred by a replacement SI firm. These switching costs are covered by the incumbent SI firm thereby putting significant power into the hands of the client firm.



#### 2.2.4.10. *Overall Assessment Of Customers' Strength*

Relatively low volumes of purchases, reduced ability of IT to offer sustainable competitive advantage, the persistent high cost of IT upgrades, intolerance of unreasonable implementation risk, prudent withholding of the IT purse strings, and increased commoditization of IT in general, have each contributed to an increase in the relative strength of the SI customer in recent years. It appears that this strength is on track to increase even further in the future as these factors are based on many of the underlying trends in the IT industry.

#### 2.2.5. *Bargaining Power of Suppliers*

In the absence of any technical substitutes, employees and subcontractors are currently the principal 'suppliers' of SI consulting firms, and in Sierra's case constitute approximately 75% of total costs.<sup>31</sup> These individuals supply the technical skill and experience that is used to achieve an engagement deliverable.

##### 2.2.5.1. *Supplier Concentration Relative to Systems Integrator*

Since technically qualified individuals are the only major supplier to systems integrators, supplier power is relatively high. In the tech boom of the late 1990's employee turnover was relatively high, as suppliers sought to extract higher prices (salaries) from the systems integrators. In light of the stagnation that has occurred in the IT industry over the last few years, supplier power has moderated considerably.

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<sup>31</sup> In Sierra's case, at least half of the remaining 25% of costs are usually for General and Administrative expenses. Suppliers in this category have only modest power and are ignored for the purposes of this analysis.

#### 2.2.5.2. *Availability of Substitute Suppliers*

In the past, SI consulting firms were highly dependent upon the performance and loyalty of employees and sub-contractors. To combat this position of supplier power, and to secure a reliable supply of expertise on which it could draw, Sierra developed strong employee retention programs, including a very employee friendly environment in which to work. This will be discussed further in chapter three. In addition, Sierra's 'build and hold' model was a direct response to this resource need. This will also be explored further in the analysis of Sierra's corporate culture in chapter three.

While there is currently no credible technological substitute for technically qualified individuals, the advent of overseas outsourcing firms is developing into alternative source of supply. Currently, code writing can be outsourced overseas on a very efficient and effective basis. For code writing at least, Sierra is less dependent on its traditional suppliers and is less subject to 'hold up' in times of increased demand. Thus, increased availability of substitute suppliers has strengthened Sierra's position.

#### 2.2.5.3. *Importance of System Integrator to the Supplier*

Adding further power to the SI firm relative to the employees and local subcontractor is the fact that SI firms are quite important to these suppliers. That is, employees and local subcontractors have a limited market in which they can sell their specialized skill set. Suppliers may be able to sell lower level skills to entities with large internal IT shops; however, many entities do not have an ongoing need for implementation specialists. Instead, they are usually operating in 'production mode' and require a much less specialized work force. Thus, the importance of the systems integrator to the supplier is high.

#### 2.2.5.4. *Differentiation of the Supplier's Services*

Employees and subcontractors generally have specialized skill sets. These skill sets can vary considerably; for example, one consultant may have an expertise in Peoplesoft version 8.3 upgrades in the forest sector, while another consultant may be specialized in records management issues in the health industry. Notwithstanding this variability, there is also a significant overlap in underlying skills. Thus, while some asset specificity exists in the SI personnel skill set, additional training gives the SI firm some flexibility to respond to changing market conditions, at least in the medium term. For this reason, differentiation of supplier's services is considered moderate.

#### 2.2.5.5. *Switching Costs of the Systems Integrator*

Switching suppliers in the context of an IT firm implies changing consultants (employees and sub-contractors) in the midst of an implementation engagement. Switching costs can be very high since the replacement consultants must be 'brought up to speed' on the complexities of the integration engagement.

#### 2.2.5.6. *Threat of Forward Integration by Supplier*

Forward integration by a supplier in the context of SI consulting implies that an employee or subcontracted consultant would stop working for the IT firm and strike out on their own and compete for the same client base. Alternatively, a client firm may try to hire away an employee or subcontractor consultant. In either of these cases, a standard 'non-compete' clause in employee contracts and subcontractor agreements mitigates this risk. In such situations, the threat of forward integration is weak, and the SI firm holds most of the power.

#### 2.2.5.7. *Overall Assessment Of Suppliers' Strength*

Based on the assessment of above, overall, the power of suppliers is moderate relative to the SI firm. Furthermore, the stagnation in the IT industry and the advent of overseas suppliers of code is decreasing the power of employees and local subcontractors.

#### 2.2.6. *Overall Assessment of the SI Industry*

Without intending to be alarmist, it is clear that the SI industry is becoming an increasingly hostile environment in which to conduct business. This conclusion is supported by the preceding five forces analysis as follows:

- **Rivalry amongst current participants:** IT spending has stagnated due to a combination of cyclical downturn and long-term industry restructuring. While it is difficult to discern the precise mix of these factors, strong evidence supports heavier weighting towards the latter factor. In light of this stagnation in demand, SI firms with high-fixed-cost, low-variable-cost operating models have put downward pressure on prices. In addition, standardization of best practices is expected to lead to increased commoditization and increased price competition; this will therefore force SI firms to focus on cost reduction to enhance profits. In addition, there has been increased competition for market share that has led to significant merger and acquisition activity. Hardware firms seeking margins from the SI sector have added to this acquisition trend. The SI firms resulting from this acquisition activity are fortified through greater financial backing, enhanced cross selling and bundling opportunities and stronger brand equity.
- **Bargaining Power of Customers:** While IT still commands a high percentage of clients' capital expenditure 'wallet,' clients are becoming more discerning in their IT initiatives. They require more compelling business cases and assurance of return on investment. Realizing that IT can no longer offer a sustainable competitive advantage, seasoned clients understand that it is wise to not be a first adopter of IT, and also that high IT spending is correlated with inferior financial returns. In addition, clients bitten by IT

failures in the past have become increasingly sophisticated in managing IT risks by employing greater use of fixed price contracts and financial penalties for non performance.

- **Threat of Substitutes and New Entrants:** While no viable technical substitutes currently exist, off shore IT services vendors can offer low cost code writing which any SI firm can procure. It is reasonable to assume that established SI firms from such off shore locations will eventually seek their own presence in the North American SI market. While it is unclear what generic strategy such firms might follow, it seems likely that a cost leadership strategy is likely. This, in turn, would put further downward pressure on the pricing of SI service offerings.
- **Bargaining Power of Suppliers:** It appears that only in its relationship with suppliers has the SI firms' position in the competitive environment been enhanced. This is due to the stagnation in demand for IT services undermining the relative power of employees and local subcontractors, as well as the availability of substitute sources of supply, namely off shore suppliers of code.

### 2.2.7. *Key Success Factors*

Sierra's ability to compete in this increasingly hostile business environment is the major focus of this paper. Fortunately, dealing with hostile markets is not a new issue for business. In fact, "it is not an exaggeration to say that almost all industries are either hostile or are in danger of becoming hostile."<sup>32</sup> Guidance from a number of sources is available. Two key resources are the research of Porter at the Harvard Business School and an exhaustive study conducted by Windermere Associates on the performance of firms in 40 hostile industries. There is significant overlap between these two sources of guidance. To avoid confusion, Porter's guidance will be presented and this will be supplemented with the findings from the Windermere study where

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<sup>32</sup> David A. Aaker, *Developing Business Strategies*, Sixth Edition, (New York: John Wiley & Sons, Inc., 1998), 60.

additional insight can be gleaned. Porter's suggestions for success in the context of hostile / maturing markets that are applicable to Sierra's operations include the following:<sup>33</sup>

- **Clarification of Generic Strategy:** As will be seen in the next chapter, Porter opines that ultimately there are only two generic strategies that result in long-term firm success: cost leadership or differentiation. Porter notes that in periods of market expansion, mixtures of these strategies can exist; however, in the context of a maturing market, firms will need to choose between the two.
- **Sophisticated Cost Analysis:** Porter notes that in a maturing market, cost analysis becomes increasingly important to rationalize product mix and also price correctly.
- **Process Innovation:** Here the key is ensure that the firm's end product or service is delivered as cost effectively as possible.
- **Increasing Scope of Purchases:** Increasing the scope of purchases of existing customers is considered to be a superior option that seeking new customers.

In general, the combined guidance of Porter and Windemere is considered to represent over arching key success factors that Sierra should attempt to meet or at least thoroughly consider to enhance its prospects for success in an increasingly hostile competitive environment. The evaluation of Sierra in connection to these key success factors is one of the main purposes of this paper. Concomitant to this goal is the identification of options that Sierra could pursue to better meet these key success factors.

In light of the current state of the industry as noted in the five forces analysis and the generic guidance offered above, there are key issues that Sierra still need to address to ensure its continued success. These include:

- What should Sierra's future generic strategy be in light of the developments in the IT industry including consolidation?

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<sup>33</sup> Michael, Porter, *Competitive Strategy: Techniques For Analyzing Industries And Competitors*, (New

- Should Sierra seek to continue to expand or hunker down?
- How well does Sierra know its costs?
- Is Sierra's current operating structure cost effective to compete?
- How should Sierra respond to bundling?

These issues will be specifically addressed in chapter four. In the meantime, information relevant to assess these issues will continue to be gathered in the next section of this chapter and in chapter three.

### 2.3. The Value Chain of the Systems Integration Industry

The SI industry value chain can be captured in five segments:

- problem identification;
- solution identification;
- hardware and software procurement;
- systems integration; and
- production support.

These segments plus Sierra's participation in these is shown in Figure 2 below. Each segment will be reviewed in turn.

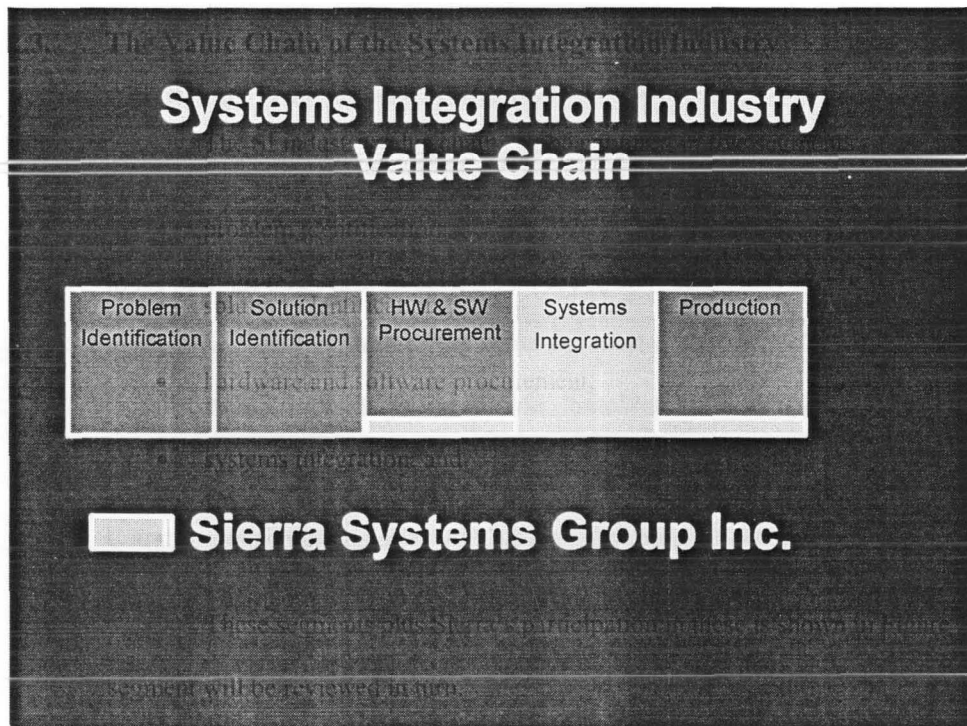


Figure 2- SI Industry Value Chain<sup>34</sup>

<sup>34</sup> Ed Bukszar, Simon Fraser University EMBA 607 – Business Strategy, Classroom Notes, Spring 2003.



### **2.3.1. Problem Identification**

The problem identification segments begins when a client firm becomes aware of a problem in its business operations that could be solved through information technology. Often the nature of the problem is very obvious; for example, the current accounting system does not supply the appropriate level of cost information to properly manage the business. In such cases, firms self-identify the problem and also the opportunity for an IT solution.<sup>35</sup>

At other times, a client firm may not be aware that an opportunity exists for operational efficiency gains through implementation of an IT solution. In such cases, opportunities for improvement through the deployment of an IT application are often identified by outsiders, for example, by audit firms. In the course of their work, audit firms must gain an understanding of their client's business, including a knowledge of internal controls that may prevent or detect material error in the financial statements. In its report to the client's audit committee (which includes members of the Board), the audit firm will often report control weaknesses and other opportunities for operational improvement that can be corrected or attained through an IT solution. In the past, the audit firm would have an opportunity to cross sell to its IT consulting arm. Further to this point, it is very interesting to note that most of the top tier SI firms in the North America (KPMG, Accenture, Deloitte and Touche, PriceWaterhouseCoopers, Cap Gemini Ernst and Young) were all related to the big five accounting and audit firms. Before the Security Exchange Commission (SEC) ruled that audit firms must divest their consulting practices, this 'inside track' to identifying systems deficiencies gave these firms a strong competitive advantage in sourcing opportunities for SI engagements. Now that this advantage has been removed, the playing field has

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<sup>35</sup> It should be noted that IT solutions should ideally be driven by the firm's overall strategy; however, this is often not the case and the results are often less than optimal. Moreover, in most cases firms cannot rely on an IT investment to achieve a sustainable competitive advantage. This is because in most cases, the IT solution can eventually be copied by other firms in the industry. An exception may be Dell computers which has developed highly refined supply and value chain supported by information technology that many competitors have been unsuccessful in attempting to replicate.

been levelled somewhat; however, the acquisition of these SI firms by other major IT players has, in fact, strengthened them and enabled them to expand their service offerings.

Historically, Sierra has not been associated with an audit firm and has not benefited from such cross selling opportunities. It has also played only a relatively small role in the problem identification segment of the SI value chain.

### **2.3.2. *Solution Identification***

Once the client firm has identified a problem that can be solved with an IT solution and has decided to proceed towards implementation, the specific type of solution and the means of implementing it must be identified. Client firms must then make a 'make or buy' decision based on the firm's core competencies. At this point, client firms will often quickly realize that even the solution identification process, let alone the implementation process, is significantly outside of their core competences, and will therefore plan to engage consulting firms for both aspects.

When a client chooses to outsource the solution identification process, the consulting firm (or firms) engaged for this purpose will identify the broad parameters of the problem to be solved with the technology solution, and include these in a Request For Proposal (RFP). The RFP will be publicized in newspapers and trade magazines. SI firms interested in the opportunity will assess the RFP and then decide whether or not to bid for the business. Systems integrators that respond to the RFP will offer various solutions that will involve different hardware and software from specific vendors. Even though most systems integrators do not have exclusive relationships with software providers, they often have strategic alliances with them.

There are a variety of firms that may respond to an RFP. Two of the main types of firms are pure systems integrators that have no exclusive relationship with a software vendor, and software vendors that will supply the software and provide the SI services (for example Peoplesoft). A third type of arrangement is when a client chooses a software vendor, as *well* as a pure systems integration firm to do the integration work. Sierra, for example, is a major systems

integrator of the Human Resources component of the Peoplesoft ERP system. Finally, it is also not uncommon for 'consortiums' of firms to team up to respond to an RFP. In this case, one firm will usually lead the bid and the others will act as subcontractors. This scenario can occur for a variety of reasons: the size of the engagement is too large for a single firm; the specialized skills of another firm are required; or the risk is too great for a single firm to bear.

As a firm that is focused primarily on SI work, Sierra rarely takes on the role of solution identifier for a client firm. Instead, Sierra responds primarily to RFP's.

### **2.3.3. *Hardware and Software Procurement***

Once the IT solution has been identified, the hardware and software must be purchased.<sup>36</sup> While some systems integrators will purchase software and hardware on behalf of their client, the systems integrator cannot usually extract significant margin from this activity simply because the client firm could buy the hardware and software itself directly for a comparable price. In Sierra's case, for example, less than 1% of its fiscal 2002 income was from product revenue.

As noted, it is also common for software vendors to respond directly to RFP's. Such firms have the ability to extract margin for three adjoined segments (procurement, integration and production), based on maintenance fees that they charge (despite the fact that they often offer little practical technical support).

At this point in time, Sierra has made the strategic decision to focus solely on providing consulting services that leverage their SI core competency, and not to develop and sell software. This decision came after two bitter experiences in the software realm, one in the 1980's and one in

the early 1990's. Both ventures failed miserably. Sierra learned first hand that the SI consulting and the software businesses require completely different business models. In the former, long-term relationships are cultivated; in the latter, the successful model is to make the sale and then focus efforts on the next sales prospect (notwithstanding the new version and ongoing maintenance fees that can be charged.)

#### 2.3.4. *Systems Integration*

The SI segment involves installing the required 'plumbing' to join a legacy/existing system with a new system. In very general terms, systems integration work primarily involves design, writing code, functional testing, and stress testing.

##### 2.3.4.1. *Design*

The design stage involves developing the technical architecture that allows for the appropriate connections between legacy IT systems and the new IT application. In its crudest form, a new application is simply 'bolted on' to the existing application. Even in the simplest case, however, the design can become very complex, very quickly. For example, a typical SAP ERP has approximately 900 data tables, each of which are identified with German acronyms that may need to be accessed by the new application. Ensuring completeness and accuracy of the data table access can be a difficult process to undertake. The design phase ensures that these appropriate connections will be made.

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<sup>36</sup> It is noteworthy that with the proliferation of software that has been written by a variety of vendors, very few client firms write their own software from scratch anymore. Also, despite the extensive media coverage given to the Application Service Provider (ASP) model in recent years, most firms still want to 'own' their core hardware and software to remove the dependence and security risk associated with reliance on an external service provider. Furthermore, the most popular revenue model used by most software vendors involves selling a license for the software for use at a specified number of workstations. In addition, annual maintenance fees will be charged and bi-annually there will likely be mandatory version upgrades. (Often the system integrator can be involved with upgrades).

#### 2.3.4.2. *Writing Code*

Once the design has been finalized, a team of programmers will write the computer code that will be used to electronically integrate the two systems. Pre-packaged code from various vendors or recycled from previous engagements is used as much as possible. Note that the whole point of pre-packaged software is to do as little code writing as possible. The wheel has been invented ... there is no need to re-invent it. Moreover, pre-packaged systems should be customized as little as possible. This is because once significant customization has been done, this code needs to be re-written again once there is an upgrade in the underlying pre-packaged software.

Further note that writing code has become a commodity that even SI firms can outsource. For example, in the past Sierra has outsourced code writing to a firm in India because Indian labour rates were approximately one third of North American rates. Knowing what code to write has become the area where real business value can be added.

#### 2.3.4.3. *Functional Testing*

Functional testing involves checking that the inter-activity between the two systems (developed in the design stage) and the code that was written actually works. Functional testing can involve using a single transaction or set of transactions to test if a particular design function has been accomplished. If 'bugs' are discovered, the written code must be analyzed and the source of the error identified, and the code rewritten and tested again. This is an iterative process that is often difficult and tedious, depending on the complexity of the integration.

#### 2.3.4.4. *Stress Testing*

Once the functional testing phase has proven that the system can handle sample transactions that cover all possible transaction scenarios, stress testing is conducted to ensure that the system can handle high volumes of transactions. For example, in the design phase, peak loads

of system processing will be identified, and during the stress-testing phase, transaction loads of two times normal would be run through the system to ensure it can still provide timely and correct interactivity.

### **2.3.5. *Systems Production***

Once the client has gone live with the new integrated system, the production phase (the ongoing use of the new technology) begins. Most SI contracts include a warranty period for the first number of months of the production phase. During this time, the systems integrator is often responsible for fixing 'bugs' that are identified using live transactions. It is common for the warranty period to be flexible in its ending date, determined by a 30-day 'bug-free' period. Once the warranty period has expired, clients who do not have significant IT resources often engage the systems integrator to provide help desk support, for at least the first year or two of production. During this time, the client will often build up its own internal production capabilities so that it will not require such technical support thereafter.

Some firms choose to outsource the Production Support function. For example, Sierra recently signed a \$6 million deal to provide production support for one British Columbia client, for a system that Sierra had previously installed. Providing production support of this magnitude is a new initiative for Sierra.

### **2.3.6. *Conclusions on Industry Value Chain***

In light of this analysis, several observations and conclusions can be drawn:

- The value chain for the SI industry is fairly well defined, starting with problem identification and ending with solution delivery.
- In general, few firms in this industry (besides IBM) participate in all segments of the value chain.
- Pure play SI firms (not affiliated with an accounting firm) focus primarily on the 'plumbing' segment (the SI segment) of the value chain.

- Software vendors often participate in three adjoining segments of the value chain (procurement, integration and production).
- Historically, systems integrators affiliated with large accounting firms were able to participate in all segments except procurement, and were therefore able to extract the most margin from the industry value chain. It is little wonder that most of the top tier systems integrators have affiliations with major accounting firms.

### 3. INTERNAL ANALYSIS

While chapter two focused on the external SI industry environment, chapter three focuses on Sierra's internal operations. Four key aspects of Sierra will be considered: corporate culture, Sierra's internal value chain, strategic fit and financial performance. This work further lays for the foundation for the analysis presented in chapter four.

#### 3.1. Sierra's Corporate Culture

One of the greatest distinguishing features of Sierra is its culture. It is so strong that it can be readily seen - almost touched - as one interacts with Sierra staff. As will be discussed, however, as Sierra grows, it faces challenges in maintaining the *consistency* of how corporate culture is experienced in some of its branches.

Fundamentally, corporate culture is based on the core values that are important to an organization. Sierra has explicitly identified these core values to include integrity, honesty, respect and loyalty. These values are directly attributable to the founders of the company who early on set a very high standard of personal and corporate conduct. While these values may sound similar to the corporate mantras of many organizations, the key difference is that Sierra actually 'walks the talk' by genuinely by living out these values. Sierra resolutely asserts that that these values are non-negotiable and that it does nothing that conflicts with them.<sup>37</sup>

In practical application, these values are directed primarily towards two key stakeholders: employees and customers. By all accounts Sierra succeeds in this regard; unusually high employee retention statistics and customer satisfaction ratings testify to this.

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<sup>37</sup> Sierra Systems Group Inc. Public website [www.sierrasystems.com](http://www.sierrasystems.com), July, 2003.



### 3.1.1. *Corporate Culture and Employees*

With regard to employees, Sierra's core values manifest themselves in the form of a strong communitarian, 'family' atmosphere in which individuals are respected, valued and affirmed. Wexler defines communitarian capitalism as upholding notions of pluralism, harmony, and shared values. It also entails a sense of membership, belonging, and meaning in a community that permits one to develop and express oneself. Essentially, this type of culture is characterized as a caring and nurturing community focused on developing human resources, nurturing talent, utilizing teams, and attending to an organization's culture. Fostering these values is considered simply to be good business practice.<sup>38</sup> Evidence that Sierra supports this type of culture abound.

Sierra has a very flat organizational structure. It consists simply of three levels - consultants, principles and partners - and there are no titles on Sierra business cards. Based on this flat structure, "it is not unusual to see a partner unloading the dishwasher or making coffee in the kitchen one minute, and giving a presentation to senior client executives the next."<sup>39</sup> Moreover, employees take on roles on client engagements that fit their skills, not their position. For example, most of Sierra's senior partners and technical directors work on client engagements alongside consultants.

Respect and loyalty are cornerstones of the communitarian culture that Sierra has developed. Sierra recognizes the importance of life after work and encourages a healthy balance between hard work and personal time. Many staff who have come to Sierra from other larger organizations have noted that at Sierra they are treated like a 'person,' rather than simply as a 'number.' As will be expanded upon in a later section of this report, Sierra's affirmation of the individual is demonstrated by Sierra's choice to pursue a 'build and hold model' in which long term investments are made in individuals. While turnover is inevitable, many individuals stay with Sierra for long periods of time, often 5, 10, even 20 years.

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<sup>38</sup> Mark N. Wexler, *The Four Faces of Capitalism: Structure and Change in Organizations*. Simon Fraser University EMBA 603, Structure and Change in Organizations, Classroom Notes, Fall 2002.

Another example of Sierra's affirmation of the individual is its deliberate choice not to employ a 'road warrior' approach. Many firms in the SI industry employ a road warrior model, in which consultants are constantly on the road, living out of a suitcase, working at client sites. This lifestyle is a very difficult one to maintain over the long term. In contrast, most Sierra employees work at client sites located 30 kilometres or less from their homes. This allows staff to maintain a healthy balance between work and their home lives.

A further aspect of the communitarian culture is the 'open door' policy that Sierra has. Nobody screens management's phone calls or emails and there is not a secretary guarding their door. If an employee has a material concern they are free to voice it to management without reproach – "Sierra will not retaliate, nor tolerate retaliation by other Sierra staff, for any matter raised in good faith."<sup>40</sup> This policy gives employees an opportunity to be 'heard' on material issues and feel valued. In addition to the open door policy, every three years a confidential employee opinion survey is conducted by an outside firm. Overall results are published in a variety of manners and task forces consisting of employees and management are formed at each branch to make recommendations on improvements arising from the survey. In addition, in each of the intervening two years Sierra conducts a mini survey called the 'Annual Report Card.'

This communitarian culture has been a wonderful success for Sierra. Sierra enjoys a very high level of employee satisfaction and loyalty to the firm and for two years running, Sierra has been named one of Canada's top 100 employers.

#### *3.1.1.1. How is Sierra's Culture Passed On?*

The roots of Sierra's culture are found in the high values of its founders. In the early days of Sierra, culture was caught rather than taught. That is, in those days, culture was passed on to newcomers simply by their being in the presence of some of the founders. Newcomers absorbed

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<sup>39</sup> Sierra Systems Group Inc. Public website [www.sierrasystems.com](http://www.sierrasystems.com), July, 2003.

the 'Sierra way' simply by osmosis. Since Sierra has grown, passing on this culture by means of osmosis has become less practical. Communication of the culture had to become more institutionalized and portable. Sierra has taken a number of steps in this regard. For example, regardless of the geographic location of their home branch in North America, as soon as possible after hiring, every new staff member spends three days in an orientation program held in the Vancouver corporate office during which they meet senior management and learn the 'Sierra way' of doing business. After this, to keep staff connected with the culture, each branch hosts regular monthly meetings at the branch so that employees can be updated on company news and stay in touch with their colleagues. The format of most meetings usually includes introducing new employees, celebrating new business wins and project successes and inviting guest speakers to present information on relevant industry topics. Afterwards, a time of food, drink and socializing is enjoyed by all. In addition, senior management often conduct branch road trips to the 14 branches across North America and each month, the "Corporate Link" is published and sent to all Sierra employees, sharing further information regarding the 'Sierra way' and company news.

### 3.1.1.2. *Implicit Values*

The discussion about corporate culture has focused thus far on the *explicit* values that Sierra espouses. But there are also *implicit* values that Sierra follows. The most significant of these is autonomy.

At the individual level, Sierra trusts its employees and considers them to be intelligent professionals; it extends great autonomy to employees based on the confidence that they will 'do the right thing.' Thus, while Sierra has a necessary level of Human Resources policies and guidelines, it could not be considered a rules based organization.

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<sup>40</sup> Sierra Knowledge Net, Sierra Systems Group Internal website – Human Resources section, July 2003.

At the branch level, autonomy is also present. As will be explored further in the discussion of strategic fit, under Sierra's branch centric model, branch managers have significant latitude to operate their branches. This value is highly protected by senior management.

### *3.1.1.3. Impact of Going Public and Company Growth on Culture*

It was during its time as a private company that Sierra developed its strong roots in the communitarian realm. Though the company has grown considerably since going public in 1998, it still has a very strong communitarian feel to it. New employees joining Sierra from other, larger IT consulting firms quickly express appreciation for Sierra's caring culture; both new and long term employees readily express that they feel treated as an individual rather than as a statistic. All in all, few cultural changes have transpired since going public; it appears that growth in the company rather than going public has resulted in more significant change.

One change that has occurred to some degree as a result of Sierra's rapid growth in combination with its branch centric model is that there is increased variability now in how staff at individual branches experience the corporate culture and the 'Sierra way' of doing business. For example, an externally-hired branch manager who brings with him/her different expectations and values may emphasize different values over an employee-focused communitarian model. This will become a bigger challenge for Sierra in the future, as it will likely become more common to hire branch managers externally than to promote from within.

### *3.1.2. Corporate Culture and Customers*

Sierra's customers also experience the company's core values in a variety of ways. Since Sierra opened its first office in 1966, its driving force has been to improve clients' business through technology. To achieve this, Sierra committed (then and now) to expanding its knowledge of clients' areas of business, and the issues and challenges they face in these realms. Based on this knowledge, Sierra offers practical solutions to clients' business problems that are in the clients'

best interest. By staying true to its vision and core values, Sierra has established a rare trust with its clients. These high values have had a strong positive impact on relationships with clients, and Sierra has enjoyed many long and profitable client relationships. In recently years, over 90% of Sierra's customers have indicated that they are very satisfied with their experience with Sierra; moreover, 75% of Sierra's revenues are based on business with repeat customers. The manner in which Sierra's culture manifests itself in connection to customers is embedded in the primary activities of Sierra's internal value chain which is explored in section 3.2 of this chapter.

### ***3.1.3. Corporate Culture and Shareholders***

As a public company, maximizing shareholder wealth should be Sierra's ultimate purpose. Interestingly, if Sierra employees were asked what the company's ultimate purpose is, or its reason for existence, the answers would likely be versions of Sierra's mission statement "To enhance the competitive position of our clients through the implementation of information technology-based business solutions."<sup>41</sup> While this goal is certainly worthy, it is not Sierra's ultimate purpose; it is simply a means to an end.

Unfortunately, maximizing shareholder wealth does not appear to be 'top of mind' for most branch managers or employees. The roots of this situation are likely based in the fact that for most of its existence, Sierra has been a private firm that has been insulated from the disciplines of the financial markets. With the blessing of its private shareholders, Sierra admirably focused attention on the satisfaction of customers and health of its employee base through its communitarian culture. 'Going public' has put the shareholder in a different light; management is no longer the majority shareholder, instead arms-length third parties are. There is now a more formal fiduciary relationship between the shareholders and employees. It appears that the nature of this fiduciary relationship has not yet been adequately recognized by many employees at Sierra - again, maximizing shareholder wealth does not appear to be 'top of mind.'

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<sup>41</sup> Sierra Systems Group Inc. Public website [www.sierrasystems.com](http://www.sierrasystems.com), July, 2003.

#### **3.1.4. Conclusions**

Sierra is to be commended for its commitment to high ethical standards and powerful corporate culture, which have benefited employees and customers greatly. Sierra needs however a better method to integrate and the needs of all stakeholders, including customers, employees and shareholders.

### 3.2. Value Chain of Sierra Systems Group Inc.

Porter's concept of the *firm* Value Chain<sup>42</sup> is a helpful tool to identify and assess a firm's core competencies. Later scholars<sup>43</sup> asserted that to achieve sustainable competitive advantage, firms should perform only those functions in which they hold core competencies or which are central to maintaining their competitive advantage, and outsource the remainder. Thus, applying this model to a firm is and considering its core competencies is a very valuable exercise.

Porter's firm Value Chain model divides a firm's activities between those that are primary to creating value, and those that are secondary. Primary activities include marketing and sales, inbound logistics, operations, outbound logistics, and service. Secondary activities include procurement, technology development, human resource management, and firm infrastructure. When Porter developed his value chain model, it appears he had in mind a relatively simple manufacturing entity. Consequently, the categories of this model need to be stretched and modified to apply it to service based firms. These adaptations are reflected in Sierra's firm value chain, as shown in Figure 3 and discussed below.<sup>44</sup>

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<sup>42</sup> Michael Porter, *Competitive Advantage: Creating and Sustaining Superior Performance*, (New York, The Free Press, 1998) 36.

<sup>43</sup> Ed Bukszar, Simon Fraser University EMBA 607 – Business Strategy, Classroom Notes, Spring 2003.

<sup>44</sup> It is noteworthy that a significant amount of SI work stems from client firms seeking to maximize the efficiency of their own firm's value chain. For example, the area of supply chain management involves implementing systems that make the Inbound Logistics, Operations, and Outbound Logistics sections of the value chain more efficient. Moreover, implementation of Customer Relationship Management systems is intended to leverage the Marketing and Sales functions of the firm value chain.

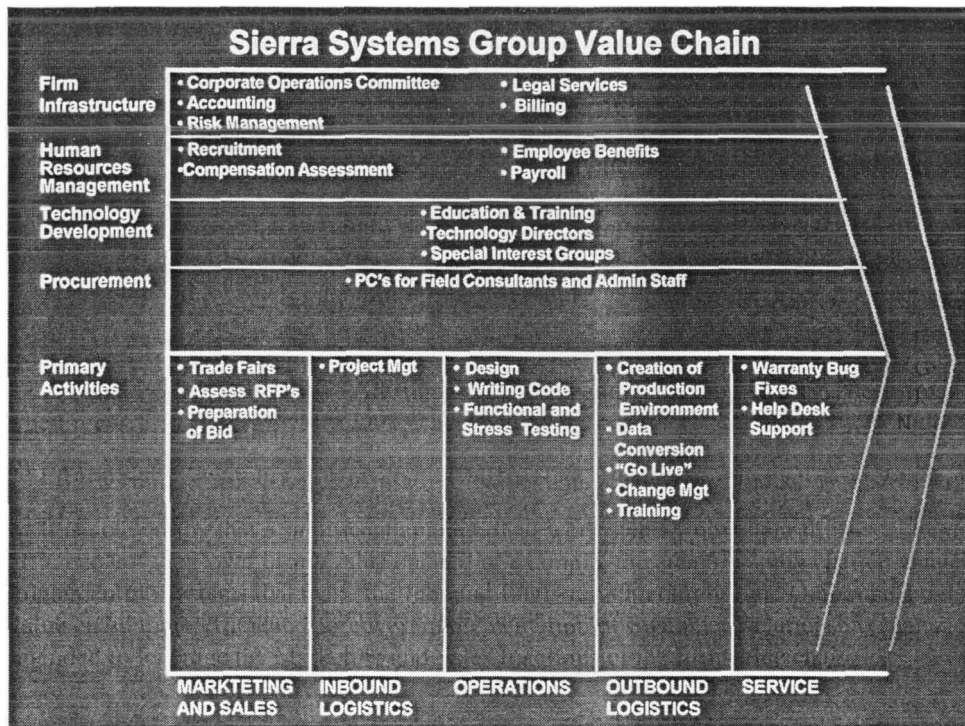


Figure 3- Sierra Systems' Firm Value Chain<sup>45</sup>

### 3.2.1. Primary Activities

#### 3.2.1.1. Marketing & Sales

Under Porter's value chain model using a manufacturing firm, the sales and marketing function occurs after the product has been developed and made available for sale. In the case of the SI industry, the sales and marketing function occurs before any significant work is undertaken on a client engagement. For this reason, this segment has been placed first in Sierra's value chain.

Historically, one of the most effective ways to generate new business in the SI field is to leverage the reputation that a firm has developed for its ability to deliver projects on time and on budget in an industry segment. In fact, until recently in its history, Sierra did not have a designated marketing function because it relied on its excellent reputation to generate new engagements.

Sierra thus followed an effective strategy, by simply and methodically following a simple approach



of doing a good job and leveraging this into more opportunities with the same client. This eventually became known as the Sierra “FISH” principle – “First In, Still Here.” Based on this approach Sierra has enjoyed many long and profitable relationships with its clients. In fact, in recent years, over 70% of revenue has been generated from previous clients. Further evidence of the success of this approach is Sierra’s focus on customer satisfaction. After every engagement, a customer survey is completed by the client and sent directly to the President. In the last number of years, Sierra has a record of meeting or exceeding customer expectations on over 95% of all engagements.

To execute this strategy Sierra has traditionally not employed a dedicated sales force of any substance. Instead, Sierra’s management has been actively involved in consulting and selling. While Sierra’s ability to grow revenues in this manner has been impressive, it is clear that there is room for improvement in connection to business development. Many partners-in-charge appear to have a technical focus to their roles rather than an account management and a business development focus.

### *3.2.1.2. Inbound Logistics*

Inbound logistics in the context of a manufacturing firm refers to “receiving, warehousing and inventory control of input materials.”<sup>46</sup> In the context of a SI firm, the notion of ‘inbound logistics’ appears to best relate to the exercise of project management. Project management is a key success factor for systems integrators, since even T&M projects can quickly become a high risk fixed price project on a de facto basis. The Project Management Institute organizes the components of project management into the nine Project Management Knowledge areas, including:<sup>47</sup>

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<sup>45</sup> Ed Bukszar, Simon Fraser University EMBA 607 – Business Strategy, Classroom Notes, Spring 2003.

<sup>46</sup> QuickMBA.com, Summary of Porter’s Value Chain Model.

<sup>47</sup> Project Management Institute, Project Management Body of Knowledge (PMBOK).

**Integration Management:** The processes required to ensure that elements of the project are properly coordinated. It consists of project plan development, project plan execution, and overall change control.

**Scope Management:** The processes required to ensure that all the work required, and only the work required, is included to complete the project successfully. It consists of initiation, scope planning, scope definition, scope verification, and scope change control.

**Time Management:** The processes required to ensure the project is completed in a timely way. It consists of activity definition, activity sequencing, activity duration estimating, schedule development, and schedule control.

**Cost Management:** The processes required to ensure the project is completed within the approved budget. It consists of resource planning, cost estimating, cost budgeting, and cost control.

**Quality Management:** The processes required to ensure that the project satisfies the needs for which it was undertaken. It consists of quality planning, quality assurance, and quality control.

**Human Resource Management:** The processes required to most effectively use the people involved in the project. It consists of organizational planning, staff acquisition, and team development.

**Communications Management:** The processes required to timely and appropriately generate, collect, disseminate, store, and ultimately dispose of project information. It consists of communications planning, information distribution, performance reporting, and administrative closure.

**Risk Management:** The processes concerned with identifying, analyzing, and responding to project risk. It consists of risk identification, risk quantification, risk response development, and risk response control.

**Procurement Management:** The processes required to acquire goods and services from outside the organization. It consists of procurement planning, solicitation planning, solicitation, source selection, contract administration, and contract closeout.

Project management is obviously a complex exercise. For most contracts, the leveraging of reputation has taken place in the context of a formal bid process. Potential clients will issue RFPs. Project management begins when Sierra reviews the RFP to determine if a bid should be made. If a bid is to be made, a response to the RFP must be drafted. These documents are normally lengthy, and include Sierra's general design characteristics and software and hardware technical details, so that the client firm or an external consulting firm engaged by the client firm can appropriately assess the nature of the solution that has been offered. If Sierra is chosen to be the service provider, a period of contract negotiation is undertaken to specify the exact deliverables to be produced, timeframes, and fees.

In a fixed price context, perhaps one of the most important functions is the ability to estimate the effort required to complete a project. Unfortunately, Sierra project managers have

been chronically poor estimators of effort to complete. Moreover, Sierra does not monitor or measure the ability of individual project managers to *estimate* effort to complete relative to *actual* effort to complete. A further indicator of Sierra's deficiency in this area is demonstrated by the fact that there is no company wide standard project management software system, let alone one that links directly into the financial accounting system. Even on medium sized projects the monthly burn rate can be \$100,000 per month. As a result, Sierra has suffered a number of significant losses on fixed price contracts.

To further address project risk, shortly after going public, Sierra developed a risk management function that essentially acts as a monitoring body for projects that are deemed to be high risk. All projects that are over \$500,000 in size are monitored by this group. Project proposal reviews are conducted before Sierra will respond to a request for proposal (RFP) by a potential client.

It appears that Sierra would be hard pressed to conclude that it has a core competence that is consistently applied across all branches in this critical segment of the SI value chain. One of the weaknesses in this area stems from the fact that the background of most project managers is primarily technology oriented, rather than pure "project management." Sierra would be well served to recruit project managers who do not have purely SI backgrounds, and who will not be distracted by the technology.

At Sierra, project managers are generally staff who have backgrounds as technical consultants. Having demonstrated technical competency in the past as employee consultants, these employees are then given the opportunity to take on leadership roles as project managers. Project managers are paid on a salary basis. While it is true that career advancement and annual salary are based on performance, there is no direct financial incentive related to project performance. There is significant variability in how projects are run; however, Sierra is seeking to implement a consistent approach based on the Rational Unified Process (RUP).

### 3.2.1.3. *Operations*

Operations involve the “value creating activities that transform inputs into the final product.”<sup>48</sup> In the context of the SI firm, the operations component of the value chain best captures the activities of design, code writing, functional and stress testing described earlier in the review of the SI industry value chain. These activities are carried out by project teams, the typical composition of which is shown in the Figure 4.

Project managers assemble these teams based primarily on the staff which are available at branch locations. Staff resources are also purchased from other branches. Historically this has been a relatively small component of labour, however, such ‘inter branch’ transactions have been increasing in recent times, especially on a cross border basis. In addition, subcontractors are often hired to fill in the project team. Generally, Sierra has attempted to keep the use of subcontractors to no more than 20% of total compensation costs. Project team members usually remain involved for the duration of the engagement which usually last between 3 and 18 months.

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<sup>48</sup> QuickMBA.com, Summary of Porter’s Value Chain Model.

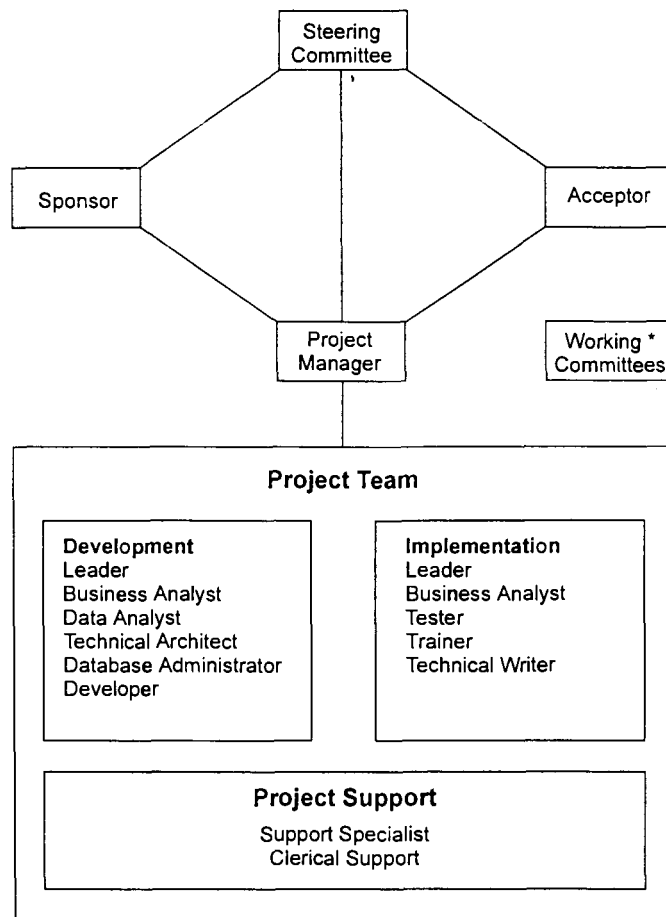


Figure 4 Typical Members of a Sierra Project Team

Like most SI firms, Sierra follows a very specific process in these activities. For example, the Rational Unified Process (RUP) is used by Sierra and is widely accepted in the industry. RUP incorporates a number of industry “best practices” including “iterative development” in which design risks are identified and dealt with early on, before they can threaten project success.<sup>49</sup> Historically much of this work was often performed at a client site where Sierra consultants can interact with client personnel and the client’s new and legacy systems; however, wide area networks have allowed Sierra staff to work in Sierra offices and still be connected to the client systems. The advent of the internet has brought even more opportunities for flexible work arrangements.

<sup>49</sup> Get Ready to RUP – Sierra Systems Group Inc, internal publication.

Sierra has outsourced code-writing to India in the past as well as to its Canadian branches in support of SI engagements undertaken in the US. In addition, Sierra has recently developed a Software Development Centre (SDC) at its Vancouver branch. The purpose of this centre is to leverage economies of scale from having expert staff located in the same premises. In sum, the SDC is akin to a software development 'hot house'. This development has significant strategic implications since the premise of the initiative is to develop high quality software at a low cost. This issue will be explored further when Sierra's strategic fit is assessed.

This segment of the value chain is where Sierra creates its most important value and is where Sierra holds its strongest core competence.

#### 3.2.1.4. *Outbound Logistics*

Outbound logistics in a hard goods context involves the activities required to get the finished product to the customer, including warehousing, order fulfillment" et cetera.<sup>50</sup> In the context of a SI firm such as Sierra, outbound logistics activities include data conversion (and testing for completeness and accuracy), 'going live' with real data and 'pulling the plug' on the previous operating system, change management, training and documentation of new business processes that are integral to the new operating system. Sierra appears to perform these functions well.

Preparation for this transition is done concurrently with the operations stage noted above. As the 'go live' date nears more of the implementation team begins to focus on the transition. 'Go live' is usually a particularly intense time in which all members of the integration team works with client staff to perform these functions.

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<sup>50</sup> QuickMBA.com, Summary of Porter's Value Chain Model.

### 3.2.1.5. *Service*

“Service” includes those “activities that maintain and enhance the delivered product’s value including customer support and repair services.”<sup>51</sup> In the context of Sierra and other systems integrators, the activities performed during the warranty period such as bug fixes and the provision of technical support in the production phase qualify as outbound logistics. Sierra appears to perform these activities well. Support services during the warranty period are provided on-site by members of the project team. This is done because these project team members know the system best and are able to diagnose any problems quickly and stabilize the system. After the warranty period expires, and if ongoing support is purchased by the client, these services are often supplied by staff who are not currently assigned to an integration engagement. Briefings are held to familiarize these employees with the material issues that they need to understand to provide a high level of support.

### 3.2.2. *Secondary Activities*

Secondary activities tend to include items that are generally known as corporate overhead.

#### 3.2.2.1. *Procurement*

The procurement segment of the systems integrator value chain is relatively small since little investment in capital goods is required. Sierra leases its office space. Its primary capital assets are the personal computers and development software that are used by staff consultants. Sierra performs adequately in this area.

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<sup>51</sup> QuickMBA.com, Summary of Porter’s Value Chain Model.

### 3.2.2.2. *Technology Development*

Under Sierra's business model, the firm does not conduct research to *discover* new technology; rather it seeks to *apply* existing technology to solve the business problems of its clients. This being said, the IT industry is highly competitive and is characterized by rapid technological change, shifting client preferences and new product developments. Thus, while others outside the firm discover the technology, it is constantly shifting and it is vital that it be quickly mastered by Sierra's consulting staff.

In this regard, Sierra's strategy is to place constant emphasis on technological expertise in its career planning and maintenance of a rigorous education program. The company fully pays for at least 6 days of education time per year and strongly encourages its employees to continually update their skills and obtain a variety of professional certifications. In fiscal 2002, the company spent in excess of \$2 million (2001 – in excess of \$2.5 million) directly on education fees, excluding meals and accommodation. With 900 employees this implies an average of over \$2,500 per employee per year or between 1.5% and 2.0% of total revenue.

In addition to strong encouragement for technical education by all consulting staff, Sierra has recently developed the internal designation of "Technology Director." These key staff are given financial support to purchase leading edge hardware and software to "play with" with the objective of discovering *new applications* for new technology. These leaders confer with each other at regular Technology Leaders meetings and at special interest group (SIG) meetings in which many of the technology leaders play active roles. In taking on the role of technology director, these employees are given the opportunity to participate in an 'employee benefit trust' that awards these directors bonuses of up to \$45,000 in value after they have completed three years of service in the role of technology director.

The key to using a new technology to solve a client's business problem is to have an excellent understanding of both the technology available and, of course, the client's problem. Again, in this regard, Sierra seeks to gain deep understanding of the business issues in the



relatively narrow market niches of its Specialty Practices. For example, Sierra has developed very strong expertise in the field of health records management systems. In this relatively narrow field, Sierra was able to capitalize on its expertise to win a two year, \$30 million contract with the Los Angeles Department of Health to implement IT systems that would ensure compliance with the Health Insurance Portability and Accountability Act (HIPAA). As this legislation is rolled out nationally in the United States, further opportunities are expected to be realized. Realizing that this deep understanding in specialized markets can eventually be duplicated by others, Sierra seeks out market opportunities in which this competitive advantage can be expected to be maintained for five years.

In sum, Sierra appears to appropriately manage its technology development.

### 3.2.2.3. *Human Resources Management*

Human resources management is one of Sierra's strongest competencies. Independent feedback has confirmed Sierra's strength in this area. For the second year in a row, Mediacoop Canada Inc. selected Sierra as one of "Canada's Top 100 Employers." In addition, Sierra was named in the top 50 places to work in Canada in the 2001 and 2002 edition of Maclean's annual reporting of the Top 100 companies to work for in Canada. In December 2001, The Globe and Mail chose Sierra as one of "The 50 Best Companies to Work for in Canada." Even more recently, in January 2002, BC Business placed Sierra fifth in "The Best Companies to Work For in BC." Sierra has explicitly recognized that high quality employees are a critical to its future success.

Sierra's primary asset is the expertise of its employees. Indeed, Sierra's growth and future success depends on its ability to attract, retain and motivate highly skilled personnel. In light of this, Sierra has concluded that the best return on investment will be derived from a long-term commitment to its employee asset base. Thus, Sierra has pursued a build and hold strategy in which it maintains its asset base during periods of lower demand to ensure that capacity is in place for assured quality delivery when demand is stronger. To supplement its employee base, Sierra has longstanding relationships with a number of subcontractors.

Sierra is not the highest paying employer in the industry; however, the company maintains uncompromising quality of its consulting staff. Sierra demonstrates this commitment to quality human resources in two primary ways. First, Sierra ensures its quality through a rigorous recruiting process. Sierra proactively recruits quality staff for its 14 offices based on the projects that it has in its revenue pipeline. In this sense, Sierra is directly market driven. Sierra has a rigorous screening process for potential employees: often pre-screened by an external headhunter, candidates who pass through this stage are then interviewed by branch management and an HR representative at the branch level. All must be satisfied with the technical skill qualifications and skill fit. Although recruitment was a challenge for Sierra during its high growth years in the mid-1990s, Sierra is now a sought-after employer – a somewhat unusual feature within the IT consulting industry. Permanent employment is conditional upon a six-month review.

Second, Sierra also ensures quality human resources by making a strong commitment to employee education and professional development, encouraging its consultants to continually grow in their technical and softer skills to enhance the value that they can provide to Sierra's clients. Every employee is expected to complete six days of professional development or continuing education each year.

The result of Sierra's commitment to uncompromising quality is outstanding loyalty demonstrated by Sierra employees – far above industry norms. Once on staff at Sierra, many become long-term staff, often "lifers." A standing agenda item at monthly office-wide meetings (usually attended by 200 people in the Vancouver office) is recognition for long service. Five-year service awards are *very* common; 10, 15 and 20 certificates are also regularly distributed. One of the reasons for the longevity of employees is that employees are not treated as "numbers," as was their experience in other larger consulting firms such as Accenture; at Sierra they are treated as individuals. This is a common sentiment expressed by employees. Indeed, Sierra is a great place to work since employees are very highly valued.

#### 3.2.2.4. *Firm Infrastructure*

The high growth rate in the mid 1990's stretched Sierra's internal capabilities. Since going public in 1998, Sierra has worked steadily to improve and strengthen these capabilities: professional managers, experienced in a public company context were brought on board; the firm's internal accounting records were cleaned up; and, most recently a new, vastly improved, financial reporting system has been implemented.

Currently, the corporate office in Vancouver handles all financial accounting, finance, risk management, and operational support functions. The billing function, however, is carried out at the branch level. Each branch is charged a monthly fee for the services provided by the corporate office. Consistent with the concept of the branch-centric model, branches should theoretically be able to obtain such services by individual service providers in the marketplace; however, it is argued that economies of scale are available when these functions are centralized.

While the branch centric model with local decision making autonomy is philosophically appealing, it has a number of weaknesses. Namely, silos of information exist in the individual branches and lead to inadequate sharing of information across the corporation. An attempt at a knowledge management system has not yet overcome this deficiency. About three years ago, Sierra made its first foray into sharing information on a company wide basis through use of an intranet tool called the 'Sierra knowledge network' (SKN) All Sierra delivery management guidelines are contained on this site, as well as templates for proposals, project management reviews, and a variety of delivery management resources. While the goal of the SKN is laudable, a weakness that Sierra has identified is that it does not adequately share lessons learned that could be used in future engagements. Recently, a new knowledge management pilot was undertaken, one of the purposes of which was to more appropriately address this weakness. This pilot unfortunately suffered a setback recently due to a significant technology change by the software vendor, namely Microsoft.

### 3.2.3. *Conclusions on Sierra's Value Chain*

A number of conclusions flow from the preceding analysis:

- Project management is not consistently applied across the branches, and for this reason, Sierra would be hard-pressed to conclude that it has a consistent core competence in this area. In addition, it appears that project managers tend to have a technology background that unduly distracts them from core project management issues. More project managers without a technology background should be hired to encourage more focused project management free from the distractions of technology.
- A standard project management software platform should be established which is integrated with the financial accounting system.
- Estimates of effort to complete should be compared to actual effort expended to develop greater precision in the estimating process.
- Sierra has performed its human resources function very well in maintaining its communitarian culture.
- Overall, Sierra has a core competence and history in systems integration segment of the SI value chain. This strong communitarian culture is very important to the organization and needs to be honoured and respected in regard to strategic options Sierra considers in the future.

### 3.3. Strategic Fit Assessment

In his landmark work, *Competitive Advantage*, Michael Porter asserted that long-term firm success can be realized by pursuing either a cost-based or a differentiation strategy.

A cost based strategy is characterized by low cost (and therefore low prices) coupled with adequate quality.<sup>52</sup> A differentiation strategy is characterized by high quality, which enables a premium price to be charged. These generic strategies can be captured by the 2 x 2 matrix shown in Figure 5. Quadrant B is considered by Porter to be a losing strategy in the long run, and is referred to by Porter as being “stuck in the middle.”<sup>53</sup>

#### Matrix of Porter Generic Strategies

		Cost	
		Low	Adequate
Quality	Adequate	A Cost Based	B
	High	C	D Differentiation

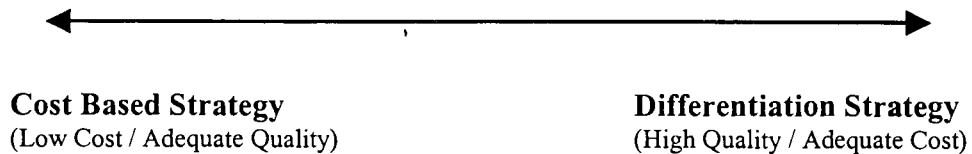
Figure 5 Matrix based on Porter's Generic Strategies

To simplify matters further, the polar opposite cost-based and differentiation strategies can be represented by a continuum, as shown in Figure 6, with losing combinations of the cost and quality variables residing between the end points.

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<sup>52</sup> The term “quality” has been used loosely here to reflect not only quality but generally non-price related features of the service offering. Source: Ed Bukszar, Simon Fraser University EMBA 607 – Business Strategy, Classroom Notes, Spring 2003.

<sup>53</sup> Michael, Porter, *Competitive Strategy: Techniques For Analyzing Industries And Competitors*, (New York: Free Press: 1980), 41.



*Figure 6 Generic Strategy Continuum*

The notion of ‘strategic fit’ is based on the premise that a firm’s operating model should be aligned with its strategy. This implies that two very different operating models would be required to support Porter’s generic cost-based and differentiation strategies. Bukszar has developed a strategic fit assessment framework that relates nine variables, the sum of which describe an entity’s operating model, to Porter’s generic strategies.<sup>54</sup> Using this framework, strategic fit is achieved if the firm’s declared strategy and the assessed values of the nine variables are aligned. This framework is not a quantitative tool for a variety of reasons;<sup>55</sup> however, used carefully, it can reveal important qualitative insights into whether a firm’s operating structure is aligned with its strategy. Given Porter’s dire prediction of the prospects for those firms that are “stuck in the middle” it is prudent to assess a firm’s operating structure relative to its stated strategy and to identify any misalignments that may exist and need to be addressed. This section presents the results of such an analysis for Sierra. The results are summarized graphically in Figure 7.

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<sup>54</sup> Ed Bukszar, Simon Fraser University EMBA 607 – Business Strategy, Classroom Notes, Spring 2003.

<sup>55</sup> Some of these reasons include the fact that the importance of individual operating model variables would vary depending on the industry in which a firm operates. Moreover, assigning values for each operating model variable based on anecdotal evidence is not empirically sound. Thus, quantitative weighting of the operating model variables and plotting an entity’s exact footprint on this framework is an imprecise exercise. To accommodate this lack of precision, but to capture the meaningfulness in the assessment, elliptical zones have been used to represent the general assessment of a particular operating model variable.

Operating Model Variable	Generic Strategies	
	Cost Based Low Cost / Adequate Quality	Differentiation High Quality / Adequate Cost
Offering Strategy	Rapid Follower	Innovative
R&D Expenses	Low R&D	High R&D
Structure	Centralized	Decentralized
Decision Making	Less Autonomy	Autonomy
Manufacturing	Economies of Scale	Economies of Scope / Flexible
Labour	Mass Production	Highly Skilled / Flexible
Marketing	Comparative / Push	High Cost / Pioneering / Pull
Risk Profile	Low Risk	High Risk
Capital Structure	Leveraged	Conservative

Figure 7 Bukszar's Strategic Fit Assessment Framework

### 3.3.1. Sierra's Stated Strategy

The prospectus supporting Sierra's 1998 IPO clearly indicates its intention to pursue a differentiation strategy:

*Sierra has developed expertise in five specialty practices which currently represent approximately 62% of Sierra's revenues. Specialty practices are expected to account for an increasing proportion of revenues over the next several years, as Sierra increasingly exploits its current specialty practices*

*and develops new ones....<sup>56</sup> Specialty practices earn higher margins for Sierra and enable it to compete effectively against market participants who may be much larger in size but less experienced in the particular area...Sierra emphasizes quality of service to secure repeat business with existing clients and to develop Sierra's reputation with potential new clients... Sierra believes that it has built an exceptional base of knowledge and expertise in each of its five current specialty practices which gives Sierra an important competitive advantage...Sierra plans to open new branches where an opportunity exists to capitalize on existing areas of expertise. Sierra also plans to develop new specialty practices through its existing branch network...<sup>57</sup>(underline added for emphasis)*

It is interesting to note that in 2002, five years after the IPO, a study completed by IDC Canada revealed that Sierra is viewed in the marketplace as a lower cost provider (called a 'value player' in the study) in the Canadian SI market.<sup>58</sup> Interpreting this perception according to Porter's matrix of generic strategies, it can be said that the SI market perceives Sierra's strategy as if plotted near the left edge of quadrant D. The degree to which Sierra is perceived as a low cost provider is very significant relative to its stated strategy. Since it is perceived as a lower cost provider, many may mistakenly infer that the quality of its services may not be as good as higher priced firms. In fact, in an earlier version of the same study, it was noted that Sierra was perceived to offer superior quality; however, this rating slipped considerably in the later version of the study. Given that high quality is, in fact, being delivered, it seems clear that this reality is being tainted by Sierra's lower prices; thus, Sierra would be wise to consider increasing prices to be perceived as a high quality SI firm. This, in turn, would also have significant implications for profit margins.

Ensuring consistency between price and quality is critical for Sierra because different operating models are required for cost-based and differentiation strategies. These are substantive issues for Sierra to resolve and will be considered further in chapter four. Notwithstanding these concerns, given the clear strategic focus of the IPO and Sierra's consistently high quality of

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<sup>56</sup> Note that this prediction has been realized. In Fiscal 2002, 75% of Sierra's revenues came from specialty practices.

<sup>57</sup> Sierra Systems Group Inc. Initial Public Offering and Secondary Offering Prospectus, April 8, 1998.

<sup>58</sup> Barbara Hall, "Perception Shakedown: A Survey of the Top Integrators in Canada," (Toronto: IDC Canada, 2002), 85.



product, the evaluation that follows will assume that Sierra is pursuing a differentiation strategy and will consider the Bukszar's nine operating variables in light of this.

### 3.3.2. Service Offering Strategy

The options for this operating model variable range from that of 'rapid follower' to 'innovator,' on the continuum of cost-based and differentiation strategies. Being a rapid follower implies that a firm copies the efforts of others to produce the offering more cheaply; being an innovator implies that a firm creates new, value-added offerings.

Sierra is a relatively innovative service provider. It has developed extensive experience in specific market segments and has used this knowledge to develop a number of unique solutions that are a better fit with the underlying needs of the business than solutions provided by other SI firms. For example, Sierra has developed a 'wrapper' solution<sup>59</sup> in the health field that is customized to the needs of this realm and that is repeatable in other client applications. The expertise that Sierra has developed in such market segments has earned it a reputation for being a 'thought leader' in its chosen market segments. Thus, Sierra's performance as an innovator is aligned with its differentiation strategy with respect to Bukszar's model.

Note, however, that while there is an advantage in being leading edge, one has to be careful to not be 'bleeding edge.'<sup>60</sup> This issue will be addressed further in the Risk Profile section of this analysis.

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<sup>59</sup> A 'wrapper solution' is a repeatable and expedient method of achieving compliance without a major legacy system rework.

<sup>60</sup> 'Bleeding edge' refers to being associated with newly developed technology that has not yet been fully refined; therefore, the first firms to adopt such technologies incur significant refinement costs.

### 3.3.3. Research and Development

According to Bukszar's model, low cost providers tend to expend little on Research and Development (R&D) while differentiators spend much higher amounts to support innovation. It does not appear that heavy R&D spending is a requirement for success in the SI industry. This is because most research is conducted by large software development firms, which then release new products into the marketplace that then become the software platforms requiring integration with legacy software platforms. Thus, it is not necessary for SI firms, including Sierra, to conduct their own research to discover *new* knowledge that can be developed to apply to client engagements.

It is important, however, to be a rapid adopter of these leading-edge technologies - this gives the early adopter SI firm a competitive advantage, at least in the short term, by delivering more sophisticated functionality in the client solutions it offers. Further to the discussion on technology development in the evolution of Sierra's internal value chain, Sierra appears to be appropriately responsive to adopting new technologies. Notwithstanding this general conclusion that SI firms are not required to invest heavily into research, IBM appears to spend significant sums on R&D - though it is unclear how much of this spending is directly of an SI nature.

Thus, although Bukszar's model suggests that differentiators should have high R&D expenditures, this is not considered to be an important factor in the strategy of SI industry players; accordingly, Sierra's relatively low expenditure in this area is not a material misalignment with its operating model.

### 3.3.4. Structure

Bukszar's model suggests that the structure of a firm pursuing a differentiation strategy should be decentralized to enhance market adaptability, in contrast to the centralized structure pursued by firms following a cost-based strategy.

Sierra has traditionally employed a decentralized, 'branch centric' model in which each of the 14 branch managers across North America has considerable autonomy. The rationale for this model has been that branch managers are closer to local market opportunities and should be empowered to capitalize on these opportunities through local decision-making. While maintaining a decentralized structure, Sierra introduced two new positions in 2002 to provide greater leadership to and consistency for the geographically dispersed branches. First, it created the role of 'practice lead' for each of its four market segments in both the US and Canada. In addition, Sierra created the role of Chief Operating Officer (COO) in 2002, for both Canada and the US. Thus, Sierra's 14 branch managers and eight practice leads report to two COO's (see Appendix I for an organizational chart of Sierra). Under this structure, practice leads currently focus primarily on marketing and branch staff still report to their local branch manager. Overall, Sierra has a very decentralized structure and is aligned appropriately with its strategy of being a differentiator. This structure is intrinsically connected to Sierra's autonomous decision-making model, as detailed next.

### **3.3.5. Decision Making**

Under Bukszar's framework, firms pursuing differentiation strategies should generally employ an autonomous decision-making structure. In contrast, cost-based providers are more apt to pursue more centralized decision-making. At Sierra, local branch managers are given tremendous latitude in decision-making. Consistent with Sierra's branch centric model, each branch manager has essentially been given a Sierra franchise to run. Again, this model has the advantage of allowing branch managers, who are most knowledgeable of the local market conditions, to be the key decision makers. Branch managers and their leadership teams decide on and develop the strategies that they would like to follow to grow their business, as well as on the tactics to be employed to implement the strategies. Consistent with this, the SDC was a Vancouver branch initiative that has had corporate-wide implications. The issue of co-ordinating strategic initiatives will be addressed further in chapter four.

Although the branch centric model has tremendous philosophical appeal, Sierra's decentralized structure and local decision-making autonomy has led to considerable variability between the branches, particularly regarding business models and corporate culture experienced at the branch level. For example, those branches that are led by branch managers who are long-time Sierra veterans experience a traditional version of Sierra's corporate culture; in contrast, branches led by non-veteran Sierra managers experience an entirely different corporate culture. The implication of this variability raises a fundamental question: Should Sierra as a consolidated entity be an aggregate of a variety of operating models or should there be greater homogeneity? This is a material issue because, as indicated earlier in this section, different strategies require different operating models to support them. Heterogeneity is perhaps acceptable if it is possible to have branches operating as silos of activity; however, problems occur when the operations of one branch implicate the operations of other branches or the entire company.

Overall, Sierra has an exceptionally high focus on autonomous decision-making, consistent with its differentiation strategy.

### **3.3.6. *Manufacturing***

Bukszar's model suggests that if a firm employs a cost-based strategy, it should employ a manufacturing model based on employing economies of scale; in contrast, if a firm employs a differentiation strategy, it should focus on economies of scope. Since Sierra sells consulting services, its 'manufacturing' base is essentially its consulting staff and subcontracted labour. Indeed, labour and subcontractor costs make up the vast majority of cost of sales.

The economic rationale of the SI industry (that client firms cannot afford to maintain skilled implementation specialists on staff for an indefinite period of time) implies that the manufacturing model is project-based. In Sierra's context, project teams usually range from a few staff to up to 20. The players involved in a typical SI engagement are reflected in Figure 4, illustrated previously. As can be seen, the project manager plays a pivotal role in the client engagement. SI engagements often involve significant customization, at the outset of the

engagement it is not usually possible to have a detailed understanding of how the solution will be ultimately delivered. Consequently, a significant part of the project manager's job is to manage the trade-offs between features, quality, time, and cost.<sup>61</sup> One method of achieving this is to maximize the use of pre-packaged code that can be implemented on a 'plug-and-play' basis to achieve routine program functions.

Historically, it was necessary for most of the Sierra project team to work at the client site. This has changed, however, with the advent of wide area networks, virtual private networks, and internet technology in general. Now, code can be written off-site by Sierra staff in various locations. A recent popular application of this capability has been the use of Canadian developers and programmers to work on SI engagements of US branches. Particularly with the favourable exchange rate, this has meant that high quality integration components can be developed at a lower cost. Sierra has also, in the past, subcontracted out code-writing to firms in India, with some success.

The outsourcing of application development has more recently been further refined by Sierra's Vancouver branch. In late 2002, it created a Software Development Centre (SDC). This centre now includes a staff of 35 full-time employees, and targets custom software development for company-wide projects that have budgets in excess of \$500,000. Figure 8 shows the project delivery model for the SDC. Sierra staff at the client site will conduct analysis that must necessarily be done on site. These requirements are then sent to the SDC, where specialized resources can develop the technical architecture and integration software. The centre uses best practices, including a rationale unified process, and functional point analysis to estimate, conduct process measurement, control scope, and assure quality. In addition, the SDC subscribes to the capability maturity model (CMM), which is the 'gold standard' certification for offshore outsourcing and maintenance vendors. The development of the SDC has significant implications for the branch centric model of Sierra, and will be considered further in chapter four. The SDC

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<sup>61</sup> Dan Burke and Alan Morrison. *Business At the Speed of Stupid*. (Cambridge: Perseus Publishing, 2001) 214.

model is more flexible because a critical mass of labour is located under one roof and can be quickly reallocated to where needed most on a variety of jobs that are in process. Concentrating specialized labour in this manner implies that less specialized labour is required on an overall firm-wide basis.

#### Client Site

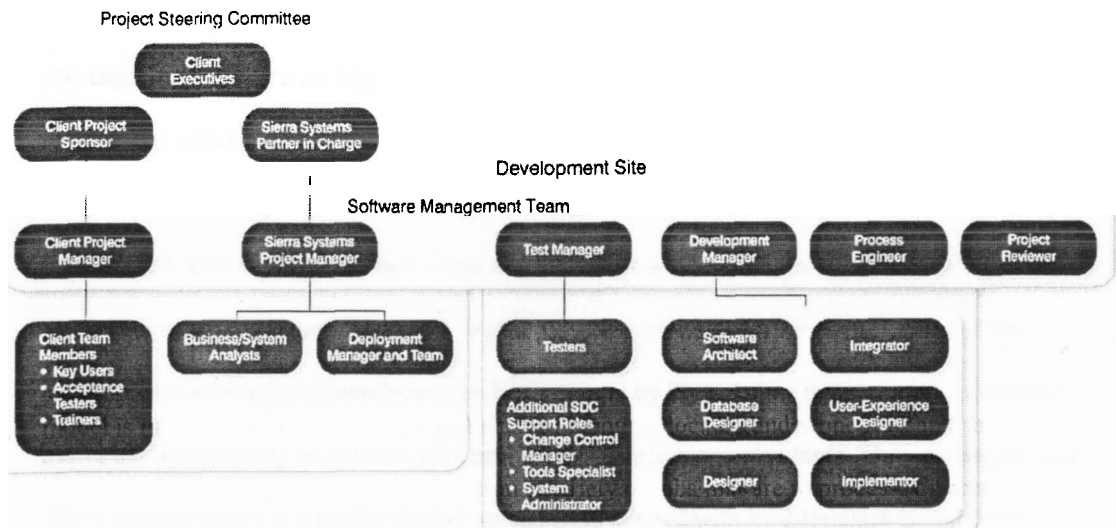


Figure 8 - The SDC's Role in a Project Engagement

Overall, Sierra's manufacturing model is moving from an inflexible, economies of scale approach, to one that is more flexible and focused on economies of scope.

### 3.3.7. Labour

Applying Bukszar's model, a firm employing a cost-based strategy would tend to employ a mass production approach to labour. In contrast, a firm aligning its labour force within a differentiation strategy requires both a highly skilled workforce and a highly flexible workforce.

First, with regard to having a highly skilled workforce, Sierra's primary (intangible) asset is the expertise of its employees. In fact, Sierra's growth and future success depend on its ability to

attract, retain and motivate highly skilled personnel. In addition, to ensure continued high quality of 'product' output, it is essential to have, experienced, capable resources, trained in Sierra's methodologies and standards. In light of the importance of employees to Sierra's success, Sierra has concluded that its best return on investment will be derived from a long-term commitment to its employee asset base. Sierra's strategy, therefore, has been to continue to employ its employee asset based even during periods of poor economic circumstances or lower client demand, to ensure that capacity is in place for high quality delivery when the economy is good and demand is stronger. In addition, Sierra invests heavily in training to constantly upgrade staff skills. Sierra's staff are widely recognized in the industry as being very highly skilled technically and well experienced. This reputation is one of the major reasons why Sierra wins many contracts, even when competing with much larger and 'big name' consulting firms. The effectiveness of this strategy from an employee standpoint can be measured by Sierra's low turnover rate. Historically, Sierra has had turnover of only 10-15% per year, low by industry standards. Thus, it appears that Sierra's commitment to a highly skilled workforce is aligned with its differentiation strategy.

Of note, however, are two factors that limit the extent to which Sierra is able to ensure the flexibility of its workforce. First, part of Sierra's employee retention strategy is to engage its consulting staff in work that is located in the same geographic region that the employee lives in. This is based largely on Sierra's communitarian culture, which encourages employees to maintain a healthy work/life balance. Although there are certainly opportunities to redeploy these resources to other locations, Sierra has chosen not to operate a 'road warrior' model of employees traveling for extended periods of time. Second, Sierra's pursuit of market niches implies asset specificity in regard to the skill set of its staff. In other words, when demand weakens in one specialty practice area, the specialized skill set of a particular employee or employee group may not be immediately transferable to a different speciality practice. When this occurs, such employees are usually kept on staff and retrained for new industry experience, albeit at a significant cost to Sierra.

Mitigating this concern about the flexibility of its workforce, Sierra augments its pool of permanent employee consultants by engaging external subcontractors up to a maximum of

approximately 20% of its total employee resource pool. This strategy provides the benefit of having available both specialized skills and flexibility in the resource pool, while allowing Sierra to either extend or contract its operating capacity as needed.

Again, Sierra has been rewarded for its long-term investment in its employee-consultant resource pool. As noted, Sierra enjoys an above average employee retention rate in comparison to industry averages.

Overall, Sierra's labour delivery model is in transition. The traditional model involved maintaining a deep skill set in each branch throughout down times to enable mass production to be undertaken in the boom times. The advent of the internet is calling this into question. Specialists are no longer required at all of Sierra's branch locations; instead, fewer specialists can be employed and highly utilized by servicing a variety of clients literally thousands of miles away. This implies that specialized labour no longer needs to be maintained on a branch-by-branch basis, but can be maintained in a company-wide resource pool. This further implies that branch offices could be occupied predominantly by business analysts who could identify the integration issues and employ remote specialists to deliver the solution. Moreover, branch employees could take on more of a customer relationship management role, staying close to the customer to service them even better. In sum, it appears that traditionally Sierra was more centrally located on Bukszar's grid in connection to labour. However, it is now moving more towards the right, and becoming more flexible, based on the advent of the internet and remote technology capabilities. The development of the SDC further leverages this capability by accumulating a number of experts in one location to aggressively develop client solutions.

### **3.3.8. Marketing**

Bukszar's model proposes that a firm pursuing a differentiation strategy will likely implement high cost, pioneering, pull tactics in their marketing efforts. Further to the comments made under the examination of Sierra's internal value chain, Sierra employs a pull strategy and



incurs pioneering costs in penetrating niche market segments with customized solutions.<sup>62</sup> The *scale* of its marketing effort, however, is low, in that it is based primarily on the efforts of senior partners at each branch. These individuals have primarily a technical/project focus, and not a business development focus. Further evidence of this lack of scale is that only recently has Sierra made efforts to establish its branch name nationally, and it has only recently developed the role of VP Marketing and supported this individual with marketing-focused staff. Thus, it appears that Sierra is on the right side of Bukszar's continuum, but is relatively small scale in this area.

### **3.3.9. Risk Profile**

In alignment with its differentiation strategy, Sierra's operating model encompasses high business risk for a number of reasons.

Fixed Price Projects Involving New "Bleeding Edge" Technology: To mitigate their own implementation risk, many clients are vigorously pursuing fixed price contracts, rather than Time and Materials arrangements. When the engagement involves new "bleeding edge" technology that has not been previously deployed, there are often unforeseen complications and delays which result in losses in completing the project. For contractual reasons and to maintain its reputation in the market niche, Sierra cannot simply "walk" from such situations. Increasing this risk further is the fact that recently, Sierra has entered into a greater number of large contracts that, if they proceed poorly, will severely jeopardize the company's future. Multi-million dollar losses from such projects have had been incurred on such projects in recent years. To reduce this risk, Sierra has implemented a corporate Risk Management team that reviews large projects. This team reviews project bids, contract negotiations, and ongoing project performance. This is considered to be a very high risk factor.

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<sup>62</sup> Some of these pioneering costs involve staying with a client even when the implementation has gone poorly. This has allowed Sierra to refine the implementation protocols in this type of setting, and also to maintain a long term relationship with the client.

**Economic Dependence on Specialty Practice Areas:** Sierra is economically dependent on the health of its Specialty Practices. Downturns in these areas of the economy or in the economy in general can have significant negative effects on the company's operating results. Although the implementation of IT solutions to enhance business competitiveness and government efficiency and effectiveness is generally considered a priority, spending on such capital initiatives can be severely curtailed in a soft economy. Two elements of Sierra's strategy serve to mitigate this risk. Sierra's deep functional knowledge in its Specialty Practices helps it better predict market trends. For example, Sierra's medium term strategy to focus on four practices was a result of extensive involvement in the industry sectors of health, justice, utilities and telecommunications. Another factor is Sierra's geographically diverse organizational model. This dispersion helps mitigate the full impact of an economic downturn. For example, in fiscal 2002, Sierra's US operations and several Canadian regions felt economic slowdowns, whereas Sierra experienced strong growth in Ontario. This is considered to be a medium risk factor.

**High Fixed Costs:** As discussed above under "Manufacturing," Sierra has concluded that the best return on investment will be derived from a long term commitment to its employee asset base. This "build and hold" strategy implies high fixed costs that can result in significant downward pressure on operating results in times of reduced demand. This is considered to be a high risk factor.

**Rapid Technology Change and Maintenance of an Expert Consulting Staff:** The IT consulting industry is characterized by rapid technological change. Sierra's future success depends on its ability to keep up with this change and add value to its clients by implementing systems that incorporate this new technology. Thus, Sierra's ability to retain, train and motivate its resource pool of highly skilled employee-consultants is a key business risk. Sierra has developed a comprehensive retention strategy to ensure its continued competitiveness in this area. In light of these programs and the excellent results it has obtained in this area, this risk factor is currently considered to be low.

Overall, Sierra carries relatively high risk that is increasing due to the increased prominence of large, fixed price contracts.

### ***3.3.10. Capital Structure***

Sierra has always had a very conservative capital structure. Sierra has made use of bank operating lines of credit; however, it has no long-term debt and it is not seeking to take on any fixed term debt in the foreseeable future.

When Sierra went public in 1998, it raised \$31 million in cash. Since this time, these funds have been used to fund acquisitions, of which there have been several over the last five years, and increase working capital. These acquisitions have been made to increase the geographic and functional scope of the business. For example, an existing IT firm was purchased in Washington, DC shortly after the IPO and one was purchased in Winnipeg in the summer of 2002. The United States is the area where Sierra is planning to focus its future acquisitions activity.

While this conservative capital structure is understandable given the relatively high-risk profile of the firm, Sierra is not immune from the discipline of the financial markets. This will be explored further in the financial analysis section to follow.

### ***3.3.11. Conclusion on Strategic Fit***

It appears that Sierra is in transition in regard to its strategic fit. Two key observations can be made in this regard. First, in the past, Sierra's operating model and labour were more centrally located on Bukszar's continuum, but appear to have moved to the right due to greater flexibility and economies of scope. Second, despite having declared a differentiation strategy five years ago and even currently, it appears that the marketplace perceives Sierra increasingly as a cost-based provider. This strategy needs to be clarified, lest Sierra develop a muddled strategy and suffer the consequences of being stuck in the middle. Risk has also increased with the advent of greater client

sophistication in terms of managing risk, and the more prevalent use of fixed price contracts by clients to mitigate this risk. Sierra also has an exceptionally decentralized decision-making structure, which has led to considerable variability in strategies employed by branches and has led to difficulty in co-ordinating corporate-wide initiatives. These issues will be explored further in chapter four.

### 3.4. Financial Assessment of Sierra Systems Group Inc.

The purpose of this section is to review Sierra's financial performance over the last number of years (including two fiscal years before the 1998 IPO) to identify possible implications for Sierra's future.

Sierra's published consolidated financial statements for the last seven years are presented in Appendix I (a-c). To facilitate analysis, these statements have been simplified and recast, as shown in Appendix II (a & b).<sup>63</sup> Standard financial ratios are presented in Appendix II (c) and the Invested Capital Balance Sheet and related ratios are shown in Appendix II (d).<sup>64</sup> Industry ratios, many of which focus on invested capital, are presented in Appendix III. While this list of industry ratios does not appear to have a specific category for IT consulting firms, it does have a category for Management Consulting Services (SIC 8742) which, in many ways, is the business Sierra is in. Observations in regard to Sierra's financial performance, on its own and through benchmarking against some key metrics of the Management Consulting Services SIC and the average of all other SIC's (referred to as ROW – the Rest Of the World) are presented below.

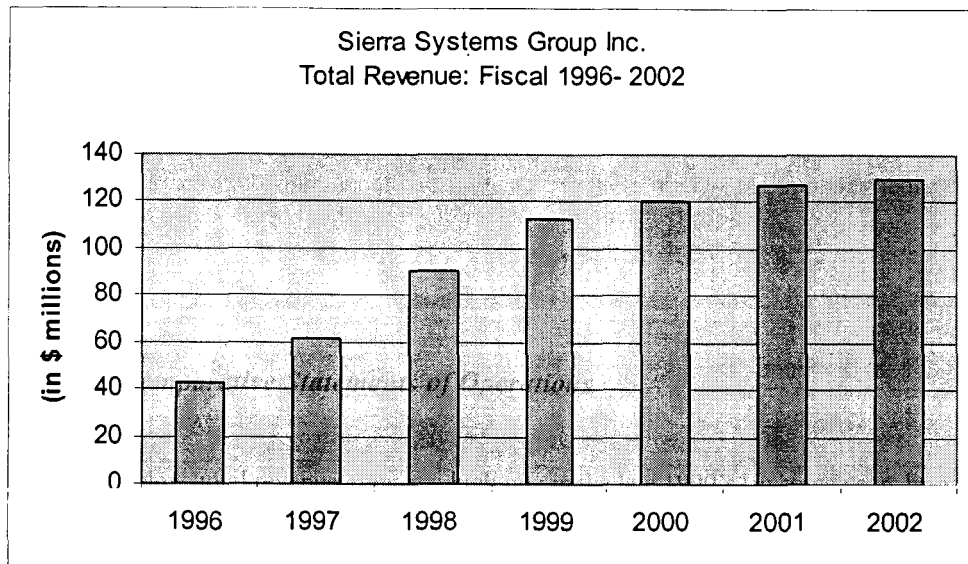
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<sup>63</sup> Perhaps the most significant change is that the long-term receivable and long-term payable had been stripped out of the recast financial statements. This has been done since this is project financing and the receivable is generally fully offset by the payable. In this case, Sierra essentially acts as a conduit receiving payments against a long-term receivable, forwarding these payments on to a financial institution thereby drawing down a long term payable. This arrangement was undertaken due to borrowing restrictions on this client that is a major university. In essence, Sierra has no long-term debt.

<sup>64</sup> Note that Invested Capital has been reduced by the amount held in Short Term Investments. These funds are primarily from Sierra's 1998 IPO. In the IPO prospectus, potential purchasers of the shares were advised that the funds raised for the company would be used for the purpose of expansion, either internally based or through acquisitions of existing businesses. Since the IPO, Sierra has purchased a number of businesses. The funds held in Short Term Investments have been invested primarily in government backed securities and therefore have not been exposed to the corresponding risks / rewards of operations. Accordingly, a lower opportunity cost of capital would be applicable to these funds. For simplicity in the EVA analysis performed in this paper, these funds were subtracted from invested capital.

### 3.4.1. Observations on Comparative Statements of Operations

As shown below, total revenue grew at a high rate in the late 1990's (in some years by as much as 40%) but growth has slowed considerably over the last few fiscal years. Sierra estimates that total revenue for fiscal 2003 will be approximately \$140 million.



Overall, profitability has suffered since the late 1990's. The reason for this appears to be related to Sierra's 'build and hold' model, in which local branches maintain a permanent staff of integration specialists - even in times of weak economic demand.<sup>65</sup> This approach implies a high-fixed-cost, low-variable-cost operating model. This allows economies of scale at the branch level by having a critical mass of resources located there. The implication of this model, however, is that in times of reduced demand due to a soft economy, financial performance will be impaired if fixed costs cannot be adequately covered through revenues. Alternatively, when there is a rebound in the economy, it is likely that Sierra may be able to increase its prices, more fully employ the specialized resources kept at the branch level, leverage its economies of scale, and return to higher

<sup>65</sup> Management's Discussion and Analysis, Sierra Systems Group Inc., 2002 Annual Report.

levels of profitability. This would appear to have been the case in the mid 1990's, when demand for Peoplesoft integration services was particularly high.

The two periods of 1996-1999, and 2000-2002 demonstrate this type of cyclicality. Much of the 1990's saw world wide IT spending grow at levels in excess of 25% per year,<sup>66</sup> however, the three year period of 2000-2002 saw IT spending growth fall to the low single digits. Post Y2K spending withdrawal, the dot.com crash, the terrorist attacks of 9-11, the global economic slowdown, and the lack of 'killer apps'<sup>67</sup> during this period all contributed significantly to this softening of demand.

Sierra was directly impacted by this cyclicality. The mid to late 1990's were boom years at Sierra; the early years of the new millennium, however, have been disappointing. More specifically, Sierra's revenue growth slowed from an average yearly rate of 39% for 1996-1999 to 5% for 2000-2002. This reduction in demand combined with Sierra's current 'build and hold' model also resulted in a reduction in average gross margin decline, from 21% for the period of fiscal 1996-1999, to 17% for the period of 2000-2002. This reduction in gross margin is consistent with the fact that utilization, the ratio of hours charged to client, dropped from approximately 78% to 72% over the same time period.<sup>68</sup>

If it were possible to be confident that such cyclicality would continue indefinitely into the future, Sierra could confidently maintain its current 'build and hold' model indefinitely into the future so long as sufficient profits were made in the boom years to compensate for reduced profits or losses in the down cycle years. However, as discussed in chapter two, while it appears that there will always be a certain level of cyclicality in the IT sector, there are also some long-term structural changes occurring in the IT sector that imply that the halcyon days may be over.

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<sup>66</sup> Georgina Swan, "Half of Tech Brands to Vanish: Gartner" Network Work Canada, 12, no. 23 (2002).

<sup>67</sup> No Author Cited, "Dataquest Forecasts Worldwide IT Services Spending up 7% in 2001," [www.semiconductorfabtech.com/industry.news/2001/12/3/12/01\[2\]global.shtml](http://www.semiconductorfabtech.com/industry.news/2001/12/3/12/01[2]global.shtml).

<sup>68</sup> Management's Discussion and Analysis, Sierra Systems Group Inc., 2002Annual Report

### 3.4.2. *Observations on Comparative Balance Sheets*

- As a consulting firm, Sierra's operations are human capital intensive, rather than invested capital intensive: Sierra has no inventory, manufacturing facilities or even owned office space as part of its asset mix. Sierra rents all of its office space and its capital assets consist primarily of computer hardware, furniture, and fixtures. Sierra's largest asset category is accounts receivable of approximately \$34 million followed by capital assets of approximately \$10 million. Accounts Payable and Accrued Liabilities primarily consist of payroll related items and Deferred Revenue. Thus, there is little opportunity to reduce Trade Capital by means of stretching payments to suppliers.
- Since going public, invested capital turnover has ranged from 2.6 and 3.0 with a mean of 2.75. This is considerably higher than the average of management consulting firms and more than one turn greater than the ROW at 2.2 and 1.7 respectively
- Considering the invested capital turnover ratio further, its inverse, the ratio of invested capital to sales, implies that for each dollar of sales, Sierra needs approximately 36 cents of invested capital. This further implies that if the value of this ratio is maintained into the future, to support sales of \$300 million, Sierra would need approximately \$108 million of invested capital.
- The ratio of Trade Capital to Invested Capital has a mean of 0.56 since the IPO. This implies that essentially half of Sierra's invested capital is trade capital. The non-trade capital portion of invested capital is capital assets and goodwill incurred on business acquisitions. This ratio is almost 0.30 higher than management consulting firms and the ROW. It is surprising that Sierra's ratio would be so much higher than that of management consulting firms. The reason for this is unclear, since neither would have a large accounts payable component to trade capital given that their main costs are payroll, which must be paid promptly. It is also unclear why Sierra would have a much higher ratio than the average of ROW; however, the AP component for these firms may reduce the ratio in this case. The further investigation of these is outside the scope of this paper.



- Trade Capital to Sales has had a mean of 0.2 since the IPO, which is considerably lower than both management consulting firms and the ROW, both of which are at approximately 0.3. If this ratio is maintained, this will imply that with sales of \$300 million, trade capital will be \$60 million, consisting almost fully of accounts receivable. Combining this ratio with the previously noted invested capital ratios, the Non Trade Capital component of Invested Capital can be inferred as shown below.

	SSG	Mgt Cons	ROW
Invested Capital Turnover (Sales/IC)	2.75	2.2	1.71
Taking the inverse of Sales/IC yields:			
Invested Capital / Sales	0.36	0.45	0.58
Less: Trade Capital / Sales	(0.20)	(0.30)	(0.31)
Equals: Non Trade Capital Portion of IC / Sales	0.16	0.15	0.28

### 3.4.3. *Observations on Statements of Cash Flows*

Some interesting observations can be made regarding Sierra's operations on a cash flow basis since the 1998 IPO. To facilitate this review a 'total' column for this period has been included in Appendix I(c), the highlights of which are summarized below.

**Recap Of Statements of Cash Flows**  
**For the fiscal years 1998 to 2002**  
(in \$ millions)

Sources of Cash		Uses of Cash	
IPO Plus Other New Equity	33	Increase in Working Capital	15
Earnings (cash basis)	26	Purchase of Capital Assets	19
		Business Acquisitions	17
		Other	8
Total Sources of Cash	59	Total Uses of Cash	59

- In sum, almost half of the \$33 million raised through the IPO and smaller equity transactions was used to fund an increase in working capital. The remainder was put into Short Term Investments and used to fund business acquisitions and is reflected in the increased amount of Goodwill on the balance sheet.
- Approximately \$26 million in cash was also generated through earnings, most of which was used to purchase capital assets.
- While Sierra continues to have a strong cash reserves its IPO cash has mostly been consumed. Sierra will need to consider other sources with which to fund its future expansion.

#### ***3.4.4. Sierra's Economic Performance Since Going Public***

The ultimate purpose of a public held company should be to maximize shareholder wealth. Economic Value Added (EVA) is a concept that has been successfully used by many firms to measure the creation (or diminution) of shareholder wealth. The conceptual roots of EVA are founded in the economic concept of residual income, a notion that was developed decades ago but which did not achieve widespread use as a performance measure. One reason for the resurgence in the concept is the promotional efforts of Stern-Stewart & Company, a New York based consulting firm that trademarked the term "EVA" in the late 1980's.

The fundamental appeal of EVA is that it measures the creation (or diminution) of shareholder wealth based on the measurement of economic profits, rather than accounting profits. Accounting profits, under generally accepted accounting principles, are simply net earnings available to be distributed to shareholders. No measurement is implicitly made of the adequacy of this return. While the concept of accounting profits has its place, it does not address the underlying economics of investment; namely, that shareholders have an abundance of investment options in which to invest for a given level of risk, each of which could generate an alternative rate of return. In simple terms, the mean of these rates of return becomes a hurdle rate, known as the Opportunity Cost of Capital, against which the returns of all other available investment options should be compared.

Under EVA, shareholder wealth is created only if the Net Operating Profits After Tax (NOPAT) of a firm exceeds the Opportunity Cost of Capital multiplied by the amount of Invested Capital employed by the firm.<sup>69</sup>

Algebraically:<sup>70</sup>

$$\text{EVA} = \text{NOPAT} - (\text{Opportunity Cost of Capital} \times \text{Amount Invested Capital Employed})$$

This EVA calculation explicitly compares the return earned from funds invested in a specific firm to the return shareholders could have earned, had these funds been invested elsewhere. If EVA is positive, shareholder wealth has been created because shareholders *could not have* earned more elsewhere. If EVA is negative, shareholder wealth has been reduced because shareholders *could have* made more profits investing their funds elsewhere. On this basis, EVA becomes an exacting test of a firm's operating performance from an investor's point of view. By

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<sup>69</sup> From an operating perspective, Invested Capital essentially includes working capital and capital assets; from a financial perspective, Invested Capital includes the funds provided by financial asset holders (Shareholders and Creditors), including retained earnings. The amount of Invested Capital under the operating definition must equal the amount Invested Capital under the financial definition.

<sup>70</sup> EVA can also be expressed as:  $\text{EVA} = (\text{Funds from Operations} - \text{Maintenance Capital Expenditure}) - \text{Opportunity Cost of Capital} \times \text{Invested Capital}$ . This paper will use the NOPAT version of EVA and will assume that Capital Asset Amortization will equal Maintenance Capital Expenditure.

using EVA, shareholders can quite accurately assess the extent to which their wealth has been created or reduced.

Because of the implicit link between EVA and the creation (or reduction) of shareholder wealth, EVA has gained great popularity with publicly traded firms. Moreover, to align the behaviour of management (and all employees) to the creation of shareholder wealth, a number of high profile firms have very successfully incorporated EVA based metrics in such areas as compensation arrangements, capital budgeting and the assessment of mergers and acquisitions. By most accounts, the implementation of these metrics has been overwhelmingly successful. Companies who have used EVA have realized significant increases in their share prices, much to the delight of their shareholders.

EVA can be improved by three basic methods: an increase in operating profitability (NOPAT); a reduction in Opportunity Cost of Capital; or better management of (in other words, a reduction in) Invested Capital employed. Much of the focus of EVA has been based on the notion that in most corporations there exists a treasure trove of ways in which EVA can be enhanced by reducing invested capital. Coke, for example, found that it could reduce its invested capital by using cardboard disposable inserts, rather than heavy metal carriers, to separate bottles. The expense charged against income (NOPAT) for the disposable cardboard carriers was less than the opportunity cost of capital of the metal carriers that were on the balance sheet as capital assets and therefore a part of invested capital. While Sierra has relatively little invested capital, EVA is still a valid metric. Appendix IV shows the economic value results by Sierra, by quarter since Sierra went public in June 1998. These results are recapped in the graphic presented below with a trend line.

**Sierra Systems Group Inc.**  
**Economic Value Added: June 1988 - June 2003**

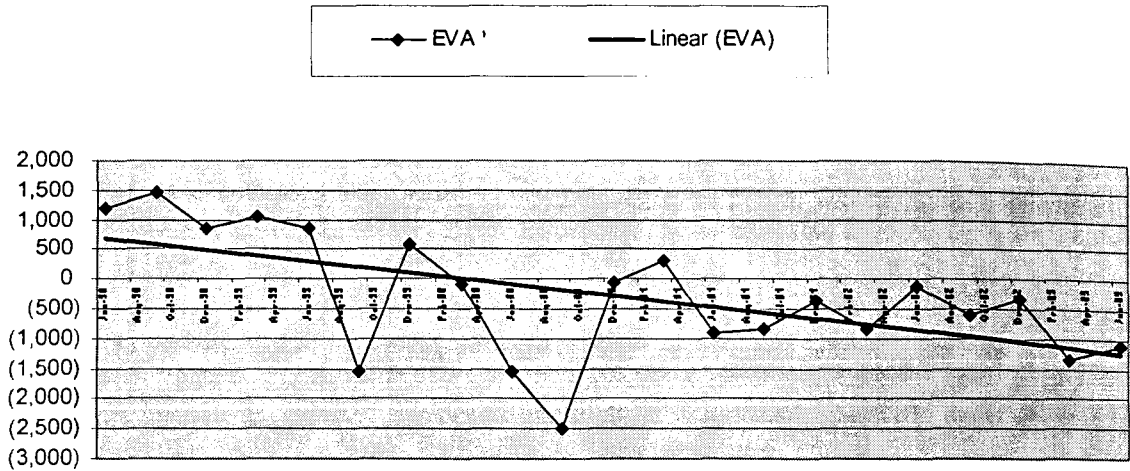


Figure 9 - Economic Value Added at Sierra Systems, June 1998 - March 2003

Applying a modest cost of capital of 8%, Sierra has reduced \$2.5 million over the last 18 quarters since going public and \$6 million over the last 8 quarters.<sup>71</sup>

Given that EVA implicitly measures the creation or diminution of shareholder wealth, it is not surprising that there is a significant correlation between EVA and share price. In fact, one study found that EVA can account for up to 75% of the movement in share prices of an entity, far more than could a conventional measure such as EPS.<sup>72</sup>

Because EVA is so strongly linked to the creation (or diminution) of shareholder wealth, it would be remiss not to explore the connection between EVA and Sierra's share price. The following graphic shows Sierra's share price performance plotted against the Dow, the S&P 500, the TSX Composite and the Nasdaq.

<sup>71</sup> An 8% cost of capital has been used in this case and is considered modest due to the relatively high risk that Sierra has a corporate entity.

<sup>72</sup> Al Ehrbar, EVA: The Real Key to Creating Shareholder Wealth, (John Wiley & Sons, New York: 1998), 166.

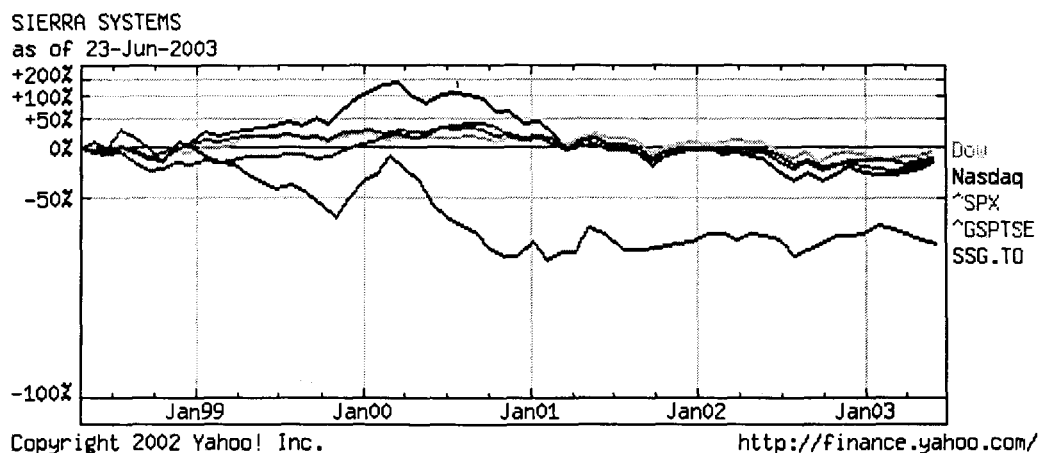


Figure 10 - Sierra Systems' Share Price Relative to Dow, Nasdaq, S&P 500, TSE300

Some conclusions can be drawn as follows:

- From almost since going public, Sierra's share price has consistently under performed in each of the market indices plotted. This downward trend is consistent with the trend in EVA.
- The only index that Sierra's share price appears to be somewhat correlated with is the Nasdaq. This is likely due the heavy technology weighting that this index had in the dot.com era. Because Sierra consults in this field, it appears that its price was carried up with the market. It appears that while the major indices plotted above have lost approximately 25% of their value during this period, Sierra's share price has lost more close to 75% of its value.
- Consistent with the studies that indicate that up to 75% of share price movement can be explained by EVA, there appears to be a significant correlation between link between the Sierra's EVA and its share price. Combining the results of Figures 9 and 10, this can be explained intuitively as follows. Across North America, there are, of course, firms whose NOPAT exceeds their cost of capital and create shareholder wealth and there are those firms whose NOPAT does not exceed their cost of capital and therefore destroy shareholder wealth. On average, however, publicly traded firms earn only their cost of

capital and thus they are neutral in regard to the creation or diminution of wealth.<sup>73</sup> This aggregate of North American firms can be represented by the indices of the stock markets plotted in Figure 10. If these premises are accepted, individual firms whose share price returns beat these indices can be expected to be have created shareholder wealth; alternatively, individual firms that do not beat these indices can be expected to have destroyed wealth. The fact that Sierra's share price performance has been below these major indices and that Sierra's EVA has been trending downwards and has been overall negative since going public is consistent with this latter case. In fact the correlation appears to be compelling; however, testing this hypothesis more rigorously is beyond the scope of this paper.

#### ***3.4.5. Shareholder Wealth and Expansion Scenarios***

In 2001, Sierra company declared its intention that by fiscal 2004, it would achieve \$300 million in revenues, 1500 employees, and a share price of \$40.<sup>74</sup> In light of the recent slowdown in the IT sector, however, Sierra has had to modify these goals; for example, Sierra's has projected that its fiscal 2003 revenue target is \$140 million. Nevertheless, Sierra's overall plan is to significantly expand the scale of its operations to the size it had originally hoped to achieve by fiscal 2004. In sum, the growth goals appear to remain the same, only the timing has been extended.

The following table considers four possible scenarios to explore the possible outcomes of increasing Sierra's operations to support sales of \$300 million. Each of these scenarios assumes that the level of invested capital needed to support this level of sales is approximately \$110 million, based on an invest capital to sales ration of 0.36.

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<sup>73</sup> Rafael Resendes, The Applied Finance Group, Ltd., Presentation to the Vancouver Society of Financial Analysts, May 27, 2003.

<sup>74</sup> Vision 2004, Corporate Brochure of Sierra Systems Group Inc. (2001)

	Case 1		Case 2		Case 3		Case 4	
	Current Performance		Increase Gross Margin to 21% Decrease G&A to 12%		Increase Gross Margin to 25% Decrease G&A to 12%		Increase Gross Margin to 25% Decrease G&A to 12% Increase Cost of Capital to 15%	
	%	\$	%	\$	%	\$	%	\$
Sales (\$300 Million)	100	300	100	300	100	300	100	300
Cost of Sales	-81	-243	-79	-237	-75	-225	-75	-225
Gross Margin	19	57	21	63	25	75	25	75
General & Admin	-14	-42	-12	-36	-12	-36	-12	-36
Capital Asset Maintenance	-2	-6	-2	-6	-2	-6	-2	-6
Operating Earnings Before Tax	3	9	7	21	11	33	11	33
Tax @ 45%	-1.35	-4.05	-3.15	-9.45	-4.95	-14.85	-4.95	-14.85
Net Operating Profit After Tax (NOPAT) A	1.65	4.95	3.85	11.55	6.05	18.15	6.05	18.15
Invested Capital		110		110		110		110
Opportunity Cost of Capital %		10%		10%		10%		15%
Opportunity Cost of invested Capital B		11		11		11		16.5
Economic Value Added A-B		-6.05		0.55		7.15		1.65

**Case 1** shows the effect on shareholder wealth expansion to \$300 million under the assumption that Sierra maintains its current level of gross margin (19%), G&A (14%) and Capital Asset Maintenance (2%) as a percentage of sales, using an opportunity cost of capital of 10%. Using these parameters, negative EVA of over \$6 million would be incurred each year. Clearly, this is not a desirable outcome for shareholders.

**Case 2** considers the EVA effect under the assumption of some operational improvements: gross margin is increased to 21%, and G&A costs are reduced to 12%. This is a much better; however, the Sierra at this point shareholders are just making back their opportunity cost of capital. This implies that shareholders would be just as well off by investing in Sierra than they would be by investing in other investments with a mean return of 10% and having the same risk profile.

**Case 3** considers a further improvement to gross margin to 25% and G&A costs are reduced of 12%. This results in a healthy enhancement of shareholder wealth of over \$7 million. This is clearly a desirable outcome.

**Case 4** demonstrates the effect of using a 25% gross margin percentage and a 15% cost of capital. This results in a yearly increase is just \$1.7 million in shareholder wealth. Given that the long run return on Canadian equities is approximately 12%, an opportunity cost of capital of 15% would be higher than the average Canadian equity; however, in light of Sierra's risk profile, such a premium would likely be reasonable. The lesson to be learned from this scenario is that with a higher cost of capital and only modest increases in gross margin, EVA is barely positive.

These four cases demonstrate that unless gross margin is increased substantially, ideally to approximately 25%, Sierra will incur more negative EVA to the detriment of shareholders. Consequently, a critical issue for Sierra to address is how to increase gross margin. This need will be further affirmed in the next section in regard to the financing of future expansion. Following this, the remainder of this section will focus on the how gross margin can be increased.



### **3.4.6. Funding of Future Expansion**

An additional issue must be considered in regard to Sierra's proposed expansion of its operations to support sales of \$300 million - how to fund the expansion. Over the last number of years, Sierra has had an 'invested capital to sales' ratio of 0.36. If Sierra were to increase its sales by approximately \$170 million, to \$300 million, this would imply that Sierra would need additional invested capital of approximately \$61.2 million. How this financing will be raised is a material issue for Sierra.

Ultimately, there are three possible sources of financing: debt, equity, or retained earnings. Each will be considered in turn.

In regard to debt financing, it is likely that Sierra would be able to secure some additional bank financing based on signed long-term contracts. Increasing its debt financing would have two offsetting effects. On one hand, because debt interest is tax deductible, Sierra's weighted average (opportunity) cost of capital would tend to decline. On the other hand, adding a significant level of debt also increases Sierra's level of financial risk, the effect of which would be to increase its weighted average (opportunity) cost of capital. Further work would need to be undertaken to quantify these offsetting effects. It is likely that approximately \$10 million could be raised through debt.<sup>75</sup> If so, this would still leave at least a \$51 million financing shortfall.

In regard to raising funds through a new equity offering, it is unlikely that many investors would be interested, based on the past performance of Sierra's share price. In fact, it would seem reasonable to assume that relatively few investors would see any past losses as sunk costs and judge any future investment opportunity on its own merits. Thus it appears reasonable to assume that new investors would want to see substantial increases in shareholder wealth created for existing shareholders before investing any new substantial amounts of money. Thus, Sierra will face significant challenges in raising additional financing required for growth through new equity issues for the foreseeable future.

If funds for expansion cannot be raised through debt or equity, funds from operations are the only remaining source. In this regard, 'insight into Sierra's ability to fund growth using only funds from operations can be achieved by considering a generally accepted notion of sustainable growth, as shown below:<sup>76</sup>

$$\begin{aligned}\text{Sustainable Growth} &= \text{Earnings Retention} \times \text{Return on Equity} \\ &= 1 \times 3\% \\ &= 3\%\end{aligned}$$

Decomposing return on equity as shown on the bottom of Appendix IIc, a declining profit margin had the greatest impact on the deterioration of return on equity. Profit margin is also the most controllable by Sierra. The overall conclusion from this analysis is that funds generated through operations is the most viable means for the medium term through which to secure the funds required to increase invested capital; however, to do this, profit margin, and in turn gross margin, must be substantially increased. If for example, gross margin could be increased to 25%, this would result in a profit margin of approximately 9.7%.

Evidence of the financial strain that revenue growth has put on Sierra is evidenced by the fact that IPO cash has been drawn upon in recently to support operations. This cannot continue indefinitely. Sierra will need to generate more funds from operations in the future to support its top line growth, lest it encounter financial stress in the future.

### **3.4.7. *Conclusions on Financial Analysis***

Overall, Sierra's financial performance since going public has been disappointing. It appears that Sierra benefits greatly from the high rates of growth that the IT industry experienced in the mid-1990's; however, the stagnation in demand since that time has hit Sierra hard. It appears

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<sup>75</sup> Based on discussion with Sierra Systems Group Inc., Spring 2003.

clear that to adapt to this financial environment Sierra will need to increase its gross margin considerably. A target gross margin of 25% appears to be adequate to ensure that shareholder wealth will be enhanced through positive EVA, that funds from operations will be increased allowing for sustainable growth, and that a differentiation strategy could be more effectively executed based on branch managers not needing to make price concessions <sup>7</sup>to cover the fixed costs of the current 'build and hold' operating model. How this could possibly be achieved is explored in chapter four.

In chapter two, the issue of whether Sierra's current operating structure is cost effective to compete in a hostile market was raised. In light of Sierra's recent financial performance, the evidence appears to indicate that Sierra will need to reduce its cost structure to prosper financially in the future. A key question becomes how Sierra will be able to adjust its cost structure to compete more effectively. A more complicated question is: how can Sierra adjust its cost structure to compete more effectively *and* still maintain its strong communitarian culture?

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<sup>76</sup> Robert C. Higgins, *Analysis for Financial Management*, Sixth Edition, (Boston, Irwin McGraw-Hill, 2001), 118.

#### 4. Analysis of Issues

Recalling Porter's over arching key success factors, a number of issues were identified in the previous three chapters as being critical to Sierra's success in the increasingly hostile SI sector. These are listed below in priority order to Sierra's context, under the general headings associated with Porter's key success factors:

##### Generic Strategy Issues:

- What should Sierra's future generic strategy be for the medium term?
- Conservation of cash
- How can Sierra balance stakeholder needs and communicate its strategy?

##### Process Innovation:

- How can Sierra refine its cost structure and maintain its strong communitarian culture?

##### Focus on Key Customers:

- How should Sierra respond to bundling?
- How should Sierra respond to the trend towards outsourcing?

##### Sophisticated Cost Analysis:

- How can Sierra improve its ability to estimate costs?
- What performance metrics should Sierra use?

Each of these will be examined in turn.

## 4.1. Generic Strategy Issues

### 4.1.1. *What Should Sierra's Future Generic Strategy Be for the Medium Term?*

In light of the increased hostility in the IT and SI industries, the decision to choose a generic strategy becomes more acute.<sup>77</sup> What then, should be Sierra's future generic strategy over the medium term (the next five years)? The answer to this question appears to be based on three factors: Sierra's current capabilities; the extent of commoditization; and the extent of price competition that will occur in the SI sector.

In regard to Sierra's current capabilities, as established in the analysis of strategic fit, Sierra's operating model is generally well suited to support a differentiation strategy. The only exception to this in the past has been Sierra's high-fixed cost, low-variable cost operating model, which has tended to undermine its ability to negotiate for premium prices. With the deployment of an enhanced SDC model, this issue should be fully addressed. Of course, Sierra could contemplate taking on a cost leadership position; however, given its current structure, this option does not appear to be practical in the short to medium term. This option should, however, be considered more seriously for the future, especially if a differentiation strategy is found to not be viable over the medium term. In summary then, for the medium term, based on its current structure, Sierra is best suited to continue to pursue a differentiation strategy.

If this is the case, the issue then becomes whether or not the restructuring that is taking place in the IT industry will allow Sierra to pursue a differentiation strategy. Recalling the inferences made in chapter two from the analogy to the auto industry, it appears that two key factors that will influence the future: the need for customization and the influence of foreign competitors in the SI sector.

Despite the commoditization that is occurring in the hardware and software sectors, it appears that for the foreseeable future, there will continue to be a need for SI services due to the

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<sup>77</sup> Michael, Porter, *Competitive Strategy: Techniques For Analyzing Industries And Competitors*, (New York: Free Press: 1980), 241.

need for industry and firm specific customization. Note, however, that the extent of commoditization in the SI sector will be a key determinant of sustainability of a differentiation strategy and therefore should be closely monitored by Sierra.

Finally, the sustainability of a differentiation strategy is threatened by the cost pressure that will come if foreign competition enters the North American SI market. In this case, the key issue is whether or not Sierra could adequately respond to such price pressure if it occurs. Sierra would have two basic options in dealing with such a pressure: it could ensure that its service offering is adequately differentiated to justify a higher price; or it could reduce its own prices to help offset any price gap. This second option would likely only be sustainable if Sierra's cost structure was quite low, matching, in effect, the cost structure of foreign competitors. This, in turn, would likely imply the significant use by Sierra of overseas labour.

Due to commoditization of SI services and price competition from foreign firms, it is unclear if a differentiation strategy for Sierra is viable for the long term. This is largely conjecture at this point, though. In summary, based on Sierra's current operating structure, it is appropriate to continue to pursue a differentiation strategy; however, industry restructuring should be monitored closely. If the SI service offering becomes more homogeneous, whether in fact or in perception, and if foreign competitors drive down prices, Sierra may not be able to sustain a differentiation strategy. There will be interesting days ahead!

While speculative, an important question to consider is how Sierra should respond if SI services become more commoditized and the SI business becomes a cost game in the long term (6-10 years from now)? If this were to occur, it is likely that a Canadian-based SDC model may still be cost prohibitive. If so, it may be appropriate for such a centre to be moved off shore to a location such as India. In the meantime, it would be prudent for Sierra to take full use of such off shore labour and develop strong relationships with such offshore vendors. Sierra may even want to consider purchasing such an off shore SDC firm. Note that both EDS and IBM have acquired Indian operating companies to secure a presence there.

#### **4.1.2. Conservation of Cash**

Again, reducing cost structure to enhance gross margin is perhaps the single most important initiative that Sierra should undertake in the medium term. Achieving this would allow Sierra to more successfully pursue a differentiation strategy, increase its shareholder wealth, and generate more funds from operations to support future expansion. Given these priorities and Sierra's current cash position, the hostile market it finds itself in, and the riskier projects it is undertaking, Sierra should exercise prudence in its future use of cash.

#### **4.1.3. How can Sierra Balance Stakeholder Needs and Communicate its Strategy?**

Unfortunately, maximizing shareholder wealth does not appear to be 'top of mind' for most branch managers or employees. The roots of this situation are likely based in the fact that for most of its existence, Sierra has been a private firm that has been insulated from the disciplines of the financial markets. With the blessing of its private shareholders, Sierra admirably focused attention on the satisfaction of customers and health of its employee base through its communitarian culture. 'Going public' has put the shareholder in a different light; management is no longer the majority shareholder, instead arms-length third parties are. There is now a more formal fiduciary relationship between the shareholders and employees. It appears that the nature of this fiduciary relationship has not yet been adequately recognized by many employees at Sierra - again, maximizing shareholder wealth does not appear to be 'top of mind.'

To address this situation, and also keep the appropriate level of attention on customer satisfaction and the needs of employees, Sierra should consider adopting a 'balanced score card' framework to ensure an appropriate integration of the needs of all relevant stakeholders, including shareholders. (See Figure 11 below)

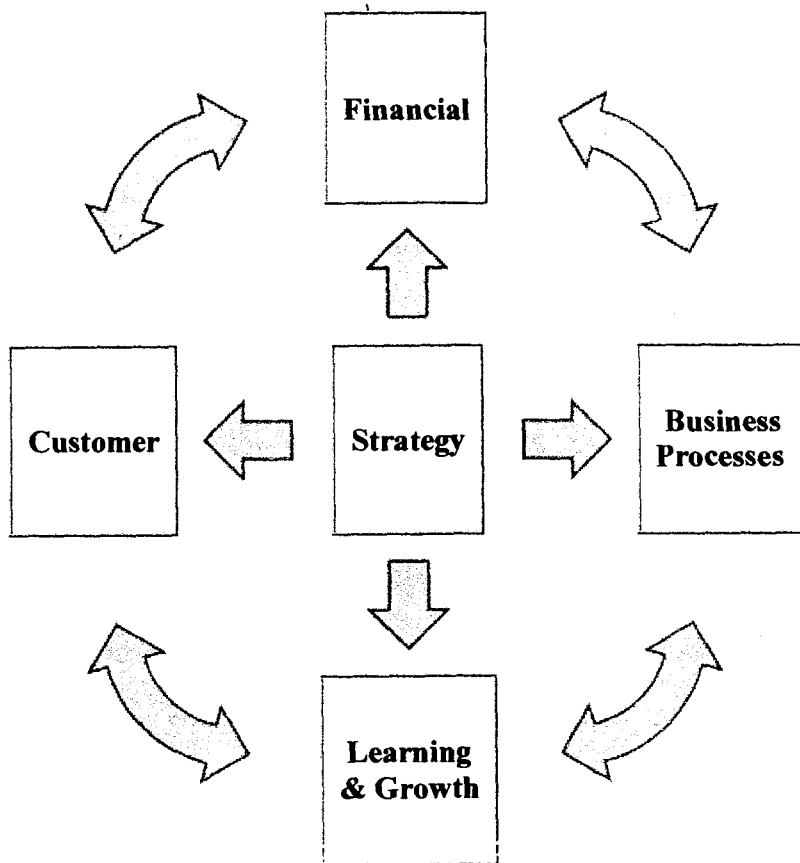


Figure 11 *Balanced Scorecard*

The balanced scorecard is a company performance management system that seeks to integrate a variety of perspectives, each of which are important to overall firm success.

The Balanced Scorecard goes beyond standard financial measures to include the following additional perspectives: the customer perspective, the internal process perspective, and the learning and growth perspective.

- Financial perspective - includes measures such as operating income, return on capital employed, and economic value added.
- Customer perspective- includes measures such as customer satisfaction, customer retention, and market share in target segments.
- Business process perspective - includes measures such as cost, throughput, and quality. These are for business processes such as procurement, production, and order fulfillment.
- Learning and growth perspective - includes measures such as employee satisfaction, employee retention, skill sets, etc.<sup>78</sup>

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<sup>78</sup> Robert S. Kaplan and David P. Norton, *The Balanced Scorecard: Translating Strategy into Action* (Boston: Harvard Business School Press, 1996), 9.



The balanced scorecard approach would likely suit Sierra's requirements very well given its strong communitarian culture, emphasis on continuous learning and skill development, and customer satisfaction. In addition, overall strategy is front and centre in this framework. As a supplement to the strategy component, it would be beneficial for Sierra (and each of its branch managers) to develop a more precise statement of strategic intent so that any gaps and inconsistencies could be identified between Sierra's overall strategy and those implemented at the branch level.

## **4.2. Process Innovation**

How can Sierra refine its cost structure and maintain its strong communitarian culture? This is perhaps the most important issue that Sierra faces. Regardless of the generic strategy that it pursues in the future, it is imperative that Sierra increase its gross margin. Increased gross margin will lead to an increase in shareholder wealth and greater funds from operations which, in turn, can be used to strengthen Sierra in a hostile market, and fund future growth. In addition, having a lower fixed cost structure would allow Sierra to pursue a differentiation strategy more effectively.

There appear to be three basic options that Sierra could pursue to reduce its cost structure:

- Implementation of a 'road warrior' model;
- Greater use of subcontractors;
- Enhanced use of the SDC model.

These will be explained in turn and their advantages and disadvantages reviewed.

### ***4.2.1. Implementation of a Road Warrior Model***

The road warrior model would involve a fundamental shift for Sierra. No longer could employees expect to work at client sites that are located within 30 kilometres of their homes.

Instead, most would expect to head to the airport on Sunday night to fly into a client city, spend the week away from home living out of a suitcase, and then fly home on Friday night.

- **Advantages:** Use of a road warrior model would allow significantly greater flexibility in deploying specialized labour throughout Sierra. Employees with specialized skills could be moved to different client sites as need for their skills arose. This would greatly enhance utilization and therefore ensure that revenues would be available to contribute towards covering the salaries of these resources. As a result, overall staffing levels and therefore fixed costs would likely be reduced significantly.
- **Disadvantages:** A road warrior model would be in complete contradiction to Sierra's communitarian culture. If implemented, it is likely that there would be significant resistance from all levels of staff. If such a model were implemented, is likely that, due to the heavy travel demands on employees, Sierra would have to pay higher compensation to employee consultants. In addition, even with higher salaries, the road warrior model leads to higher burn out rates and therefore higher employee turnover rates, which in turn would lead to higher recruitment and training costs.

#### **4.2.2. *Greater Use of Subcontractors***

Under this approach, Sierra would reduce its headcount of permanent employee consultants and instead, increase its use of subcontractors hired for specific projects. That is, when a new engagement called for more labour with a certain skill set, this labour would simply be hired on a sub-contracted basis. In general, Sierra has kept the use of subcontractors to less than 20% of its total compensation costs. For example, in fiscal 2001, only 15% of Sierra's total compensation costs were for subcontractors. More recently, however, this has grown to approximately 21%. Greater use of subcontractors as an option to reduce Sierra's cost structure would imply raising this percentage to 40-50%, or even higher.

- **Advantages:** The main advantage of this approach is that it changes labour from being a fixed cost to being a variable cost. This gives the firm significant flexibility in its overall cost structure.
- **Disadvantages:** Sierra's core competency is in SI work. The use of subcontracted labour for SI services threatens to undermine Sierra's core competency. This is because when a project is finished, the competency developed walks out the door. In an employee consultant model, however, the experience gained stays with the company as long as the employee does (assuming that there is an adequate knowledge management system to disseminate this experience). In addition, though subcontractors reduce fixed costs, subcontractors are more expensive than employee consultants to deploy to a client engagement. That is, the fully loaded cost of an employee is significantly less than the cost of a subcontractor. Finally, corporate culture is also diluted when subcontractors are used to such a degree.

#### **4.2.3. *Enhanced Use of SDC - The Refinement of the "Build and Hold Model"***

The advent of the internet has enabled a compromise between the 'road warrior' and the 'work near home' models. More specifically, the internet allows employees to work remotely from client sites, even sometimes if they are located thousands of miles away. This capability allows employees with specialized skills to work on engagements for a variety of branches, regardless of geographic location. It is this technology that has allowed the Vancouver and Victoria branches to develop their software development centres.

It appears that the SDC model could be more fully developed, such that the composition of branch staff would include fewer specialists, and a greater number of business analysts. The business analysts, who have a much more adaptable and less costly skill set, could gather information on the nature of the integration issues, and forward these to a SDC. Specialists in the SDC would then develop the system architecture to support the implementation, and write and test any code that is necessary.

An SDC model would result in a number of other important benefits, including the following.

- Utilization could be significantly increased by concentrating the flow of specialized work to fewer specialists that are located primarily at a SDC. This, in turn, would reduce overall fixed costs. Without further study including a detailed skills inventory and skills load assessment it is difficult to estimate the savings that would accrue based on this approach; however, a 5% reduction in staffing would appear to be reasonable. If so, this would imply savings of approximately \$5 million per year. This would translate into a 4% increase in gross margin.
- A key advantage of the SDC model is that it is fully consistent with the ‘work near home’ model that is a core element of Sierra’s communitarian culture.
- The SDC model also fully maintains the branch centric model - that is, branch managers would still be able to exercise significant autonomy in pursuing opportunities in their marketplace, and develop the client relationships they consider to be important.
- An SDC model would allow branch managers to pursue an even broader range of client opportunities because under the SDC model, they would have significantly greater technical resources upon which to call than would be currently available to them.
- Significant synergies would likely accrue when technical specialists work together on challenging assignments. Under this model, it is more likely that code that has been written and developed by the SDC for earlier, similar applications, could more easily be recycled and reused in other client engagements. Under Sierra’s current ‘work near home’ model, and due to the lack of a robust knowledge management system, it is very likely that the wheel has been reinvented a number of times over the years.
- Under the SDC model, local branch staff would have greater capacity to take on stronger business development roles. Business analysts, located at the branches, could be assigned the responsibility of maintaining even stronger customer relationships than they currently do, and leverage this client knowledge and relationships into additional business opportunities. Thus, the primary role of the business analyst would be to understand

clients intimately, to support current engagements and identify opportunities for future ones.

- It appears that if an SDC model were followed throughout Sierra, in addition to there being higher utilization (and therefore overall lower staffing levels required at the branch level), there may also be less of a need to maintain expensive office space in each branch location, again resulting in reduced fixed costs. More and more, branch employees would be located at the sites of clients for which they are responsible.
- An additional advantage of this SDC model is that if such a centre were located in Canada, client engagement from the US would be able to take advantage of the favourable US exchange rate. This cheaper labour would result in even greater gross margin enhancements. That is, if as discussed later in this chapter, a stronger differentiation strategy were pursued involving charging premium price, and if costs could be reduced concurrently (through higher utilization and favourable exchange rates), gross margin could be considerably enhanced.
- The experience of the staff at an SDC location would likely also develop a strong core competence in the preparing estimates to complete. The reason for this is that these individuals would see a greater variety of integration issues and be able to leverage past experience. While no empirical evidence is available it appears that one of the reasons for poor estimates to complete in the past is due to the fact the project manager preparing the estimate has 'not been there before.' That is, they are using a new technology in a new client context. Due to the breadth and depth of experience of senior SDC staff, project managers would be able to provide estimates to complete which have significantly greater accuracy.
- A further advantage of the SDC model is that if Sierra were ever purchased by another corporate entity, Sierra would have a stronger intangible asset base to sell. That is, currently, much of its high-end technical expertise is dispersed among the branches. If Sierra were ever sold, and if the staff did not like the new corporate culture that was introduced, many employees could leave the company, leaving the new purchaser with

little. Instead, if such expertise were located in an SDC centre, a new owner would be unlikely to break it up, under the adage 'if it ain't broke don't fix it.'

- An SDC model may also provide a marketing angle that could be leveraged. Flying in a client to see an SDC could provide a compelling selling opportunity.
- The SDC could also determine if any code writing could be outsourced to an off shore location such as India. Outsourcing in this manner would allow a significant cost advantage, and would also enable code to be written overnight. This has the potential to decrease delivery time to the client. For example code written the previous night in India could be assessed and tested the next day in North America.

It is interesting to note that if pursued more vigorously, the SDC model would significantly change the nature of labour resourcing at Sierra. Historically, while some 'inter-branch' exchange of specialized labour has taken place, labour has more or less been attached to a particular branch. Under an SDC model, specialized labour would become less branch specific and more of a company wide resource for all branches to access. This would further imply that projects would be less associated with a particular branch and more connected to the company overall. The implication of this is that rather than focusing on operational results of a particular branch, Sierra would tend to focus more on the operational results of a particular project.

#### *4.2.3.1. The Impact of an SDC Model on the Branch Centric Model*

The impact of an enhanced SDC model on Sierra's branch centric model is an important issue to be considered. This is especially true in light of the priority that Sierra currently gives to branch autonomy and decentralization. There are clearly a number of advantages and disadvantages to both a centralized or decentralized model. These are summarized in Figure 11.

## Centralization vs Decentralization Primary Advantages and Disadvantages

<u>Centralization</u>	<u>Decentralization</u>
<p><b>Advantages</b></p> <ul style="list-style-type: none"> <li>Economies of Scale</li> <li>Synergies</li> <li>Consistency in Culture and Market Offering</li> <li>Easier Knowledge Sharing</li> </ul> <p><b>Disadvantages</b></p> <ul style="list-style-type: none"> <li>Distance to Customer</li> <li>Reduced Geographic Reach</li> <li>Slowness of Decision-Making</li> <li>Lack of Local Market Knowledge</li> </ul>	<p><b>Advantages</b></p> <ul style="list-style-type: none"> <li>Innovative</li> <li>Quick Decision Making, Nimble</li> <li>Presence in Local Markets to Garner Market Information and be Visible to Clients</li> </ul> <p><b>Disadvantages</b></p> <ul style="list-style-type: none"> <li>Silo Effect - Ease of Information Sharing is Lost</li> <li>Lose Economies of Scale</li> </ul>

*Figure 12 - Advantages and Disadvantages of Centralization and Decentralization*

The ideal balance between these two extremes would capture the advantages of each and mitigate the disadvantages. The enhanced use of the SDC model in the context of a branch centric model as previously described will allow Sierra to capture three main benefits that should make a significant difference to its operating results: economies of scale, synergies and easier knowledge sharing.

In regard to economies of scale, under the SDC model, Sierra would in fact be able to apply a greater scale of resources towards developing a client solution more efficiently and effectively. In regard to synergies, there is clearly an advantage to be realized when experts work together, rather than in isolation.

An additional issue that Sierra is currently seeking to address is the silo effect that occurs when lessons learned at the branch level are not adequately circulated amongst the branches. The SDC will significantly help this; however, a more robust knowledge management system will be a strong supplement in this regard. The SDC could, in fact, play a key role in the development of a robust knowledge management system, since SDC staff would likely develop a broader and deeper

knowledge of technical issues, and could provide a central point of contact and a strong sounding board for field staff.

If an SDC model is determined to be an appropriate model for Sierra to pursue, a material issue to consider is how to transition towards this model. Again, care must be taken to respect Sierra's corporate culture of branch autonomy. In light of this, perhaps the most effective way to promote the SDC model is to allow it to develop naturally. That is, allow branch managers to *choose* to source their systems integration work from the SDC if they see fit to do so. If the scale effects, synergies and other advantages are as compelling as predicted, managers will be attracted to use it to earn higher margins on their branch projects. Under this approach, the SDC would simply become an alternate service provider. This approach fully respects the local autonomy of the branch managers and allows the SDC model to flourish only if it can offer a compelling value proposition.

#### 4.2.3.2. *Strategic Implications of an SDC model*

As noted in the strategic fit analysis, despite Sierra having declared a differentiation strategy, the marketplace perceives Sierra to be a value player rather than a differentiator, which in turn may have led some to assume that the quality of Sierra's offering is adequate but not high.

It appears likely that some of the price reductions were due to branch managers seeking to secure new business in an effort to cover the relatively high fixed cost of having otherwise under-utilized implementation specialists on hand at the branch. By using an enhanced SDC model, local branches would no longer need to bear such fixed costs to the same degree. Instead, branches could simply purchase the expertise they need through the SDC when they need them. This effectively converts a fixed cost to a variable cost at the branch level. If so, this would relieve the pressure branch managers feel to secure new business at a lower cost and would therefore give the branch managers more freedom to negotiate more strongly for higher contract prices - and therefore allow Sierra to pursue its declared differentiation strategy.



Further to this point, minimum branch margins could be agreed to between each branch manager and the corporate office. Then, when negotiations of new contracts are being undertaken, branch managers would be careful to ensure that the project margin would meet or exceed the minimum acceptable branch margin. There will be occasions when, for strategic reasons, it may be acceptable to allow project margin to be lower than the branch margin floor; however, this should be the exception and not the norm, and within the branch managers' authority to control.

Notwithstanding this renewed effort to implement a differentiation strategy, with the maturation of the IT market and the increased competition that is present, Sierra will need to be prepared to be more of a price taker than a price setter. Perhaps the best that Sierra can hope for in implementing a differentiation strategy is to pursue the highest possible contract prices without losing bids to competitors.

#### **4.3. Focus on Key Customers**

The Windemere study concluded that successful firms in hostile markets tend to “focus ...on developing strong relationships with medium-sized customers...” and in doing so... “tend to emphasize good service and reasonable prices to their end-user customers.” In addition, to attract these customers, successful firms “...often adopt industry specialties.”

Porter also notes that “increasing [the scope of] purchases of existing customers may be more desirable than seeking new customers” and alternatively, “in a mature industry, winning new customers usually means battling for market share with competitors and is consequently quite expensive.”<sup>79</sup>

The essence of this advice is that Sierra should focus applying its FISH (first in, still here) principle with even greater effort on retaining relationships with key customers. It also may be prudent for Sierra to attempt to broaden the scope of services that it can offer its clients. Should

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<sup>79</sup> Michael, Porter, *Competitive Strategy: Techniques For Analyzing Industries And Competitors*, (New York: Free Press: 1980), 244-245.

Sierra pursue business with new clients? Yes, of course, but the majority of effort should be on retaining and strengthening the relationships that Sierra has with its current clients and increasing the ways in which Sierra can serve them. In light of counsel from Windemere and Porter, some recent developments in the IT industry can be considered in this regard, namely bundling and outsourcing.

#### **4.3.1. *How Sierra Should Respond to Bundling ?***

In chapter two of this report, it was noted that a number of firms, especially hardware vendors, have begun to offer services that capture all parts of the value chain. In fact, some observers indicate that one of the main drivers of the merger and acquisition activity that is taking place is the drive to meet the needs of customers: “Vendors...want to move beyond supplying products to [become] full-fledged ‘strategic partners’ with closer, longer-lasting relationships with key customers.”<sup>80</sup> IBM’s purchase of PWC consulting, Fujitsu’s purchase of DMR, and Computer Associates International Inc’s failed hostile take over attempt of Computer Services Corp were all motivated by the desire to supply not only hardware but also services.

This type of bundled offering is compelling and presents the issue of how Sierra, as a pure play systems integrator, should respond. Clearly, Sierra does not have the capability to replicate this bundling strategy on its own - for example, Sierra does not manufacture hardware and has suffered from previous forays into the software realm. How then should Sierra respond? Options include: strengthening relationships with current customers with current service offerings; strengthening relationships with software and hardware vendors that do not offer SI services; and strengthening relationships with current customers by broadening its service offering.

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<sup>80</sup> Robert Scheier, “The Method in the Merger” [www.varbusiness.com](http://www.varbusiness.com), July 13, 2003.

#### *4.3.1.1. Strengthening Relationships With Current Customers With Current Services*

Again, Sierra should continue to develop very deep customer relationships to combat the appeal of bundled offerings that involve SI components. To strengthen its relationships with targeted customers, it will be important for Sierra to continue to develop its strong reputation and presence in its chosen market segments. Sierra needs to continue to be viewed as a thought leader in these market segments. In the context of enduring relationships, Sierra can play the role of not only of a reliable and trustworthy business partner but also an expert one - the 'go to' firm for sound advice. If Sierra is able to continue to develop these types of relationships, it is less likely that it will be shut out of new SI opportunities by bundled offerings of its large competitors.

#### *4.3.1.2. Strengthening of Relationships with Software and Hardware Vendors*

Sierra could continue to develop strong strategic relationships with software and hardware vendors that do not offer SI services as part of their offering, or with such vendors for which SI services represents a weak area in their offering. This would enable Sierra to offer bundled service offerings, and in turn, Sierra could fill the SI role that these vendors need to provide a full solution to clients.

Note, however, that it is important that these strategic relationships not be exclusive. That is, Sierra's independence is seen by many clients as a significant strength. For example, some clients may see that the solution offered by IBM may have weaknesses due to the fact an IBM component may not be the best of breed; nevertheless, this may be a required component of the IBM solution. A stronger solution may be possible consisting of the best of breed components from a variety of vendors. Sierra, in fact, could play a pivotal role in assembling such a solution in a similar way in which it has done in the past. Sierra could indeed position itself not as a bundler but as a best of breed service provider that will source the very best components for a solution,

regardless of the vendors involved. In this regard, Sierra could also position itself as a leader of a consortium of these vendors that together provide a total solution to a client.

It will also be important for Sierra to develop a number of strategic alliances to mitigate its dependence on any particular alliance. For example, Sierra's growth in the mid 1990's was a direct result of Peoplesoft implementations.<sup>81</sup> It is important to note that in the context of consolidation in the IT sector, alliances such as the Peoplesoft relationship could be significantly affected. For example, if successful, Oracle's recent hostile takeover attempt of Peoplesoft could put Sierra's Peoplesoft practice at risk.

Sierra should continue to monitor closely the effect that bundling has on its SI business. By following the steps outlined above, it may in fact be the case that Sierra will not be able to adequately combat the appeal that bundling has for its clients. In this case, Sierra would be well advised to consider in the future a merger with a software firm that lacks SI capability.

#### *4.3.1.3. Strengthening Relationships with Current Customers by Broadening the Service Offering*

Recalling from Figure 2, Sierra has been engaged primarily in the integration component of the SI value chain. Two specific opportunities exist to expand the scope of Sierra's operations and leverage its current capabilities: management consulting, and outsourcing. Though Sierra may not be able to directly provide software and hardware, with a strong management consulting presence it could provide more of these in-demand services and would also put it in a stronger position to take on lead roles in providing entire solutions based on a consortium approach.

##### *4.3.1.3.1. Management Consulting*

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<sup>81</sup> Revenue from Peoplesoft implementations grew from \$8 million in 1996 to \$22 million in 1997. Source: Sierra Systems Group Inc. Initial Public Offering and Secondary Offering Prospectus, April 8, 1998.

Sierra employees have developed considerable business competence over the years, and could leverage these skills further by providing consulting services to identify IT solutions that will support the chosen strategies of its clients. The ability to leverage Sierra's existing skills set in a management consulting context would allow Sierra to further strengthen its relationship with current clients and also leverage opportunities for additional SI work. In addition, the management consulting services themselves would increase billable services and therefore utilization of existing staff.

Sierra will need to be careful if it embarks upon this initiative. Effective management consulting requires a skill set that is more strategically oriented and less technically focused than the skill set that many Sierra consultants currently possess. If pursued, MBA degrees would likely become more of an asset than specialized technological competencies or education. To increase its competence in this area, Sierra may also be well advised to acquire small management consulting practices that would bring fresh perspectives to the business and not be unduly biased by technical considerations. If this approach is followed, combined with the pursuit of the SDC model, it appears that the future focus of acquisitions for Sierra would be less geographically based and more functionally based than it has been in the past. It is noted, however, that in light of the cash constraints for expansion that were identified earlier in this section, Sierra would need to ration its capital regarding future acquisitions.

#### 4.3.1.3.2. Outsourcing

There are many varieties of outsourcing. At one extreme the service provider owns all of the hardware and software needed for a client company and also provides the administrative and middle management need to run such 'back office' operations as billing, accounting, and HR. In a nutshell, these are secondary activities of Porter's generic firm value chain. The premise of this approach is that the service provider can achieve cost savings due to scale and synergies. For example, the same accounting package could be used to support a variety of clients. Accenture, for example, has developed an outsourcing service for the North American utilities market. It performs

all billing, accounting, procurement, and customer support for a variety of North American Utilities. In a highly publicized deal with BC Hydro, Accenture guaranteed a savings of \$250 million over ten years. Accenture will be able to generate these client savings and earn a healthy return based on the scale effects and synergies it can capture through its infrastructure.

It is impractical for Sierra to consider such an extensive model for the provision of outsourcing services. While financing issues should theoretically be kept separate from investment decisions, the capital requirements are so large that they are well beyond Sierra's capability. In addition, such an extensive model would be far beyond Sierra's current core competence to effectively manage. In addition, it is unlikely that Sierra could generate the scale needed to achieve adequate cost savings to make such a venture feasible.

A much more modest outsourcing venture is possible, however. Providing more help desk support for IT systems that Sierra has implemented could be a worthwhile venture. Sierra has, in fact, already been involved in such an arrangement. While the margins tend to be lower, since less skilled staff are required to provide such support, an outsourcing arrangement such as this could offer some significant benefits.

- Outsourcing arrangements tend to be long term in nature, usually for multiple years. Such an arrangement would allow Sierra to have an insider's knowledge of future opportunities for higher margin work. For example, operating a help desk would allow Sierra to become aware of key problems that the client is facing, thereby allowing Sierra to participate earlier in the SI value chain at the problem identification stage. This could be a critical source of information supporting the sale of management consulting services to current clients.
- Outsourcing agreements also provide a long-term stable cash flow and an annuity based revenue source. That is, Sierra would not have to rely exclusively on an 'eat what you kill' revenue model.
- Providing an outsourcing service also provides an opportunity for Sierra to enhance overall utilization. Consultants who are between assignments are said to be 'on the

bench.' If there were extended periods of bench time for some staff, it may be possible to have them assist with a help desk. While some staff may feel this is punitive, it would be better than the boredom of warming the bench.

Once experience is gained in the regard to the running a help desk service effectively, Sierra may want to consider expanding this service to actually staffing the IT departments for clients and co-managing this function. This would provide Sierra with even greater opportunities to cross sell higher margin integration services in the future. These could potentially focus on the integration of application silos and the building of data warehouses to facilitate management reporting.

The key for Sierra in any outsourcing arrangement would be to grow the business strategically in terms of strengthening its relationships with current clients and also targeting key new clients with the purpose of providing higher margin integration services.

It is significant to note that one of the largest IT services firms in Canada, CGI Group, earns more than twice as much of its revenue from outsourcing functions as from SI work. Moreover, it appears that many in the SI industry are moving in this direction, and that Sierra needs to be a part of this movement to maintain its ground in the marketplace.

#### **4.4. Sophisticated Cost Analysis**

Porter notes that sophisticated cost analysis is of critical importance when operating in the context of a mature market. This allows a firm to rationalize its product mix and also achieve correct pricing.<sup>82</sup> In addition to eliminating the services that are not profitable or charging more for these services, having sophisticated cost information allows the firm to cover a broad spectrum of price points for its clients. This is another key success factor based on the findings of the

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<sup>82</sup> Michael, Porter, *Competitive Strategy: Techniques For Analyzing Industries And Competitors*, (New York: Free Press: 1980), 241-242

Windemere study.<sup>83</sup> How can Sierra achieve this? In Sierra's case there appear to one key step that could be taken in this regard - refinement of estimates of effort to complete.

#### ***4.4.1. Refinement of Estimates of Effort to Complete***

Unfortunately, there are a number of cases in which Sierra has incurred significant losses because its estimates of effort to complete were very poor. The reason for this are complex; however, it appears that one of the main causes is that the project managers who are preparing the estimates to complete are often dealing with a new technology, in a complex client environment.

How can this remedied? Fortunately, it appears that this situation could be effectively dealt with by deployment of the SDC model. The senior managers at a SDC would develop a very broad and deep knowledge of the effort that is required to implement a complex solution. Seeking the input of these managers in regard to the estimates of effort to complete would likely go a long way to ensuring that the effort to complete is accurate. In addition, accuracy would also be enhanced if the compensation of the project manager preparing the estimate was based in part on his or her ability to estimate accurately. While there is a risk that with this method project managers would be motivated to 'sandbag' their estimates, the cost of this is likely to be significantly less than the cost that Sierra has incurred in regard to wildly optimistic estimates to complete.

#### ***4.4.2. What Metrics Should be Used to Ensure Cost Effectiveness?***

Inherently related to the notion of cost analysis is the issue of what metrics should be used to measure cost effectiveness.

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<sup>83</sup> David A. Aaker, *Developing Business Strategies*, Sixth Edition, (New York: John Wiley & Sons, Inc., 1998), 263-264.



Historically, utilization rates are often used in professional service firms, including Sierra, as a performance metric at both firm and individual levels. In a purely T&M or cost plus context, this metric makes perfect sense. The more hours that are billed, the more gross margin and therefore profits are made. “Utilization, utilization, utilization” is a mantra that has often been heard at Sierra. In light of this, performance bonuses have been used to motivate employees to maximize utilization, which in turn will maximize profits. Consequently, employees are motivated to spend generous amounts of time creating solutions to client problems.

Care must be taken, however, in employing utilization as a metric specifically in the case of fixed price contracts. This is because the economics in a fixed price arrangement are completely different from those in a T&M or cost plus arrangement. In a fixed price context, profit is maximized by delivering the agreed upon solution with as *little* time spent as possible. Given the increased prevalence of fixed price contracts, it appears that Sierra would be well served to reconsider this performance metric at the employee level.

The implementation of utilization as a performance metric at Sierra was based the popularity of T&M projects. In the past, most of Sierra’s projects were T&M in nature; however, currently, an increasing number of projects are fixed price in nature. This transition has been incremental and it appears that many have not realized the fundamental difference in how success is measured. For example, there appears to be strong anecdotal evidence that in a fixed price context project managers will be inclined to notionally set a budget for effort (in hours) for the project based on dividing the total contract price by a blended hourly “bill rate” for the staff involved on the project. But this approach is fundamentally flawed. Hourly ‘bill rates’ are only relevant in a T&M or cost plus context. In a fixed price context individual hourly bill rates are an invalid concept. Revenue is not earned on an hourly basis, it is earned by the completion of a project *regardless of how many (or how few) hours are required*. That is, the same amount of revenue will be recognized on project completion whether 1,000 or 10,000 hours are spent on a project. Because price is fixed, cost is the only element that can be controlled to maximize profit. Thus, the profit derived from a fixed price contract is *greatly* affected by the hours spent. Profit is

maximized when the solution is delivered with as little effort as possible. In fact, every hour spent on a fixed price project that is greater than the minimum effort required represents wasted profits.

It is also important to note that there is a curvilinear aspect to utilization. That is, long term profit is likely maximized at point before 100% utilization of total time available. For example, in Sierra's case, keeping up to date on new technology developments through education will enhance long term profitability; however, to encourage education, some otherwise billable time needs to be spent on education. The same could be said of vacation time and management time in connection to coordination and control activities. These issues can be addressed in two ways. Reasonable time allowances can be backed out of the denominator (time available) component of the utilization statistic or, if such time is included in the denominator, it needs to be accepted that the optimum utilization percentage is likely considerable less than 100%, perhaps as low as 75% or 80%.

Utilization is still a very important metric; however, it needs to be used carefully to ensure that the optimum level is achieved by employees and that they spend the appropriate amount of time on client engagements. One option that would be helpful in this context would be to reward employees not only for achieving optimum utilization but also for their performance on individual assignments. Work packets from job break down structures could be assigned specific time budgets. Time budgets could be negotiated between the project managers and the employee. Because the project manager is financially motivated to maximize project margin, he or she will be motivated to reduce the amount of time spent allocated to the project's work packets. Individual consultants will be motivated to negotiate larger budgets to ensure that they will not go over budget in completing the task and therefore lose out on their financial reward.

This approach forces a much higher level of focus on efficient delivery of tasks at the micro level and also aggregates to a much more accurate overall estimate of the effort to complete a project. This, in turn, is a vital statistic to ensure the profitable delivery of a project on time and on budget. In addition, more thorough time estimates allow for the earlier detection of problem projects.

## 5. Recommendations

Historically, Sierra's attempt to execute a differentiation strategy has been undermined by its high fixed cost operating model of having technical experts dispersed amongst its branches. If Sierra were able to adopt an operating model with lower fixed costs, it could be freer to pursue a differentiation strategy since with lower fixed costs it would be freer to walk from deals that have lower margins due to downward price pressure. Thus, with such a lower fixed cost model, it appears that Sierra could become more choosy in the engagements that it takes on. If demand for IT and IT services rebounds, thereby allowing prices to be increased, Sierra could enjoy the best of both worlds - higher prices and a lower cost structure, the combination of which would allow for a significant increase in gross margin. If demand for IT and IT services does *not* allow prices to be increased, or if off shore firms come to North America and pursue a cost leadership strategy, there will likely be significant downward pressure on SI prices. In this case, Sierra's ability to pursue a differentiation strategy will be tested. Even if Sierra could improve its cost structure, if it were forced to play a pure cost game, it would likely not succeed unless it could source a significant amount of its labour from overseas.

### 5.1. Generic Strategy for the Medium and Long Term

An increase in hostility in the SI market makes having a defined strategy more important than ever. Sierra's current structure is well aligned with a differentiation strategy. In light of this, for the medium term, and the relative uncertainty in the market, it appears to be most appropriate for Sierra to continue with this strategy and not change to a cost leadership approach. A differentiation strategy is vulnerable, however, to the commoditization of systems integration services, and also the entrance of foreign-based competitors entering the North American market with a cost leadership strategy. Accordingly, Sierra must carefully monitor these two factors over the coming years. Should these factors result in a differentiation strategy not being sustainable for the long term, Sierra will need to consider its long-term options. These could range from Sierra adopting a cost leadership approach to forming a joint venture with an off shore SI firm that does

not have a significant presence in the North American market. In the latter case, Sierra could offer such an off shore firm significant credibility in this market, and the off shore partner could offer access to a reliable supply of inexpensive labour. Under this scenario, it may also be appropriate to relocate an SDC off shore to further realize cost savings.

In addition, it appears that the large IT firms are seeking to offer bundled solutions that capture many segments in the SI value chain. Sierra does not have the resources to support a similar broad presence. Accordingly, Sierra should continue to pursue a niche strategy of focusing on particular market segments in which it can develop a core competence and a reputation on as a thought leader. This should continue to allow Sierra to compete with larger firms that attempt to cover a broader scope of verticals.

**Recommendation:** Sierra should pursue a differentiation strategy for the medium term and carefully monitor the developments of commoditization and entry into the North American market by foreign competitors who may pursue a cost based strategy. For Sierra to balance the interests of shareholders, customers, and employees, and also to assist in the clarification and communication of strategy, Sierra should consider employing the 'balanced scorecard' approach. In addition, to identify any gaps or inconsistencies in strategic understanding, each branch should develop its own statement of strategic intent.

## **5.2. Process Innovation**

Sierra must refine its process to reduce its cost structure for three reasons. First, reduced fixed costs would allow Sierra to more effectively carry out a differentiation strategy. This is the case because in periods of reduced demand (whether cyclical or structurally caused), it appears that Sierra branch managers are motivated to price their services lower than necessary to secure business that will cover fixed costs. Reducing fixed costs should alleviate this issue. Second, Sierra's future success will ultimately be defined by the extent to which it can maximize shareholder wealth. Sierra needs to reduce its cost structure to generate higher gross margin that

would allow it to produce higher shareholder wealth. Third, to fund future growth, Sierra will need to increase gross margin, which in turn will increase funds from operations that will allow it to fund future expansion. Currently, there are limited opportunities for Sierra to secure such funding through equity markets or through debt.

It appears that the most effective way for Sierra to reduce its cost structure by refining its 'build and hold' strategy by implementing an expanded SDC model. Such a model would concentrate technical resources in one centre, rather than having these resources dispersed amongst the branches. This should decrease overall headcount of technical staff, and increase gross margin. There are a number of other benefits to implementing this model, including the fact that it is fully aligned with Sierra's communitarian culture and its branch centric model. The synergies realized from this approach should allow integration solutions to be delivered more quickly and at a reduced cost.

**Recommendation:** Sierra should study further the reduction in costs it would achieve by pursuing an enhanced SDC model. Such a study would require a detailed inventory of skill sets and skill usage loads to verify the savings that would accrue.

If Sierra implements such an enhanced SDC model, it may wish to locate this in Canada to take advantage of the favourable exchange rate with the US dollar. In addition, if the enhanced SDC model is pursued, to respect the branch centric model, Sierra should allow project managers at the branch level to choose whether or not they use the SDC model. If its benefits are compelling, branch managers will be keen to use it.

### 5.3. Focus on Key Customers

Sierra should continue to strengthen its presence in its targeted market segments by strengthening its relationship with key customers and also further enhancing its reputation as thought leaders in these chosen markets.

A number of SI firms have taken significant business initiatives into the areas of management consulting and outsourcing. It is tempting for Sierra to follow suit. Instead, it appears that Sierra would be best served to imitate such tactics only on a limited basis and to support the deeper relationships with its key customers. It appears that Sierra would be better off to focus on developing deep penetration into the niche markets that it has chosen. It appears that Sierra has neither the resources nor the necessary infrastructure to realize synergies and scale effects on extensive outsourcing operations similar to what other IT firms are offering. Some limited outsourcing could be undertaken, however, in the area of production support (for example, help desk support) that would allow Sierra to maintain a deeper, ongoing relationship with its client and use this opportunity as a means of gathering business intelligence that would identify future opportunities for higher margin SI work. Sierra may also want to consider venturing into some management consulting engagements for firms in its target market segments. Again, this would hopefully allow Sierra to add strategic value to its clients and also identify opportunities for future SI work.

**Recommendation:** Overall, Sierra should continue to focus on SI engagements; however, limited outsourcing and management consulting work could be undertaken in its target market segments primarily to strengthen Sierra's relationships with clients and identify opportunities for additional integration work.

#### 5.4. Sophisticated Cost Analysis

To be able to rationalize unprofitable service offerings and to provide customers with service offerings at various price points, Sierra needs to significantly enhance its ability to perform estimates to complete.

**Recommendation:** To increase the accuracy of estimates to complete Sierra could further leverage the skill set of an SDC staff. In addition, project managers should be compensated, in part, on the accuracy of their estimates of effort to complete. In addition, to encourage employees to minimize the amount of time that they spend on fixed price projects, care will need to be taken in evaluating employee performance based on utilization. One option that would be helpful in this context would be to reward employees not only for achieving optimum utilization but also for their performance on individual assignments. Work packets from job break down structures could be assigned specific time budgets. Time budgets could be negotiated between the project managers and the employee.

Overall Sierra is a great company and kudos is due to Sierra's founding partners and current senior management team. These individuals have built a growing business that has prospered for over 35 years. It faces challenges ahead, as it faces what appears to be a market environment that is becoming increasingly hostile. It is hoped that this research and these recommendations will make a modest contribution towards Sierra's future successes.

## 6. Appendices



## 6.1. Appendix Ia - Consolidated Balance Sheet

Sierra Systems Group Inc.  
Consolidated Balance Sheets  
As at September 30, 1996 through 2002  
(in thousands of Canadian dollars)

	2002	2001	2000	1999	1998	1997	1996
	\$	\$	\$	\$	\$	\$	\$
<b>Assets</b>							
<b>Current assets</b>							
Cash	4,803	2,976	4,944	1,390	2,667	280	17
Temporary Investments	6,000	13,752	13,441	15,006	22,177	0	0
Accounts receivable, including work-in-progress	33,982	28,092	28,166	31,266	24,906	14,278	10,404
Current portion of long-term accounts receivable	1,558	2,920	2,920	3,248	4,256	3,941	0
Income taxes recoverable	890	695	2,003	666	0	0	0
Future income taxes	0	472	676		0	0	0
Prepaid expenses	2,306	1,148	848	887	610	194	227
	49,539	50,055	52,998	52,463	54,616	18,693	10,648
<b>Long-term accounts receivable</b>	0	851	2,651	4,449	5,785	2,950	0
<b>Capital assets</b>	10,265	10,959	8,908	7,340	5,225	3,491	2,346
<b>Future income taxes</b>	3,646	2,406	1,741	950	1,046	0	0
<b>Goodwill</b>	19,312	11,406	12,668	10,611	6,228	0	0
	82,762	75,677	78,966	75,813	72,900	25,134	12,994
<b>Liabilities</b>							
<b>Current liabilities</b>							
Bank indebtedness	4,488	0	3,490	1,971	1,397	1,715	3,996
Accounts payable and accrued liabilities	12,770	11,928	11,714	8,951	8,905	8,520	3,544
Deferred revenue	2,465	1,354	936	1,187	1,117	1,017	141
Future income taxes	465			67	617	124	220
Current portion of capital lease obligation	136						
Current portion of project financing	995	2,920	2,920	2,920	4,858	3,941	0
	21,319	16,202	19,060	15,096	16,894	15,317	7,901
<b>Capital Lease Obligation</b>	54						
<b>Project financing</b>		851	2,651	4,449	5,785	1,140	0
	21,373	17,053	21,711	19,545	22,679	16,457	7,901
<b>Shareholders' Equity</b>							
<b>Capital stock</b>	41,147	40,070	40,236	38,048	35,508	1,537	976
<b>Contributed Surplus</b>						54	54
<b>Retained earnings</b>	20,242	18,554	17,019	18,220	14,713	8,945	5,526
<b>Common Shares Owned by a Subsidiary</b>						(1,859)	(1,463)
	61,389	58,624	57,255	56,268	50,221	8,677	5,093
	82,762	75,677	78,966	75,813	72,900	25,134	12,994

## 6.2. Appendix Ib - Consolidated Income Statement

Sierra Systems Group Inc.  
Consolidated Statements of Operations  
For the years ended September 30, 1996 through 2002  
(in thousands of Canadian dollars)

	2002	2001	2000	1999	1998	1997	1996
	\$	\$	\$	\$	\$	\$	\$
<b>Revenue</b>							
Services	128,589	126,069	119,807	109,537	88,180	59,876	40,986
Product sales	1,363	1,260	876	3,552	1,945	1,397	1,387
	<u>129,952</u>	<u>127,329</u>	<u>120,683</u>	<u>113,089</u>	<u>90,125</u>	<u>61,273</u>	<u>42,373</u>
<b>Cost of sales</b>							
Compensation	96,497	91,198	90,018	78,669	57,264	41,973	29,569
Other costs	9,368	10,848	11,108	11,296	8,913	5,176	3,702
Product costs	1,174	1,065	559	2,749	1,680	1,263	1,272
	<u>107,039</u>	<u>103,111</u>	<u>101,685</u>	<u>92,714</u>	<u>67,857</u>	<u>48,412</u>	<u>34,543</u>
<b>Gross profit</b>	22,913	24,218	18,998	20,375	22,268	12,861	7,830
<b>General and administration</b>	16,639	17,312	16,527	10,971	7,684	5,622	4,687
<b>Amortization of capital assets</b>	3,206	3,146	3,142	2,554	1,717	1,108	773
	<u>3,068</u>	<u>3,760</u>	<u>(671)</u>	<u>6,850</u>	<u>12,867</u>	<u>6,131</u>	<u>2,370</u>
<b>Earnings (loss) from operations</b>							
<b>Other income (expenses)</b>							
Foreign exchange gain	174	530	312	(126)	416	28	(16)
Interest	193	814	565	633	539	(175)	(209)
	<u>367</u>	<u>1,344</u>	<u>877</u>	<u>507</u>	<u>955</u>	<u>(147)</u>	<u>(225)</u>
<b>Earnings before income taxes and goodwill</b>	3,435	5,104	206	7,357	13,822	5,984	2,145
<b>Provision for (recovery of) income taxes</b>							
Current	2,462	2,959	2,359	4,126	5,483	2,661	850
Deferred	(715)	(461)	(1,782)	(717)	493	(96)	60
	<u>1,747</u>	<u>2,498</u>	<u>577</u>	<u>3,409</u>	<u>5,976</u>	<u>2,565</u>	<u>910</u>
<b>Earnings (loss) before goodwill</b>	1,688	2,606	(371)	3,948	7,846	3,419	1,235
<b>Goodwill amortization</b>	0	1,071	830	441	34	0	0
<b>Net earnings (loss) for the year</b>	<u>1,688</u>	<u>1,535</u>	<u>(1,201)</u>	<u>3,507</u>	<u>7,812</u>	<u>3,419</u>	<u>1,235</u>

### 6.3. Appendix Ic - Consolidated Statement of Cash Flows

Sierra Systems Group Inc.  
Consolidated Statements of Cash Flows  
For the years ended September 30, 1996 through 2002  
(in thousands of Canadian dollars)

	2002	2001	2000	1999	1998	1997	1996	Total 1998 to 2002
	\$	\$	\$	\$	\$	\$	\$	\$
<b>Cash provided from (used for)</b>								
<b>Operating activities</b>								
Net Earnings (loss) for the year	1,688	1,535	(1,201)	3,507	7,812	3,419	1,235	13,341
Items not affecting cash:								
Amortization of capital assets	3,206	3,146	3,142	2,554	1,717	1,108	773	13,765
Amortization of goodwill	0	1,071	830	441	34			2,376
Future income taxes	(715)	(461)	(1,782)	(717)	493	(96)	60	(3,182)
Loss on disposal of fixed asset						8		
	4,179	5,291	989	5,785	10,056	4,439	2,068	26,300
Net change in non-cash working capital items	(3,767)	1,714	4,183	(5,605)	(11,842)	(2,209)	(2,042)	(15,317)
Net change in long-term accounts receivable	2,213	1,800	2,126	2,344	(2,835)			5,648
	2,625	8,805	7,298	2,524	(4,621)	2,230	26	16,631
<b>Financing activities</b>								
Project financing - net	(2,777)	(1,800)	(1,798)	(3,274)	5,562	2,131		(4,087)
Shares purchased for long term incentive plan	(193)	(340)						(533)
Shares issued	270	365	934	498	31,363	1,012	284	33,430
Shares repurchased					(550)	(848)	(638)	(550)
Repayment of Capital Lease Obligation	(52)							(52)
	(2,752)	(1,775)	(864)	(2,776)	36,375	2,295	(354)	28,208
<b>Investing activities</b>								
Temporary investments	7,752	(311)	1,765	7,172	(22,177)			(5,799)
Purchase of capital assets	(2,214)	(5,197)	(4,331)	(4,083)	(3,310)	(2,261)	(1,294)	(19,135)
Investment in INSI Strategic Technologies	(6,872)							(6,872)
Investment in Transformation Solutions Inc.	(1,200)							(1,200)
Investment in TWA Consulting Services Inc.			(1,633)					(1,633)
Investment in Pacific International Mapping Corp.				(964)				(964)
Investment in Systems Interface				(3,722)				(3,722)
Investment in EDM Management Systems Inc.					(3,484)			(3,484)
	(2,534)	(5,508)	(4,199)	(1,597)	(28,971)	(2,261)	(1,294)	(42,809)
<b>Increase (decrease) in cash</b>	(2,661)	1,522	4,233	(1,849)	2,783	2,264	(1,622)	2,030
<b>(Bank indebtedness) cash &amp; bank indebtedness- Beginning of year</b>	2,976	1,454	(781)	1,068	(1,715)	(3,979)	(2,357)	(1,715)
<b>(Bank indebtedness) cash &amp; bank indebtedness- End of year</b>	315	2,976	1,454	(781)	1,068	(1,715)	(3,979)	315
<b>Represented by</b>								
Cash	4,803	2,976	4,944	1,190	2,465	0	17	4,803
Bank indebtedness	(4,488)	(3,490)	(3,490)	(1,971)	(1,397)	(1,715)	(3,996)	(4,488)
	315	2,976	1,454	(781)	1,068	(1,715)	(3,979)	315

## 6.4. Appendix IIa - Condensed Consolidated Balance Sheet

Sierra Systems Group Inc.  
Comparative Balance Sheet  
for Fiscal Years 1996 through 2002

	2002	2001	2000	1999	1998	1997	1996
<b>Current Assets</b>							
cash	4,803	2,976	4,944	1,390	2,667	280	17
short-term investments	6,000	13,752	13,441	15,006	22,177	0	0
accounts receivable	29,282	26,244	27,341	29,844	22,787	13,696	9,502
loans receivable							
inventories	0	0	0	0	0	0	0
unbilled revenue	4,700	1,848	825	1,422	2,119	582	902
prepaid expenses	2,306	1,148	848	887	610	194	227
other assets	4,536	3,573	4,420	1,616	1,046		
	<u>51,627</u>	<u>49,541</u>	<u>51,819</u>	<u>50,165</u>	<u>51,406</u>	<u>14,752</u>	<u>10,648</u>
<b>Net Fixed Assets</b>	10,265	10,959	8,908	7,340	5,225	3,491	2,346
Goodwill	19,312	11,406	12,668	10,611	6,228	0	0
	<u>81,204</u>	<u>71,906</u>	<u>73,395</u>	<u>68,116</u>	<u>62,859</u>	<u>18,243</u>	<u>12,994</u>
<b>Current Liabilities</b>							
Operating Loan	4,488		3,490	1,971	1,397	1,715	3,996
Accounts payable and accrued liab.	14,862	13,282	12,650	9,810	8,527	5,965	3,220
Income taxes payable					2,097	1,762	465
Current portion of long-term debt							
distribution payable							
	<u>19,350</u>	<u>13,282</u>	<u>16,140</u>	<u>11,781</u>	<u>12,021</u>	<u>9,442</u>	<u>7,681</u>
<b>Long-term Debt</b>							
Future Income Taxes	465	0		67	617	124	220
<b>Shareholder's Equity</b>	<u>61,389</u>	<u>58,624</u>	<u>57,255</u>	<u>56,268</u>	<u>50,221</u>	<u>8,677</u>	<u>5,093</u>
	<u>81,204</u>	<u>71,906</u>	<u>73,395</u>	<u>68,116</u>	<u>62,859</u>	<u>18,243</u>	<u>12,994</u>

## 6.5. Appendix IIb - Condensed Consolidated Income Statement

**Sierra Systems Group Inc.**  
**Comparative Statement of Earnings**  
**for Fiscal Years 1996 through 2001**  
**(in Thousand of Canadian Dollars)**

Growth Rate of Revenue	2%		6%		7%		25%		47%		45%			
	2002	2001	2000	1999	1998	1997	1996							
Revenue	129,952	100%	127,329	100%	120,683	100%	113,089	100%	90,125	100%	61,273	100%	42,373	100%
Costs and Expenses														
Direct cost of sales	107,039	82%	103,111	81%	101,685	84%	92,714	82%	67,857	75%	48,412	79%	34,543	82%
General and administrative	16,639	13%	17,312	14%	16,527	14%	10,971	10%	7,684	9%	5,614	9%	4,687	11%
EBITDA	6,274	5%	6,906	5%	2,471	2%	9,404	8%	14,584	16%	7,247	12%	3,143	7%
Capital Assets depreciation	3,206	2%	3,146	2%	3,142	3%	2,554	2%	1,717	2%	1,108	2%	773	2%
Amortization of goodwill	0		1,071		830		441		34		0		0	
Interest (Income) / Expense	(193)		(814)		(565)		(633)		(539)		175		209	
Other income	(174)		(530)		(312)		126		(416)		(20)		16	
Income before Taxes	3,435		4,033		(624)		6,916		13,788		5,984		2,145	
Provision for Income Taxes														
- current	2,462		2,959		2,359		4,126		5,483		2,661		850	
- future	(715)		(461)		(1,782)		(717)		493		(96)		60	
	1,747		2,498		577		3,409		5,976		2,565		910	
NET EARNINGS	1,688		1,535		(1,201)		3,507		7,812		3,419		1,235	
EPS	0.18		0.17		-0.13		0.40		1.03		0.50		0.18	
<b>DATA SECTION:</b>														
distributions	0		0		0		0		0		0		0	
outstanding units	9,237,964		9,192,908		9,100,992		8,832,636		7,620,088		6,859,220		6,859,220	
effective tax rate	0.509		0.619		-0.925		0.493		0.433		0.429		0.424	
<b>Calculation of NOPAT</b>														
Income before Taxes	3,435		4,033		(624)		6,916		13,788		5,984		2,145	
Amortization of Goodwill	0		1,071		830		441		34		0		0	
Interest (Income) / Expense	(193)		(814)		(565)		(633)		(539)		175		209	
Other Income	(174)		(530)		(312)		126		(416)		(20)		16	
Net Operating Profits Before Tax	3,068		3,760		(671)		6,850		12,867		6,139		2,370	
Income taxes at 45% (estimated)	(1,381)		(1,692)		302		(3,083)		(5,790)		(2,763)		(1,067)	
NOPAT	1,687		2,068		(369)		3,768		7,077		3,376		1,304	

## 6.6. Appendix IIc - Standard Financial Ratios

Sierra Systems Group Inc.  
Comparison of Standard Ratios  
for Fiscal Years 1996 through 2002

STANDARD FINANCIAL RATIOS		2002	2001	2000	1999	1998	1997	1996
<b>Profitability Ratios</b>		<b>Formulas</b>						
Net operating Margin (EBITDA)	EBITDA / Sales	0.05	0.05	0.02	0.08	0.16	0.12	0.07
profit margin	net income / sales	0.01	0.01	-0.01	0.03	0.09	0.06	0.03
return on assets	net income / assets	0.02	0.02	-0.02	0.05	0.12	0.19	0.10
return on equity	net income / equity	0.03	0.03	-0.02	0.06	0.16	0.39	0.24
<b>Asset Utilization Ratios</b>		<b>Formulas</b>						
asset turnover	sales / assets	1.60	1.77	1.64	1.66	1.43	3.36	3.26
accounts receivable turnover	sales / accs. rec.	4.44	4.85	4.41	3.79	3.96	4.47	4.46
accs. rec. collection period	365 / accs. rec. turn	82.25	75.23	82.69	96.32	92.29	81.59	81.85
<b>MEASURES OF LIQUIDITY</b>		<b>Formulas</b>						
current ratio	current assets / current liabilities	2.67	3.73	3.21	4.26	4.28	1.56	1.39
acid-test	curr. assets less inventory / curr. liab.	2.67	3.73	3.21	4.26	4.28	1.56	1.39
<b>FINANCIAL LEVERAGE</b>		<b>Formulas</b>						
debt-to-equity	Debt / Equity	0.07	0.00	0.06	0.04	0.03	0.20	0.78
debt-to-assets	Debt / Assets	0.06	0.00	0.05	0.03	0.02	0.09	0.31
assets-to-equity	Assets / Equity	1.32	1.23	1.28	1.21	1.25	2.10	2.55
<b>THE LEVERS OF PERFORMANCE</b>		<b>Formulas</b>						
ROE is the product of the following		0.03	0.03	-0.02	0.06	0.16	0.39	0.24
profit-margin		0.0130	0.0121	-0.0100	0.0310	0.0867	0.0558	0.03
asset-turnover		1.6003	1.7708	1.6443	1.6602	1.4338	3.3587	3.26
assets-to-equity		1.3228	1.2266	1.2819	1.2106	1.2516	2.1025	2.55
ROE		0.0275	0.0262	-0.0210	0.0623	0.1556	0.3940	0.24

## 6.7. Appendix II d - Invested Capital Ratios

Sierra Systems Group Inc.  
Comparative Invested Capital Balance Sheet  
for Fiscal Years 1996 through 2002

	2002	2001	2000	1999	1998	1997	1996
<b>Operational Definition of Invested Capital</b>							
Trade Capital	36,765	36,259	39,169	40,355	40,782	7,025	6,963
Less: ST Investments	(6,000)	(13,752)	(13,441)	(15,006)	(22,177)	0	0
Revised Trade Capital	30,765	22,507	25,728	25,349	18,605	7,025	6,963
Net Plant, Property, and Equipment + other assets	29,577	22,365	21,576	17,951	11,453	3,491	2,346
Invested Capital	60,342	44,872	47,304	43,300	30,058	10,516	9,309
<b>Financial Definition of Invested Capital</b>							
short-term debt	4,488	0	3,490	1,971	1,397	1,715	3,996
long-term debt (including current portion)	0	0	0	0	0	0	0
equity (all accounts) plus deferred tax + distributions payable	61,854	58,624	57,255	56,335	50,838	8,801	5,313
Less: ST Investments	(6,000)	(13,752)	(13,441)	(15,006)	(22,177)	0	0
Revised Invested Capital	60,342	44,872	47,304	43,300	30,058	10,516	9,309
<b>RATIOS BASED ON INVESTED CAPITAL</b>							
Debt to Invested Capital	0.074	0.000	0.074	0.046	0.046	0.163	0.429
Trade Capital to Invested Capital	0.510	0.502	0.544	0.585	0.619	0.668	0.748
ROIC (b.o.p.) - EBITDA	0.140	0.146	0.057	0.313	1.387	0.778	
ROIC after deprec. + after tax (b.o.p.)	0.034	0.030	-0.030	0.116	0.693	0.377	
Invested Capital Turnover	2.154	2.838	2.551	2.612	2.998	5.827	4.552
Trade Capital to Sales	0.237	0.177	0.213	0.224	0.206	0.115	0.164

## 6.8. Appendix III - Industry Ratios

Industry	SIC	#Firms	Ebitda Mar	Con. Mar	IC Turn.	Rev Risk	Debt/IC	TC/IC	TC/Sales	Est. DOL
Motorcycles, bicycles & parts	3751	5	0.027	0.350	2.103	0.607	0.482	0.494	0.247	1.986
Hazardous waste management	4955	23	0.028	0.143	1.456	0.403	0.443	0.335	0.238	2.112
Printed circuit boards	3672	20	0.029	0.062	2.309	0.431	0.394	0.502	0.221	1.279
Lab analytical instruments	3826	20	0.084	0.249	1.300	0.543	0.298	0.549	0.496	1.683
Management consulting svcs	8742	21	0.084	0.181	2.238	0.470	0.241	0.284	0.291	1.324
Petroleum, ex bulk statn-whsl	5172	14	0.084	0.069	9.728	0.472	0.508	0.177	0.071	1.087
<b>Averages</b>			0.145	0.203	1.688	0.569	0.474	0.294	0.290	1.942

Source: Simon Fraser University, EMBA 606, Financial Management, Summer 2002



6.9. Appendix IV - Economic Value Added June 1998 - 2003

Sierra Systems Group Inc Selected EVA Data June 1998 - June 2003																							
	Mar-98	Jun-98	Sep-98	Dec-98	Mar-99	Jun-99	Sep-99	Dec-99	Mar-00	Jun-00	Sep-00	Dec-00	Mar-01	Jun-01	Sep-01	Dec-01	Mar-02	Jun-02	Sep-02	Dec-02	Mar-03	Jun-03	
Operating Income	3360	44,817	3366	2,480	2,905	2,658	(1,614)	2,381	1,231	(1,497)	(3,156)	1,186	1,900	1,900	(268)	(132)	980	119	1,452	838	1,432	(393)	42
Add Back Goodwill Amortization	34		34	103	103	103	131	168	165	240	258	268	268	268	268	268	0	0	0	0	0	0	0
Tax @45%	3,394		3,400	2,563	3,008	2,761	(1,483)	2,549	1,396	(1,257)	(2,500)	1,454	2,168	2,168	0	136	980	119	1,452	836	1,432	(393)	42
NOFAT	(1,527)		(1,530)	(1,153)	(1,354)	(1,242)	667	(1,147)	(628)	566	1,305	(654)	(976)	(976)	0	(61)	(441)	(54)	(653)	(376)	(644)	177	(19)
	1,867		1,870	1,410	1,654	1,519	(616)	1,402	768	(691)	(1,595)	800	1,192	1,192	0	75	539	65	789	460	788	(216)	23
Invested Capital	33,828	44,817	50,221	51,793	53,294	54,803	56,268	57,833	58,542	59,339	57,255	57,946	59,350	58,397	58,624	59,377	59,439	60,471	61,373	62,967	62,496	62,484	
Less: Short Term Investments	0	(25,000)	(22,177)	(22,177)	(20,000)	(18,000)	(15,000)	(15,000)	(15,000)	(14,000)	(13,441)	(13,989)	(13,410)	(13,373)	(13,373)	(13,752)	(13,752)	(7,152)	(6,000)	(6,000)	(6,000)	(6,000)	
Revised Invested Capital	33,828	19,817	28,044	29,616	33,294	35,803	41,268	42,833	43,542	45,339	43,814	43,948	45,940	45,024	45,251	45,625	45,687	53,319	55,373	56,967	56,496	56,484	
Opportunity Cost of Capital	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
Opportunity Cost of Invested Capital	677	396	561	592	666	666	736	825	857	871	307	876	879	919	900	905	913	914	1,066	1,107	1,137	1,129	
Economic Value Added	1,190	1,474	848	1,062	853	(1,552)	577	(88)	(1,582)	(2,502)	(77)	313	313	(919)	(826)	(366)	(847)	(115)	(607)	(320)	(1,353)	(1,106)	

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