

**STRATEGIC ANALYSIS OF AUTODESK AND THE MOVE TO CLOUD
COMPUTING**

by

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Executive Summary

This paper provides an analysis of the opportunity for Autodesk to move its core technology to a cloud delivery model. Cloud computing offers clients a number of advantages, such as lower costs for computer hardware, increased access to technology and greater flexibility. With the IT industry embracing this transition, software companies need to plan for future change and lead with innovative solutions. Autodesk is in a unique position to capitalize on this market shift, as it is the leader in engineering design software and would be the first in this industry to offer design solutions through the cloud.

This paper considered a number of factors when looking at the move to cloud computing, including an analysis of the current environment and competitive landscape. Autodesk faces the need for anticipatory change to ensure the company stays ahead of a rapidly changing industry. Constant innovation and ever-improving computer technology makes it important that companies stay on top of their game to avoid losing to the competition. This type of change can be difficult to predict making it critical that senior executives be prepared to lead the company forward into future growth. Autodesk also needs to consider changing expectations among customers, which include the need for easier access to products, simpler interfaces and an overall enhanced user experience.

When compared to the competition, Autodesk is a leader in the industry with a large number of competitive advantages, such a large customer base and strong investment in research and development. The Autodesk portfolio of solutions also provides the greatest breadth and depth of products in the industry. The challenges that face the company include the need to gain further brand recognition outside of the engineering design software industry as this could open the door to new customers and markets. In addition, the constant threat of substitute products continually drives the need for innovation and product development. Autodesk's primary distribution channel has been a Value Added Reseller channel, helping to drive the company's success and large market penetration. However, with the introduction of 3D model based design and Building Information Modeling (BIM), there has been an increased divergence between Autodesk and the traditional channel partners, affecting customer support and increasing challenges with implementation and adoption.

To address these issues, three strategic alternatives were considered:

- A. Move Autodesk products to the cloud and improve the VAR capability and capacity
- B. Move Autodesk products to the cloud and eliminate the VAR channel
- C. Develop some applications on the cloud but maintain Autodesk core technology as desktop solutions

After careful analysis that considered management preferences, systems, organizational culture and the available resources of the company, it was determined that Strategic Alternative A is the option that could be successfully implemented in the current environment. Autodesk will have to consider some organization changes in order to move forward with this strategy. This

includes increased communication and collaboration across divisions and among all levels of staff. In addition, Autodesk will need to hire new personnel, invest in IT systems, backend solutions, and product development that will support the move to the cloud. There will also be the need for greater focus from senior executive staff to improve the reseller channel and offer new, on-going programs to support the VARs' growth and profitability. By moving forward with this new strategy, Autodesk will reap the benefits of increased market penetration, greater customer satisfaction, increased brand awareness and continued innovation. This will ensure Autodesk's leadership position and the opportunity to take advantage of growing revenues in an industry poised for continued growth and increasing demand.

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Table of Contents

Approval.....	ii
Executive Summary	iii
Acknowledgements.....	vi
List of Figures	ix
List of Tables.....	x
Glossary	xii
1: Chapter One: Overview.....	1
1.1 Industry	1
1.2 Autodesk	3
1.3 Issues Related to Strategy	10
1.4 Summary	12
2: Chapter Two: External Analysis	14
2.1 Five Force Analysis.....	14
2.1.1 Supplier Power (Weak).....	15
2.1.2 Buyer Power (Weak).....	17
2.1.3 Threat of Substitutes (Strong)	22
2.1.4 Barriers to Entry (Strong).....	25
2.1.5 Rivalry (Weak).....	31

2.2	Industry Attractiveness.....	33
2.3	Sources of Competitive Advantage.....	34
2.4	Competitive Analysis	40
2.5	Opportunities.....	43
2.6	Threats.....	43
2.7	Strategic Alternatives	44
3:	Chapter Three: Internal Analysis.....	48
3.1	Assessment of Strategic Alternative A.....	49
3.1.1	Management Preferences	49
3.1.2	Organization.....	63
3.1.3	Resources	71
3.2	Assessment of Strategic Alternative B.....	77
3.2.1	Management Preferences	77
3.3	Assessment of Strategic Alternative C.....	82
3.3.1	Management Preferences	83
4:	Chapter Four: Final Recommendation.....	86
4.1	Sub-recommendations.....	86
4.2	Timeline	88
4.3	Conclusion.....	90
	Bibliography.....	91

List of Figures

Figure 2.1 Michael Porter’s Five Forces Diagram (Porter, 2008)	15
Figure 2.2 Industry Supply Chain Diagram.....	18
Figure 3.1 The Diamond-E Framework (Crossan et al., 2009)	48
Figure 4.1 Flowchart and Timeline	89

List of Tables

Table 1.1	Infrastructure Design and GIS Software Companies	3
Table 1.2	Strategic Fit Grid.....	7
Table 2.1:	Rivalry Characteristics	33
Table 2.2	Relative Importance of the Key Sources of Advantage	35
Table 2.3	Competitive Ranking by Source of Advantage.....	42
Table 3.1	Management Objectives for Strategic Option A	50
Table 3.2	Management Experience for Strategic Option A	55
Table 3.3	Management Team for Strategic Option A	58
Table 3.4	Leadership for Strategic Option A	61
Table 3.5	Structure for Strategic Option A	64
Table 3.6	Systems for Strategic Option A.....	67
Table 3.7	Culture for Strategic Option A.....	70
Table 3.8	Operational Resources for Strategic Option A.....	72
Table 3.9	Human Resources for Strategic Option A.....	74
Table 3.10	Financial Resources for Strategic Option A.....	76
Table 3.11	Management Objectives for Strategic Option B	79
Table 3.12	Management Objectives for Strategic Option C	84

Table 4.1 Sub-Recommendations for Strategic Alternative A.....87

Glossary

- BIM** Building Information Modeling is an intelligent model-based design process that provides insight for creating and managing building and infrastructure projects faster, more economically and with less environmental impact.
- CAD** Computer-Aided Drafting and Design is the use of computer technology for the process of design and design documentation.
- GIS** Geographic Information Systems refers to the hardware, software and systems for mapping, analysing, storing and retrieving geographic data.
- R&D** Research and Development is investment into learning new products, systems and processes that can benefit an organization.
- SaaS** Software as a Service is a delivery model where software is provided over the internet or the through the cloud.
- VAR** Value-Added Reseller is a company that resells the product of another company and will add additional value to the solution through services or product enhancements.
- WWSS** World Wide Sales and Software is the term for Autodesk's global sales organization
- WWCS** World Wide Channel Sales is the term for Autodesk's global channel sales organization

1: Chapter One: Overview

This project will provide an analysis of the business and implementation strategy for a shift to cloud computing as the primary delivery model for Autodesk software. Autodesk is a world leader in design, engineering and entertainment software and the company has traditionally offered its core software platforms as desktop solutions. Industry and clients are now looking for greater flexibility and easier access to high-end design solutions. A move to cloud computing can offer great advantages to Autodesk and its customers but also brings new challenges and introduces a new way of doing business. These changes will affect revenues and require additional investments in back end systems to support the move to internet-based solutions. A move to the cloud will also require a change to Autodesk products, which customers use for highly complex design, simulation and analysis processes. This paper will consider these changes, along with others when determining the best approach to implementing a cloud strategy at Autodesk. Autodesk has a very broad portfolio of products used in many different industries. This paper will focus specifically on the infrastructure industry and products in the Engineering Services division at Autodesk and assumes that a successful cloud strategy for this division can be replicated across other departments in the company. The infrastructure industry consists of civil engineering, government, water and wastewater, utilities, mining, oil and gas and other resource based activities.

1.1 Industry

The global computer software industry is very large with over 60,000 companies in the US alone with combined annual revenues of approximately \$240 billion and \$450 billion in

global revenue. Of the top 100 software firms around the world, those that provide applications specific to the design industry have total software revenues of approximately \$7.3 billion (First Research, 2011). These companies service various customer segments such as engineering, architecture, manufacturing, utilities and construction. A few big software companies dominate the design software or computer-aided drafting and design (CAD) industry with a large number of smaller organizations providing niche solutions that address specific functions within a particular customer base. The design software industry was borne with the advent of the desktop computer when people moved from manual drafting, using pencil and paper, to embracing 2D CAD applications. The industry is now again going through another phase of rapid change with the move from CAD to 3D model based design. The drastic improvements in computer hardware, mobile technology and skilled labour have allowed this change to 3D to happen much faster than the transformation to CAD in the 1980's. Clients in various industries are embracing the opportunity that 3D design can offer, such as Building Information Modeling (BIM) in Architecture, Engineering and Construction. The primary competitors in the infrastructure industry include Autodesk, Bentley Systems, Intergraph and ESRI as well as a number of niche companies that compete on a smaller scale. Google has also become more prevalent in the industry with SketchUp, a simple modelling application and Google Earth for mapping or Geographic Information Systems (GIS). There are also a few open source CAD applications on the market, however, these have not seemed to affect the business of the larger companies. Table 1.1 provides more detail and key facts on the main competitors in the infrastructure industry. Chapter 2 will examine these companies more closely.

Table 1.1 *Infrastructure Design and GIS Software Companies*

Company	Annual Revenues (Millions)	Total Employees	Primary Products	Headquarters
Autodesk	\$2,200	7,300	AutoCAD [®] , AutoCAD [®] Civil 3D [®] , AutoCAD [®] Map 3D, Autodesk [®] Infrastructure Design Suite	San Rafael, California
Bentley Systems	\$500	3,000	Microstation, ProjectWise, AutoPlant	Exton, Pennsylvania
Intergraph	\$770	4,000	GeoMedia, Intergraph Government Solutions, ERDAS	Huntsville, Alabama
ESRI	\$794	2,700	ArcGIS, ArcInfo, ArcView	Redlands, California
Google	\$29,321	31,353	SketchUp, Google Earth	Mountain View, California

Note. Adapted from *Global Software Top 100 – Edition 2011*, by M. van Kooten, 2011.

1.2 Autodesk

Autodesk was founded in 1982 as a software company focused on developing design technology primarily for engineers, architects and others involved in creating the environment around us. At that time, Autodesk had one application, AutoCAD[®], which grew to be its flagship product and the industry standard for design around the world. The initial founders of Autodesk were anti-corporate individuals who were passionate about building smart, useful software that customers would love. Since the 1980's Autodesk has grown both organically and through

acquisition to become the world leader in 3D design, engineering and entertainment software. Autodesk offers a very large portfolio of products used in many industries, including engineering, architecture, manufacturing, government, movie and video game development. Autodesk also has a Consulting group that provides services associated with implementing and configuring Autodesk products. With the rapid change in technology and the emergence of platforms such as cloud computing, SaaS and mobile apps, Autodesk has grown from 10 million to over 30 million users worldwide in the last two years alone. Autodesk is a leader in model based design and BIM software and is well positioned to reap the benefits of the transformation and growth in 3D technology. Currently, Autodesk has annual revenues of approximately \$2.2 billion dollars and is a publicly traded company on the NASDAQ stock exchange (Autodesk Inc., 2012).

As Autodesk has grown over the years, there have been many changes and a divergence from its anti-corporate beginnings. Autodesk has become a much larger company with a focus on sales, revenues and developing innovative technology solutions. Autodesk has maintained and expanded its strength as a volume provider of design software through the development and investment in its reseller channel. Autodesk has been selling its products through resellers since the beginning and has been recognized over the years as having one of the strongest VAR (Value Added Reseller) models in the world. However, Autodesk is currently facing a challenge in working with the reseller (VAR) channel, as there is a continued divergence between VAR capabilities and capacity and the direction of Autodesk and its products. Autodesk is becoming more specialized with increasingly complex solutions and in many cases the VARs are not growing in their ability to support customers. For example, BIM, Digital Prototyping and 3D model based design is a paradigm shift of how design is being done on projects today. BIM is changing how the industry works on large projects and affects multiple stakeholders including government, owners of projects, design consultants and builders. Not only does BIM affect the

process of how a project is planned, designed, built and managed, but also how it is financed and the legal requirements associated with the risk and responsibilities of all parties. Design technology is no longer just a tool to help support a function but is a critical part of the business, making it even more important that it work well and is implemented quickly. If a client encounters problems and doesn't have access to the Autodesk software that he or she uses every day it can cost thousands or tens of thousands of dollars as these individuals work within critical project timelines.

The history of Autodesk has been a transition from a company focused on one mass consumer product, AutoCAD[®], to a broad portfolio of solutions with many specialized applications for specific industries. Many of the VARs have been Autodesk partners since the beginning and not all have been able to make this transition. As Autodesk products become more specialized, the type of customer training and support also becomes more specific and requires individuals with industry knowledge and expertise. To be able to support this, resellers need to invest in hiring new employees with industry experience and in most cases have to change their business model to include more consulting services. A large number of VARs have not invested to move their business in this new direction causing misalignment between Autodesk and its partners. This causes frustration among customers who often come back to Autodesk for direct support or attribute failure to the technology resulting in negative feelings towards the Autodesk products. Approximately 85% of Autodesk's business comes through sales from the VAR's, which makes this a critical issue. Over the last few years in North America there has been an increasing trend of consolidation of the resellers, resulting in fewer VARs with bigger presence with Autodesk customers. This trend is risky for Autodesk as this consolidation causes disruption in the channel and defocuses the VAR sales teams in the short term. It also means that if one reseller encounters problems, it will have a greater impact on Autodesk revenues. These risks

make it critical that Autodesk address these issues and come up with solutions to ensure customers have access to the technology and support they require. Autodesk also has a large developer network and a number of strategic partnerships with companies such as Microsoft and Oracle.

Autodesk's current vision is to help people imagine, design, and create a better world. The company has become the leader in design solutions through a very strong market penetration strategy that has developed over the years. Autodesk engages in a differentiation strategy as outlined in Table 1.2, Strategic Fit Grid. This Strategic Fit Grid, developed by Ed Bukszar, helps to identify where Autodesk sits on a scale ranging from low cost to high quality. It is also important that this differentiation strategy be consistent with both the external environment and the internal capabilities of the company. The Grid shows that the differentiation strategy is consistent with the internal capabilities, highlighting the fact that the problem is related to changes in the external environment. A differentiation strategy is common across all companies in the industry. This is evident from the fact that software prices can vary dramatically depending on the product and price is usually not the driving factor for customer purchasing decisions. Autodesk invests heavily in research and development to continue offering innovative solutions to customers and to ensure the company is staying on top of changing trends and technology.

The Information Technology (IT) industry has been shifting to cloud computing over the last number of years. Cloud computing offers organizations a number of benefits, such as reducing costs for IT hardware, greater flexibility in deploying applications and improved efficiencies through the simplification of IT infrastructure. Cloud computing was introduced in the 1960's, however it did not gain much momentum until mid-2000's when companies such as

There are many other companies, such as Salesforce.com, Oracle, SAP and IBM that all offer cloud solutions. As Autodesk customers become more familiar with the benefits of cloud computing in their day-to-day applications, the greater the probability that they will look to move all of their technology off the desktop. Autodesk has released some product extensions that provide cloud services to customers, however greater investment is required to keep up with the software industry as a whole. The move to cloud has not directly affected revenues, as there is continued year over year growth, however the company needs to anticipate this change and come up with a strategy that will position itself for success.

Crossan et al refer to anticipatory change as the change management undertakes to get ahead of changing industry conditions (Crossan, M., Frye, J., Killing, P., & Rouse, M., 2009). In the case of anticipatory change, the performance of the firm is strong, but if it does not address the changing environment, the business could be negatively impacted. One of the main challenges is that there is often a lack of urgency among staff in the organization, as they do not feel pressured to make changes since the company is profitable. Autodesk currently faces a situation of anticipatory change and future business could be at risk if competitors and customers embrace the shift to cloud and the company chooses to do nothing. Autodesk must also address the continued divergence between the VARs and the company and the risk this poses to future profits. Autodesk must do a good job of trying to understand how these changes will affect the organization in the long run and make changes now that will best prepare the company for future success. It is critical that the company be confident in this strategy and drive change from senior management throughout the organization to ensure buy in and success among employees.

With Autodesk being the global leader in the design software market, the company has been in a unique position to take advantage of the existing customer base by offering new products and services to this group. This strategy is evident, as Autodesk has continued to expand its product offering to existing customer sectors as well as acquire companies that offer niche or new products that Autodesk does not sell. These niche solutions have introduced Autodesk products into new markets, diversifying the company's portfolio and providing the opportunity to leverage Autodesk's strong brand with new customers. The size of the company and the diversity of Autodesk's product portfolio are factors that contribute to a highly complex structure. Autodesk organizes its divisions around specific products that relate to an industry. The main divisions include AEC (Architecture, Engineering, Construction), Manufacturing, Engineering Services, Media and Entertainment and Platform Solutions and Emerging Business. Each division has their own support groups such as product development, marketing and finance. There is a great deal of horizontal communication within Autodesk, as staff from all different divisions will communicate with each other daily. This includes informal communication between people who have no relationship through the organizational chart. The company promotes this through the internal website, blogs, email updates and many other ways to promote communication and the sharing of best practices among peers. Autodesk will often seem to be a complex company to those outside of the organization, such as customers and resellers. This is due to complex pricing structures, partner models and systems that are external facing. Over the years the competitive landscape has changed as Autodesk competes against new companies in new markets. Autodesk continues to differentiate itself by leading the industry in innovative technology solutions that help customers to address complex issues, such as sustainable design, BIM, urbanization, and climate change.

1.3 Issues Related to Strategy

Autodesk currently faces a few issues related to its strategy that provide compelling reasons for change and the opportunity to move to cloud computing. One of the biggest challenges that face the industry is the constant anticipatory change, as mentioned above, required to stay on top of new trends and technology. In order to be successful it is critical that companies be leaders in their industry, as this will help to ensure market penetration of their products. Customers invest a great deal of time in training and education to learn these solutions, making it more difficult for competitors to displace existing software solutions. However, if a new, disruptive technology is introduced, such as cloud computing, Autodesk will need to ensure they are first to market to capture the leading edge customers who drive new technology forward in the industry. In addition, those customers who already use Autodesk products will be more likely to move to a new solution from a familiar company and platform. This is why R&D and being able to predict new trends are a critical part of Autodesk's strategy. The result of this is that sometimes the company will go down a path and later determine it is not the best course of action. Customers sometimes see this as a lack of focus or commitment and the frequent change frustrates them. Autodesk is always in a struggle to ensure the company maintains its leadership by constantly re-evaluating its products and staying on top of the competition while at the same time addressing the customer resistance to change. The company must appeal to both the leaders and laggards in the industry which becomes challenging, particularly now as the industry moves from CAD to 3D model based design.

Personal computers have become fully integrated into the lives of people in the Western world. Children are being introduced to them at an early age and they now play a critical role in their education. Over the years, software programs have also become simpler, with more

intuitive user interfaces and realistic graphics. The complexity that the industry once faced with DOS programming and difficult commands no longer exists. Autodesk must continue to ensure that its products align with this change in industry and to evolve and enhance the user experience. Simplifying the software interface will also provide the company with the opportunity to increase market share, as new customers will be able to get up to speed faster making the Autodesk solutions even more attractive. Autodesk products are used for the design and analysis of complex projects, which in the past has required a more robust application and investment in training. Continuing to simplify these programs will ensure that the company is well positioned to compete against existing and potential new competitors.

Software companies are impacted by the availability of computer hardware and systems required to run their solutions. For example, the introduction of the iPad and tablet to the market has provided new opportunities for mobile solutions to a wider audience that was not available before. This complementary relationship between these products can have a big impact on the strategy of the company, as it will open up or close the door on potential delivery methods for Autodesk products. The availability of systems to support the transition to cloud computing needs to be considered and how Autodesk's current technology platform will be updated to support this move. As well, Autodesk needs to be able to leverage these new mobile technologies to its advantage by being the first to offer solutions for customers.

Finally, Autodesk's existing business model for delivering software to clients offers some challenges. This model is standard throughout the industry with some variation among companies. Currently, with the majority of Autodesk products, customers purchase a license and pay an annual subscription or maintenance fee, which provides access to support, new versions

and a number of other benefits. This model does not always offer the most flexibility as customers will be in a situation where they need a large number of licenses for a short period to work on a specific project. Under the current model, customers are required to purchase these licenses, which can be a significant cost and will leave them with an excess of product they don't need after the project ends. This type of licensing is also the target of rampant piracy, particularly in the emerging markets such as China and India where downloading illegal software is more culturally acceptable. The theft of software costs Autodesk a great deal of money, both in lost revenues and internal costs of regulating the problem. Many of the issues with Autodesk's current strategy relate to the rapid change in the technology industry and the need for the company to anticipate and stay on top of these trends. Cloud computing has the potential to address many of these challenges, such as the opportunity to be first to market, enhancing the user experience, leveraging new mobile technologies, and offering an opportunity to improve the existing licensing and software delivery model.

1.4 Summary

Chapter 1 has introduced Autodesk and its current corporate strategy as well as the purpose of this paper, to analyse the business and implementation strategy for a move to cloud computing. The design software industry is going through a rapid transformation as it moves from traditional CAD to 3D model based design. Some people are embracing these changes while others are resistant. Customers are looking for simple, fast and flexible solutions that will allow them to gain a competitive advantage in the market. The move to cloud computing may address some of these challenges and position the company for even greater success in the future.

The next chapter will focus on the external analysis and dive deeper into the industry to understand what makes companies in this market successful, who are the competitors and what opportunities and threats do they face. The outcome of this analysis will be to identify some strategic options and in Chapter 3, we will review Autodesk's internal capabilities and determine which options could successfully be implemented. Finally, we will wrap up with the final chapter, which includes recommendations and a timeline for implementation.

2: Chapter Two: External Analysis

This chapter will determine the sources of competitive advantage in the industry and will look to find opportunities where Autodesk can gain increased benefits from these advantages. Michael Porter's Five Forces Model will be used to determine these sources of advantage (Porter, 2008). Competitive analysis will also consider the threats and opportunities companies face in the industry and will look at some strategic alternatives for a more effective strategy.

2.1 Five Force Analysis

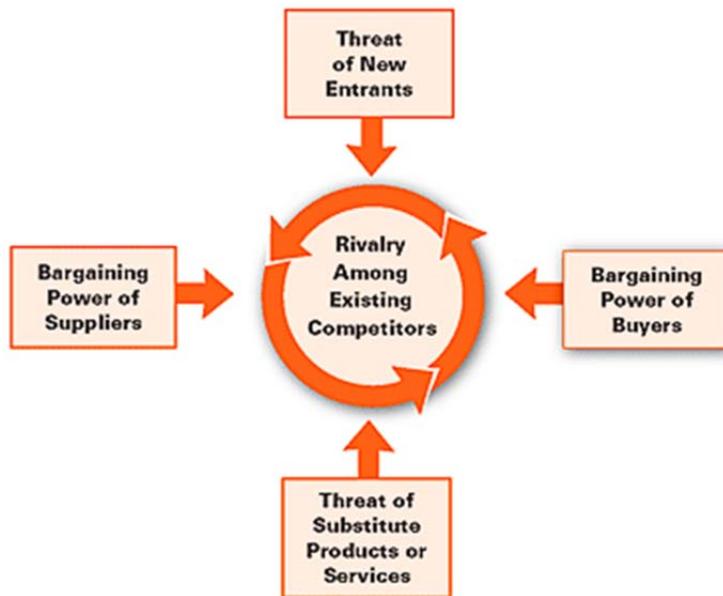
The Industry analysis is a comprehensive study of significant external factors that affect a company's success in a particular industry by uncovering the greatest opportunities and threats. The opportunities and threats are determined by identifying the competitive advantages in an industry, also called key success factors (KSFs). The Five Forces analysis will determine the KSFs in the industry. This analysis offers key insights to senior management and plays a critical role in strategic decision-making.

Michael Porter identifies five competitive forces that will affect an industry's profitability. These forces include supplier power, buyer power, threat of substitutes, barriers to entry and rivalry. When these forces are weak, there is greater opportunity for companies to become profitable and when the forces are strong this becomes more difficult and it is hard for organizations to achieve a competitive advantage. Organizations will often use KSFs to reduce

the power of a force in the industry. For example, if a firm sells a greater volume of products it can reduce supplier power and shift this power back to the firm. Figure 2.1 shows a diagram that outlines Porter's five forces and the fact that all of these have an impact on the degree of rivalry in the industry.

Figure 2.1 Michael Porter's Five Forces Diagram (Porter, 2008)

The Five Forces That Shape Industry Competition



2.1.1 Supplier Power (Weak)

Porter believes that suppliers can affect the profitability of firms in an industry with their bargaining power. For example, if a supplier has a great deal of influence and power, it can dictate higher prices to their buyers or demand special consideration. In the engineering design software industry the supplier power is weak. The primary suppliers to the software companies are software engineers and skilled labour needed to develop the technology. There are many

software engineers around the world and although a good one can charge a premium for their services, there are not so few that they hold much power over the firms they work for. Software development language and platforms are becoming more common and are moving to a common standard, for example .NET programming language. This trend towards open development languages means there are more and more people with the skills for programming all types of applications. The growing labour pool in the emerging markets, such as China and India, has also increased competition for these types of jobs. Software companies are outsourcing product development to these countries to take advantage of lower wages and a larger population. For example, Autodesk employees in China are responsible for a large part of the software development for the AutoCAD® Civil 3D® solution.

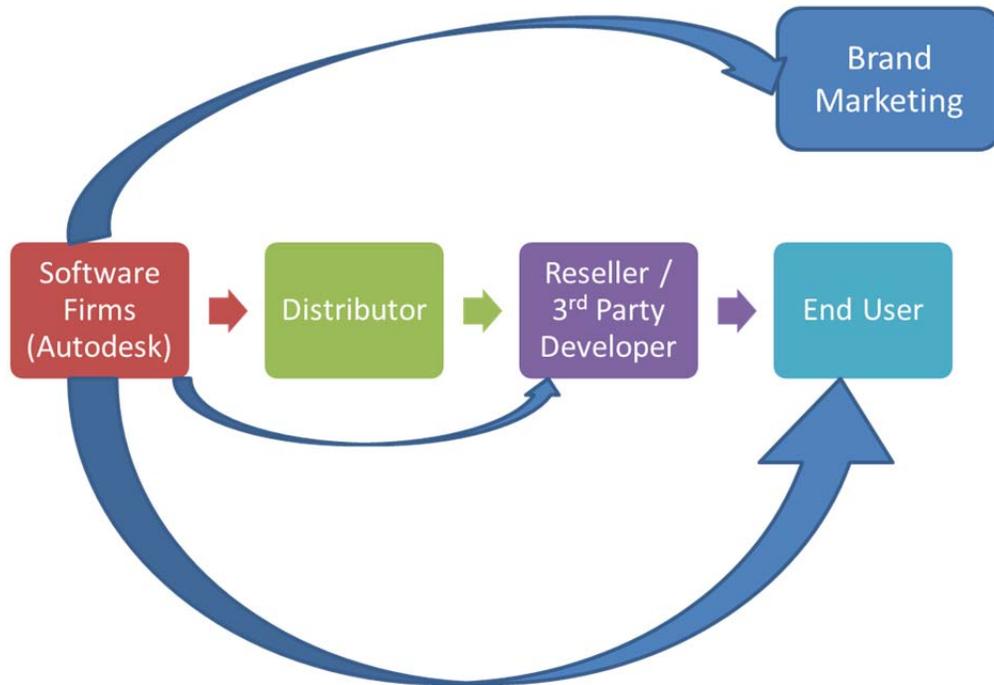
Although companies are outsourcing product development, the decisions for product direction are driven by head office and leverage critical industry knowledge and the expertise of senior level staff. These key staff members can hold a great deal of influence over the company, but are not a large enough group to have a significant amount of supplier power. Software companies will often have their engineers sign non-compete clauses to make it more difficult for them to leave and go to the competition with proprietary information. Many firms will also offer high incentives and stock option packages that entice people to stay. The software developers have limited ability to forward integrate, as the firms in this industry are very large organizations with a great deal of resources and the developers are very fragmented.

2.1.2 Buyer Power (Weak)

Similar to suppliers, Porter argues that buyers have an ability to affect profits depending on their bargaining power. For example, buyers that purchase large volumes of products can have a significant amount of power over their suppliers and can influence the purchase terms. Walmart is a good example of a very large organization that exerts a great deal of buyer power over their suppliers, a critical part of the company's strategy. In the engineering design software industry, the buyer power is generally weak although there are pockets of customers who have greater influence. This type of customer could vary, depending on the software company, but the larger clients that purchase greater volume of products have more power than the smaller organizations. For example, Autodesk works with large global engineering firms that buy millions of dollars of software each year and they get to enjoy benefits such as discounted pricing and greater access to Autodesk technical resources. These customers also have greater visibility with senior management and can sometimes influence product direction.

The industry as a whole has different buyers depending on the software company and their approach to the market. The distribution also varies based on the importance of a customer to the firm's profits. As mentioned earlier, larger customers will often buy direct from the firm and not through regular commercial distribution. Figure 2.2 shows a diagram of the Industry Supply Chain, which illustrates the fact that different firms may have different perspectives when it comes to buyer power. Some organizations, such as Autodesk, sell the majority of their software to distributors, who in turn supply to resellers. Autodesk also sells directly to end users, but this is primarily only for strategic accounts, which are the large global firms that receive discounted pricing. Resellers still have the opportunity to receive commission on the back end for sales that Autodesk does directly with these accounts. Most other business is sold through the

Figure 2.2 Industry Supply Chain Diagram



channel, reducing the chances of Autodesk competing directly with the resellers. However, this has recently started to change with Autodesk offering some of their less expensive products for sale on the Autodesk website. In addition, Autodesk has begun to move more into the consumer market with the release of inexpensive mobile apps that users download on to their tablets or phones, which are sold directly by the company. To date this has not been much of a threat to the profitability of the VARs. There are cases in the industry where software companies will compete with their partners on deals, causing resentment, frustration, and damaging the relationship. It presents a good opportunity for competitors to try to convince a VAR to start selling their own technology.

Firms in the industry may use multiple distribution systems or may choose one, such as only direct to customers. Throughout the industry, software companies, not the distributors or

resellers, maintain control of the brand, which is what customers recognize. Brand recognition (KSF) is an important source of competitive advantage and these firms invest a great deal of money in marketing to promote their products and provide service and support to customers. Distributors help to reduce administration costs related to order processing and can receive discounts based on volume purchases, however they do not have a great deal of influence over the software companies as they have no real impact on the end user who purchases the product. Distributors do not have much effect on the overall sales volume of the product.

The majority of the software companies in this market sell their products through a reseller channel. Software firms that sell through VARs are more at risk to fluctuations and changes within the channel than those organizations that sell direct to consumers. This is because the channel is less fragmented and issues with a large reseller could have a big impact on revenues for the software companies. Therefore, the overall health and profitability of the VARs is important. Software companies attempt to control these risks with brand recognition (KSF) and by offering services directly to customers even when selling product through a reseller channel. For example, almost all software companies offer a Subscription or Maintenance Program, which include things such as technical support, online training and product upgrades for an annual fee. These programs are very important to software companies as it provides recurring revenue, which is predictable, allowing for more accurate budgeting. These programs also provide the software firms with important customer information and data, giving greater insight into the buying patterns of customers. It also enables software firms to develop direct relationships with their customers beyond the reseller channel. In the past, resellers would be the only point of contact with the customer, and it would be difficult to get customer data. The VARs sell subscription programs to customers and it has become a large source of recurring revenue for

their organizations as well, making it a successful program for both parties. Strong technical support (KSF) is a competitive advantage for firms in this market.

In some cases, there are also minimum requirements, such as technical expertise and industry knowledge, VARs must meet to be able to sell specific software solutions. Software companies will offer funding to help support Sales and Marketing (KSF), which are a source of advantage for companies in this industry, as a strong sales and marketing approach will help to drive greater brand awareness and market penetration.. Since most resellers focus on selling specific software applications and services associated with one brand, there can also be a high cost for the reseller to change. Bentley Systems chose to forward integrate their supply channel and moved from a reseller model to only selling direct. This can be a big risk for VARs as it eliminates their business opportunity and can negatively affect revenues. Many software companies will also limit the reseller's ability to sell multiple solutions by entering into exclusivity or non-compete contracts. The resellers have a much smaller revenue stream making backward integration very unlikely. The business among the resellers is also much more price sensitive, competitive and results in smaller profit margins than the software companies who develop the technology. A strong distribution channel (KSF) can be a source of competitive advantage for companies in this industry.

Third party developers (KSF) are also a source of competitive advantage for software companies because as they provide an additional way to sell and market the software company's products at a low cost. Most software companies have Developer Networks or Communities (KSF), which are programs that provide support to companies or individuals that create software that runs on the software companies' products. For example, Transoft is a company based in

Vancouver that has developed programs for detailed intersection design that runs on top of Autodesk's AutoCAD® Civil 3D® solution. Third party developers are very common in the engineering design software industry and their products are usually complementary to the software firms. Therefore, a strong developer partner can be influential in helping to sell products and increase revenues for the software firms. Even though there are a large number of advantages to third party developers, they generally tend to be smaller companies and do not have a lot of buyer power. The developers also gain a great deal of benefits by being able to leverage the brand name of the larger software company, so they are invested in maintaining this relationship. Software firms have various levels of investment in their developer networks and different approaches with their programs. In some cases, these firms will purchase the smaller organization or the technology and integrate it into their own product line. Alternatively, a software firm may end up developing their own solution that competes with the third party application. This can be challenging for developers that do not have the financial and marketing resources of the larger software companies.

Software companies also sell product directly to end users. These customers are generally fragmented and spread across a large area, with limited power over the software firms. The exception to this is the bigger strategic accounts that are smaller in number but represent a large segment of the market. Within Autodesk, the strategic account business counts for approximately 20% of revenues. Large global engineering firms or public agencies, such as the Federal Government, are subject to better pricing and the ability to negotiate directly with the software company. Individuals or smaller companies would not have the same power. Engineering design software is an important requirement for most customers' jobs and greatly enhances the efficiency and performance of the user. For this reason, customers demand quality and will pay more for a better solution, making product features and functionality a source

competitive advantage in the industry (KSF). Switching costs are also perceived to be high by end users due to the learning curve to change software products.

2.1.3 Threat of Substitutes (Strong)

Substitutes are products that are available outside the industry that provide similar benefits or functions. The availability of substitute products can decrease profitability, as there is greater choice for the consumer who can go elsewhere to purchase a similar solution. This results in an increase in competition. The overall threat of substitutes in the industry is strong. One of the main reasons for this is the nature of technology and the fact that it is always changing which means companies in this market need to be aware of industry trends and shifting customer needs. The standard application for engineering design used throughout the industry is 2D design and GIS applications. As discussed earlier, the use of 3D model based design is growing quickly and is on its way to becoming the new standard. The price of 2D design software packages vary significantly depending on the product, however, the cost differential to move to 3D is negligible. There is an additional financial cost to move to 3D software when the training, implementation and learning curve costs are considered. In the past, these costs were very prohibitive as the technology was hard to learn and required a large investment in computer hardware. However, with the new technologies that are available these tools are much easier to learn and can be deployed on standard workstations. The perceived switching costs by customers and the reluctance to change is one of the largest obstacles for companies trying to sell new, innovative solutions. As mentioned earlier, this can also be a source of advantage for companies who are first to market with their solution and can build a loyal customer base. A large customer base (KSF) offers a key competitive advantage for a firm as it increases perceived switching costs to

customers. In addition, strong investment in R&D (KSF) will help companies to stay leaders in the market, making it less likely that customers will look for other solutions. Many software companies, including Autodesk, will acquire smaller companies to gain access to new technology. This strategy allows them to acquire innovative solutions and to maintain a leadership position in the market. To take advantage of these opportunities for acquisition, it is important for software firms to have sufficient capital available. This access to capital (KSF) can offer a competitive advantage for firms in this market. For example, Autodesk has almost zero debt and over a billion dollars in cash (Autodesk Inc., 2012). This is not standard in many industries but is more common among the larger software companies.

A secondary substitute would be paper drawings, however, this is not practical for most work and CAD is the tool of choice. The industry is very familiar with 2D applications and these applications work well for most organizations, however, it can be difficult for people who are not familiar with 2D drawings to understand what they mean. This can cause confusion, delays and costly mistakes when designs are incorrect or misinterpreted. The industry also uses physical models to show what a design will look like. Physical models can be cumbersome and costly to build and have to be rebuilt anytime a change is made.

Another substitute to purchasing 2D or 3D software is the availability of illegal software on the internet. In Western countries, engineers, planners and government officials are part of professional associations and are expected to follow a code of conduct, which makes them less likely to risk illegal activity. There is also a greater chance of legal action against companies who use illegal software, which can be damaging to their reputation. One must continue to consider illegal software as a substitute for some companies and individuals.

Another substitute that needs to be considered is the evolution of cloud computing and applications that can be accessed through the web. Although there is not a significant threat today from cloud solutions targeted at engineering design as most companies don't offer this, the use of cloud as a method of delivering software is increasing rapidly and could signify a major shift in the market. Cloud computing can offer greater access to a wider market, helping to drive an increase in customers (KSF) and stronger brand awareness (KSF). Quite often, engineering design solutions are cost prohibitive for smaller organizations or individuals who only need to use the product for a short amount of time. By offering these products on the cloud, customers can pay per use and do not have to spend the full amount needed to purchase a perpetual license. As well, customers will not have to invest in costly computer systems, removing another barrier for those customers who may not be able to afford to invest in the required hardware. Another benefit to cloud applications is that customers will no longer have to worry about keeping up with new versions of the software, as this will always be accessible through the web. Finally, the cloud also offers the benefit of increased mobility. Many customers need to access software in different locations and the cloud will provide this without having to be in the office or at a computer. All of these benefits offer an additional source of advantage, which is the ease of use and access (KSF) for customers. Since customers are able to get software through the web, the distribution model (KSF) changes to a real-time transaction between the software company and customer. The cloud makes it easier to get access to technology when it is needed and at a reasonable price.

Open source software is also a potential substitute for this market. Open source technology is being considered more and more by companies. Google Earth is an example of free software that is available for personal use, however clients must purchase a license to use

commercially. This is becoming more typical of another new approach being offered by companies online called the “Freemium” model where they will provide a free solution to consumers with a premium solution available for purchase.

2.1.4 Barriers to Entry (Strong)

Barriers to entry are threats to companies looking to enter a new market that will keep competition low, or will produce an environment where competition is high. When competition is low there are greater opportunities for firms in the market to make profits. Understanding the threats to entry will help to determine the scope of competition. Porter identifies a number of major barriers, which include economies of scale and scope, experience and learning effects, product differentiation, switching costs, access to distribution channels, industry regulations, and behavioural entry barriers. The barriers to entry are strong in the engineering design software industry and can offer a great deal of competitive advantages to incumbent firms already in the market.

2.1.4.1 Economies of Scale and Scope (Strong)

Economies of scale states that as the production volume of a product increases, unit costs will decrease. Economies of scope refer to the fact that as a firm produces two or more products, its average cost decreases. The economies of scale and scope in the software industry are strong and are a source of competitive advantage for firms in the industry (KSF). Engineering design software development requires large upfront R&D expenditures (KSF), which is a barrier to new entrants and includes a significant payback period prior to profitability. The greater the volume of software that a firm sells, the lower average unit costs as these costs have been fixed and sunk into R&D and the company does not incur additional variable costs to produce the product.

Profits can be invested back in R&D for future development and continued progress of a product line or other areas of the business.

All of the companies in the industry also provide products to other different, yet related industries. A broad product line is an advantage for companies in this market because they are able to leverage innovation and R&D from other divisions to complement the creation of new technology. Software companies will often share core technologies across divisions, spreading costs out across multiple products, helping reduce development costs for new products that may take time to gain sales momentum. A larger firm will also enjoy economies of scope for their marketing efforts by being able to share these costs across the entire organization. It will also be able to leverage brand recognition (KSF) across divisions, helping to promote all of the company's products. Finally, as a strategy to retain customers, companies will have multiple products, enabling them to penetrate accounts broadly and reduce the chances of losing a client to a competitor. These economies of scope (KSF) can provide a significant competitive advantage to a firm and deters new entrants who have to compete against well-established incumbents.

2.1.4.2 Experience and Learning Effects (Strong)

The learning effects refers to the fact that as individuals gain experience and learn how to do something, the faster and more efficient they become. The experience effect goes beyond just time to state that the more a task is performed, the lower the cost to do it. The experience and learning effects in the engineering software industry are very strong. Software companies gain an advantage when employees learn and increase their skills and capabilities. In most cases, this will lead to faster development of new technologies that can result in proprietary software that will offer one company an advantage over another. The more the software engineers and developers learn the process for R&D (KSF), the faster they can work on innovations. This will

result in those companies with economies of learning and experience being able to amass a large amount of intellectual property for lower costs than the competition. This is an important source of competitive advantage for firms in this market.

2.1.4.3 Product Differentiation (Strong)

As discussed in Chapter 1, differentiation is the primary strategy and is a source of competitive advantage (KSF) for firms in this industry. Product differentiation takes place when a company distinguishes their product from the competition through branding, product functionality, marketing and sales. Product differentiation is critical in this industry and the effects are very strong. Customers place a very high value on having features and functionality that are intuitive and relevant to their existing workflow (KSF). Software companies that offer solutions that make sense for the industry and increase productivity over and above any existing solution will be the most successful in attracting new customers and retaining existing ones. This is a very important source of competitive advantage for firms in this market. The costs to differentiate are more intensive in the sales, marketing and advertising required to promote a product and company. All of the organizations who are competing in this industry spend a great deal of effort and investment in ensuring that their brand is recognized and promoted. Brand recognition (KSF) is a very important source of competitive advantage in this industry. This makes it very difficult for a new company looking to enter the market, as it will need to spend a great deal to establish a presence and gain market share.

Innovation and an investment in R&D (KSF) also allow software companies to continue to differentiate their product and stay ahead of the competition. Companies that are able to significantly differentiate and show value will be able to gain market share and in some cases charge higher prices for their product. Innovation and differentiation will also help companies

gain a first mover advantage in the market. By leading with innovation, these companies can create buzz and awareness for their products and can attract more customers before the competition. Software companies that do not focus on innovation will eventually lose, as they will be surpassed by other organizations who invest in technology advancements. Software firms that have a large investment in innovation and R&D make it difficult for others with fewer resources to enter the market.

2.1.4.4 Switching Costs (Strong)

As discussed earlier, the switching costs are high in this industry and as such are a strong barrier to entry. Switching costs refer to the actual or perceived costs for customers to change to another solution. Engineering design software is highly technical and is used by specialists and trained professionals throughout the industry and can be a very highly valued skill for employees to have. In some cases, it can take significant training to learn the technology and there are additional costs to companies for software implementation, such as set up and configuration. Once users become comfortable with a particular technology and interface, they can be reluctant to switch to something new. Another source of advantage in this industry is having a strong technical support mechanism for customers (KSF). Customers will consider the availability and quality of technical support when they are looking at a new product. Those firms with a strong support mechanism will be less likely to have customers switch to other brands. Software companies have different approaches, with some offering direct support and others through a third party. As mentioned earlier, Subscription Programs are an important way that companies to offer support to customers.

2.1.4.5 Access to Distribution Channels (Strong)

Porter believes the availability of distribution channels can have a big impact on the ability for new entrants to enter a market. The greater the competition is with a distribution channel in a market, the harder it will be for a new firm to enter and be successful. Distribution channels are important in the engineering design software market and the approach a company takes with their supply chain can result in large costs advantages. This makes a strong distribution channel a source of competitive advantage (KSF). Finding a distribution channel is not a large barrier to entry, however ensuring that companies have the right type of distribution is important. For example, a firm that sells direct could potentially be more profitable than one that sells through VARs, as it would have higher profit margins. On the other hand, a company that sells through a strong VAR channel can get greater access to markets and quickly increase their customer base. The quality of distribution is important in engineering design software because it is a specialized technology and technical support and training are a critical part of the solution (KSF). These factors show that access to distribution is a strong barrier to entry in the industry. Many resellers in the market will take on new products they believe will be successful and allow them to offer a unique solution. However, it takes time to develop which would give time for the incumbent companies to adapt and compete against the new entrant. In addition, resellers for one brand are sometimes restricted from selling competitive software making it more difficult to penetrate established VARs. Some software companies also offer their products for download on the web, which makes it very easy to distribute, and saves costs over those who deliver through traditional methods, such as shipping boxes of product.

2.1.4.6 Industry Regulations (Weak)

Industry regulations refer to government policies that are in place that can be a deterrent to new companies entering the market. Industry regulations are a weak barrier to entry in this market. Software firms protect their proprietary information through copyright laws and intellectual property patents. With the rapid pace of changing technology, there are always new ideas and approaches to designing a software program. Therefore, this is not a significant barrier but does protect the incumbent firms from having their technology copied by new entrants.

2.1.4.7 Behavioural Entry Barriers (Strong)

Porter also discusses network effects which arise when the value of a product to an individual increases when there are a greater number of people using it. Network effects are very strong in the engineering design software industry. Customers are very reluctant to switch from a product that they see as the industry standard or being the leading choice of technology. Companies that have a large customer base (KSF), market penetration and perceived brand recognition (KSF) have a competitive advantage in the industry. This is because people are more comfortable investing in technology that is widely used, particularly in a professional environment. People within organizations will often purchase a technology that is familiar and the industry standard rather than something that is new or not widely used. Word of mouth is also a strong influencer in this industry and this has a greater impact when a company has a larger customer base and strong brand. A strong reputation is a competitive advantage in the industry (KSF). Although new entrants may be able to find a distribution channel to sell their products, it is very difficult to overcome the network effects and to move from a small player to a large, dominant company in the industry.

Another reason that network effects make it difficult for new companies to enter the market is related to education. For example, Autodesk design software is the standard in the industry and is taught in high schools and universities, which means that there is a pool of skilled labour available to Autodesk customers without any additional investment on their part. In many cases, staff that customers hire will not have to be trained on something new. In the software industry, there are also large online communities (KSF) that offer support and discussion forums through social media, blogs and other methods that allow for the sharing of information. These forums allow for greater network effects as they will promote one brand over another and the companies with more customers will have a bigger online community. In addition, as discussed, third party developers (KSF) will help promote the brand and the more customers using the third party software the greater the exposure and value to the software companies. These network effects make it difficult for new entrants as it can take a long time to develop all these different sources of advantage.

2.1.5 Rivalry (Weak)

Porter considers a number of things when looking at rivalry in an industry. This includes the number of firms in the market, price competition, the ability to differentiate, industry growth and fixed costs. These factors along with the strength of the other forces discussed earlier will determine if rivalry is strong or weak. In the engineering design software industry rivalry is weak. As discussed in chapter one, there are five main competitors that focus on the infrastructure industry who own the majority of the market share. These companies are Autodesk, Bentley Systems, Intergraph, ESRI and Google. The fact that there are a smaller

number of firms in the industry lowers the overall rivalry. In addition, these firms focus on different segments of the market and offer different products, resulting in less competition. There is some overlap in customers, but generally the clientele is diverse, keeping profits high for the firms. The prices for these solutions vary significantly depending on the product and the company. On the lower end is Google SketchUp, which can start at \$500 with ESRI on the high end and can be very expensive when implementation costs are factored in. Autodesk products in the infrastructure industry vary from \$5000 - \$8000, depending on the application, with Bentley products being in a similar range. Both Bentley and ESRI are private companies so product pricing is not widely available in the market and the assumptions provided are based on general feedback. Price can be a factor for winning business, but each of these companies invests in trying to differentiate their products from the competition. In most cases, this ability to differentiate (KSF) will eliminate the price competition and shift the decision to consider return on investment and overall value, increasing the customers' willingness to pay for one solution over another.

As mentioned earlier, the primary cost for this industry is R&D, which these companies will need to recover through the sale of their product and supporting services. For the lower cost and easier to use products such as Google SketchUp, companies will aim for high volume and large market penetration. The more expensive products tend to be focused on a specific market segment and these companies will earn high profit margins through implementation services. Exit costs are low as companies invest upfront in research and development. If things do not work out these companies can move on to something else or drop a product without incurring additional costs. There is a large opportunity and growing demand for 3D solutions in the Infrastructure industry. More and more design is being done in 3D and with the tools now becoming easier to use and less cost prohibitive, this demand is expected to increase. There is

also a growing need around the world for additional spending on engineering design and construction due to urbanization, resource extraction, water resources and the requirement to replace ageing infrastructure. This growth in design will result in an increase in sales for software companies in this market.

Table 2.1 summarizes that price competition is low and profitability high, making rivalry a low force in this industry.

Table 2.1: Rivalry Characteristics

Rivalry – Characteristic	High	Low
Price Competition		X
Number of Firms		X
Ability to Differentiate	X	
Demand Growth	X	
Fixed Costs**		X

***The fixed costs to produce are low once a product is developed*

***R&D Costs will vary*

2.2 Industry Attractiveness

Porter states that firms in an industry with low supplier power, buyer power, threat of substitutes, rivalry and high barriers to entry will be able to achieve above average profits. The engineering design software industry exhibits all of these traits with the exception of the threat of substitutes, which is strong. This should provide an excellent opportunity for firms in this market to make great profits, however they will need to stay on top of the trends so that a substitute product on the market doesn't surprise them. This is a very attractive industry for those firms that are leaders and can continue to gain market share and develop a strong brand and reputation.

2.3 Sources of Competitive Advantage

Table 2.2 lists the sources of advantage in the industry and rates them according to a three-point scale. This will show what is most important to gaining a competitive advantage in the industry. The table also lists a description of each advantage as well as which of Porter's Force it was identified in.

Based on the analysis, the most important KSF for the industry is brand recognition. A strong brand offers customers a sense of security and comfort in the product they are purchasing. Companies can take advantage of powerful network effects that drive increased adoption and generate awareness in the market. Brand recognition also provides a way for companies to differentiate their products from the competition and a strong brand will increase switching costs, making it less likely that people will change to another product. Finally, brand recognition will give greater power over distribution channels as software companies engage in direct market and sales initiatives, maintaining control over customer messaging and revenue growth.

A large customer base is also a critical source of advantage to firms in this market and helps to promote brand recognition. As mention earlier, many network effects happen from having a large customer base, including a bigger online community, increased access to support, and more people trained in using the software. These factors promote greater adoption of the products and influence organizations to choose one platform over another. A large customer base will also help to reduce the threat of substitute products on the market, as people are less likely to switch to a new solution that does not offer all of these resources.

Table 2.2 *Relative Importance of the Key Sources of Advantage*

Ranking: 3=Very Important; 2=Important; 1=Less Important

Source of Advantage	Ranking	Description	Force
1. Brand Recognition	3	Strong brand recognition is critical to success	Buyer Power Threat of Substitutes Barriers to Entry <ul style="list-style-type: none"> • Product Differentiation • Behavioural Entry Barriers
2. Large Customer Base	3	A large customer base promotes economies of scale and product awareness	Threat of Substitutes Barriers to Entry <ul style="list-style-type: none"> • Behavioural Entry Barriers
3. Training & Support	3	Training and support ensure customer satisfaction and results in higher switching costs	Buyer Power Barriers to Entry <ul style="list-style-type: none"> • Switching Costs • Distribution
4. R&D	3	Strong R&D fosters innovation and keeps up with industry trends	Threat of Substitutes Barriers to Entry <ul style="list-style-type: none"> • Economies of Scale and Scope • Experience and Learning Effects • Product Differentiation
5. Product Features	3	Products that demonstrate ease of use and superior functionality drive sales	Buyer Power Barriers to Entry <ul style="list-style-type: none"> • Product Differentiation
6. Distribution	3	A strong reseller or distribution partner offers a great deal of benefits	Buyer Power Threat of Substitutes Barriers to Entry <ul style="list-style-type: none"> • Distribution
7. Product Differentiation	2	Differentiation is the main strategy of firms in the industry and eliminates price competition	Barriers to Entry <ul style="list-style-type: none"> • Product Differentiation Rivalry
8. Sales & Marketing	2	Sales and marketing is a critical part of driving brand recognition and increasing market share	Buyer Power Barriers to Entry <ul style="list-style-type: none"> • Economies of Scale and Scope

Table 2.2 Continued

Ranking: 3=Very Important; 2=Important; 1=Less Important

Source of Advantage	Ranking	Description	Force
9. Economies of Scope	2	A diverse portfolio spreads costs across divisions, leverages existing R&D and a strong brand	Barriers to Entry <ul style="list-style-type: none"> Economies of Scale and Scope
10. Third Party Developers	2	Third party developers help to promote the brand	Buyer Power Barrier to Entry <ul style="list-style-type: none"> Behavioural Entry Barriers
11. Reputation	2	A strong reputation signals (and is derived from) a quality product and a positive view with existing and potential new customers	Barriers to Entry <ul style="list-style-type: none"> Behavioural Entry Barriers
12. Ease of Use and Access	2	Customers prefer software that is easy to use and access as it lowers cost of ownership and deployment	Threat of Substitutes
13. Experience & Learning Effects	1	On the job learning and experience improves employee knowledge and drives innovation	Barriers to Entry <ul style="list-style-type: none"> Experience and Learning Effects
14. Economies of Scale	1	R&D costs are sunk and the greater the volume of sales, the lower fixed costs per unit	Barriers to Entry <ul style="list-style-type: none"> Economies of Scale and Scope
15. Community	1	A strong online and educational community promotes sharing among users and increases switching costs	Barriers to Entry <ul style="list-style-type: none"> Behavioural Entry Barriers
16. Capital	1	Firms will acquire innovative technology and require capital to be able to make strategic purchases	Threat of Substitutes

Training and support is another very important KSF in the industry. Software companies that sell product through a distribution channel will offer direct training and support through Subscription Programs to maintain contact with customers and to promote buyer power. A strong Subscription Program increases customer satisfaction, reducing the chances of clients moving to another technology. Due to the technical nature of engineering design software, it is also critical that there be strong training mechanisms to ensure that product adoption takes place. If there is no access to training, clients will never use the software and implementation will fail.

Research and development is also a critical part of the strategy for software firms. Customers expect value from their investments in technology, so companies must continue to innovate and invest in R&D. A healthy investment in R&D will provide the opportunity for continued product differentiation from the competition and will reduce the threat of substitute products in the market. R&D will also offer increased economies of scale and scope as new products will introduce additional benefits to the company, and a smart investment in R&D should result in increased sales and revenues. Firms will also promote a culture of learning and innovation within the organization.

Product features are an important KSF in the industry as it is one of the main criteria for customers purchasing a solution. The product functionality must meet customer business needs and will differentiate one solution over another. Engineers are responsible for important projects that have a wide impact on society and they must be confident in the tools they are using to do their job. The greater comfort they have with a solution and its technical functionality, the less risk they feel and less chance they will switch to another solution. In addition, the engineering

industry is highly competitive and customers are always looking for a product that will give them a competitive advantage on projects.

As discussed earlier, distribution is a very important KSF in the industry, particularly the availability and accessibility of a quality distribution channel. As there are many different types of distribution options in the industry, it is important for firms to choose a mechanism that will offer a competitive advantage and will increase the barriers for new companies looking to enter the market. The different distribution methods can affect profitability, customer satisfaction and market penetration so it is an important part of the strategy for firms in the industry.

Product differentiation is a KSF in this industry and is the primary strategy for all firms. Companies leverage all functions of the business to try to differentiate, including technical support, product features, distribution, sales and brand marketing. A firm that can differentiate their product will enjoy increased barriers to entry and lower price competition as customers will be willing to pay more for a product they feel is a stronger solution.

Sales and marketing activities drive competitive advantage for firms in the industry. Most software firms invest heavily in their sales and marketing divisions as these groups will drive many of the other critical KSF's, such as a larger customers base, product differentiation and economies of scale and scope. Direct sales and marketing activities by firms will reduce the power of distribution channels for those companies that do not sell product direct to the end user. Firms can provide marketing and sales strategies to the distribution channel ensuring consistent messaging and helping to maintain control.

Economies of scale and scope are both important KSF's in the industry. Economies of scope takes advantage of cross-divisional marketing opportunities and will drive increased brand awareness. Economies of scale take advantage of a large customer base and results in lower fixed costs as market penetration increases.

Third party developers are a good source of competitive advantage for firms in the engineering design software industry. They can provide additional sales and marketing capabilities with little investment on the part of the software company. They also help promote network effects in the industry, as there is greater adoption of the technology and increased support. A firm's reputation is another KSF and a positive reputation will help to drive product sales. A company's reputation is a reflection of how customers perceive the quality of a product and service. A positive reputation is important, as it will promote the value of the solution and greater product awareness. Although brand recognition will also offer the benefit of greater awareness, it does not guarantee that a firm will have a positive reputation. Therefore, it is important that a distinction be made between reputation and brand recognition.

The ease of use and access to a product is also an important KSF in the industry and has a strong relation to product features and differentiation. A critical factor that will affect a customer's decision to purchase a product is the requirements around implementation and training. Customers are always requesting products that are easier to use and deploy as this helps to reduce costs and the learning curve associated with a new software solution. Firms that invest R&D into making products more intuitive will have a competitive advantage in the industry. The rapid growth of cloud computing has increased customer awareness of these benefits and is increasing demand for these types of solutions.

The experience and learning effects provide a KSF in the industry as it can be a strong catalyst for innovation and increased employee knowledge through R&D and on the job learning. The online community is also a as it promotes brand awareness and marketing for the company. It can also offer another avenue for technical support with customers.

2.4 Competitive Analysis

As mentioned earlier, there are five main competitors in this industry. These are Autodesk, Bentley Systems, Intergraph, ESRI and Google. Autodesk, Bentley and Intergraph are the primary competitors with the majority of customers in the infrastructure industry using their engineering design platforms. Both Autodesk and Intergraph are public companies with Autodesk having the greatest diversity in terms of its product portfolio and the largest revenues from the Infrastructure industry. ESRI focuses on the GIS industry and shares some of the same customer within the industry as Autodesk, Bentley and Intergraph, however their main effort is on Government agencies. Over the last few years ESRI has begun to make more of a push into the engineering design software market. A large number of customers also use Google Earth to quickly overlay their design and show a 3D worldview. Google is a new competitor to this market compared to the other companies. Google SketchUp is an easy, low cost tool that many customers are starting to look at for simple conceptual design and GIS functions. SketchUp can be used in the early stages of a project but is not robust enough for detailed design and analysis. Google is a very innovative company with a diverse portfolio of solutions, high revenues and large investment in research and development. With the recent technology innovations and availability of 3D model based design, these software companies are all looking to move existing

and new customers in this industry to their own product solutions. This is a critical time where gaining market share is important, as it will allow these organizations to benefit from the network effects of online communities, word of mouth and momentum that drive product sales.

Table 2.3 shows the ranking of these firms in the industry based on the key source of advantages that were identified earlier. The ranking is based on a five-point scale with one being the weakest, and five the strongest. Once these scores are totalled for each company it will provide a better picture of which firms are the strongest in the industry.

Table 2.3 Competitive Ranking by Source of Advantage

Ranking: 5=Strong; 1=Weak

Source of Advantage (importance)	Ranking: 5 (strong) – 1 (weak)									
	Autodesk		Bentley		ESRI		Google		Intergraph	
1. Brand Recognition (3)	3	9	2	6	3	9	5	15	2	6
2. Large Customer Base (3)	4	12	3	9	3	9	5	15	2	6
3. Training & Support (3)	5	15	2	6	4	12	3	9	2	6
4. R&D (3)	4	12	2	6	4	12	5	15	2	6
5. Product Features (3)	5	15	2	6	3	9	2	6	2	6
6. Distribution (3)	4	8	1	2	4	8	3	6	2	4
7. Product Differentiation (2)	4	8	3	6	4	8	4	8	3	6
8. Sales & Marketing (2)	4	8	2	4	4	8	4	8	2	4
9. Economies of Scope (2)	4	8	3	6	2	4	4	8	3	6
10. Third Party Developers (2)	4	8	3	6	4	8	2	4	2	4
11. Reputation (2)	3	6	3	6	3	6	5	10	3	6
12. Ease of Use & Access (2)	3	6	3	6	3	6	5	10	3	6
13. Experience & Learning Effects (1)	4	4	4	4	4	4	4	4	4	4
14. Economies of Scale (1)	4	4	3	3	3	3	5	5	3	3
15. Community (1)	5	5	3	3	5	5	5	5	3	3
16. Capital (1)	4	4	2	2	3	3	5	5	3	3
Total	49	132	31	81	42	114	48	133	30	79

2.5 Opportunities

The competitive analysis above outlines a number of opportunities in this industry that Autodesk is positioned to benefit from. Autodesk is a leader in the industry and already has a large number of customers using its solutions. There is a great opportunity to leverage network effects and increase sales and demand for Autodesk products. It is also a good time to introduce new solutions and look at opportunities in new markets to continue to grow market share and increase the number of customers. Autodesk also has a great opportunity to leverage its very large reseller channel and to continue to provide top quality training and support. This should be a focus for the company in ensuring the VARs are increasing their capability and capacity to be able to support customers on complex projects. Although this is an opportunity, it could also present a challenge to the company if there continues to be diverging goals between the VARs and Autodesk. There is also the opportunity to improve on the channel by introducing new partners or looking at new business models that support the direction of the company and the solutions. Autodesk should also continue to invest in R&D and innovative product features and solutions. This will continue to support growth in market share and increased adoption of Autodesk products. All of these things will drive economies of scope and allow the company to benefit from a diverse portfolio of solutions with industry focus. Finally, Autodesk should keep its commitment and investment in supporting third party developers and the online community, such as social media, blogs and thought leadership. Autodesk is a leader with these strategies and continued investment will help the company differentiate itself from the competition.

2.6 Threats

Brand recognition and reputation are both important sources of advantage in this industry and are an important part of a differentiation strategy. Although Autodesk is recognized among

engineers and government agencies, the company does not have a strong brand outside of this industry. Autodesk needs to continue to develop brand awareness and a strong reputation outside of its traditional customer base. On the other hand, Google is known worldwide with a very large customer base, strong brand recognition and a very positive reputation. Although Google does not currently have the product depth and focus of Autodesk, if it was to begin to make a stronger push into this industry, it would be able to capitalize on the strengths of its brand. As we identified earlier, Google has a high ranking in some of the most important sources of advantage, putting it in a strong position to compete if it was to invest in the development of the technology. In addition, Google's has invested in cloud technology with the release of a number of applications, making this a focus for the technology giant. ESRI is also a strong player in the GIS market and Autodesk will need to monitor this. Similar to Google, ESRI only focuses on a specific segment of the market, however, if it shifts its technology direction it could begin to push beyond GIS into Autodesk's larger market share of engineering design customers. Finally, as Porter's Five Forces showed, substitutes are a threat to this industry and to Autodesk. Autodesk will need to ensure that it stays on top of industry trends in order to maintain a leadership position in the market.

2.7 Strategic Alternatives

Option A: Improve the VAR Channel and Move to Cloud

A strategic alternative that Autodesk could consider to address the opportunities and threats faced in the industry is to invest in developing all of the core products as cloud solutions and to continue to sell these through the reseller channel. Autodesk products are highly technical solutions with analysis and modelling capabilities, which require a robust system with significant

computing power. Therefore, it would take some R&D and consideration as to how these products could be offered in the cloud and if there would be any significant changes required to the software platform. The move to cloud computing also changes the delivery model to Software as a Service (SaaS), which affects how customers pay for the product. Currently customers pay an upfront fee to own the rights to use the software indefinitely and pay an annual subscription on top of this. A move to cloud would no longer require the upfront purchase of the perpetual license. Rather than buying a license, they will be paying for use, which could take the form of an annual subscription fee or an option to pay based on the amount of time the software is used. Changing the revenue streams could have a significant effect on how revenue is recognized and the reported profitability of the company. This is because a perpetual license is recognized as upfront revenue for the company and will be reported in the year it is earned. Subscription is recognized ratably, over the term of the contract, spreading the revenue out over a longer period and often extending from one year to the next. If Autodesk transitions to a subscription only model, it will significantly affect how revenues are distributed and reported to the market. The move to cloud computing will also require an investment in back end systems, such as server farms and data warehouses, in order to run the software. A move to SaaS means that customers no longer bear the burden of running complex IT infrastructure and this instead falls to the software company to manage.

Another consideration when deploying this strategy has to do with government requirements for data storage, privacy and data security. Autodesk is a global company with customers all around the world. Many of these customers are government agencies or private firms that use Autodesk software for large capital projects that often require sensitive information. Some countries have laws around how and where this data can be stored which is a challenge if servers used for cloud applications reside outside the country where the data was

created. Finally, if Autodesk moves their applications to cloud solutions, the resellers would also need to adapt their sales approach. Autodesk would have the opportunity to increase the knowledge and experience of the existing VARs and possibly introduce new VARs that are able to better support customers and Autodesk's strategy of moving to the cloud.

Option B: Eliminate the VAR Channel and Move to Cloud

Another strategic option would be to move all of Autodesk's products the cloud, requiring the consideration mentioned above, but instead of investing in the VARs, Autodesk could eliminate the channel and sell direct. A move to cloud computing would change how products are delivered to customers. Instead of requiring a license, they could just go online and pay Autodesk directly as they use the product. This could provide an opportunity for Autodesk to consider a move to direct sales rather than through the reseller channel. This would affect all areas of the company, such as sales, marketing, support and finance. Autodesk currently does not sell directly to customers, with the exception of a few large strategic accounts, so this change in distribution would have a significant impact on the administration associated with selling product. Autodesk would also have to invest in more of a local presence in each of the regions as customers would require direct support and training. This could require Autodesk to invest in additional office locations and personnel to deal directly with customers.

Option C: Continue with Primary Applications on the Desktop and Offer Some Cloud

Solutions

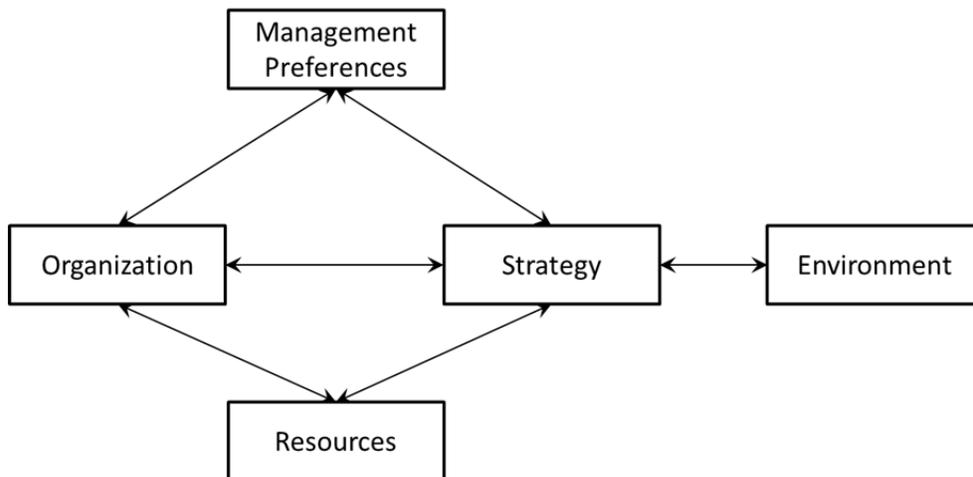
The last strategic alternative that Autodesk could consider is to continue to offer its core solutions on the desktop and provide some applications on the cloud as value added solutions. This is similar to the current strategy of the company where the primary products are offered as

desktop platforms with additional benefits to Subscription customers, such as access cloud storage for file sharing and specific applications for rendering and simulation. Subscription is a program that Autodesk offers which provides support, product upgrades and value added solutions for an annual fee. This is similar to most maintenance programs offered in the industry. Subscription can be a critical part of revenues and profitability as it provides consistent recurring revenue and allows for more accurate budgeting and investment in R&D. Autodesk could continue to expand on this strategy by increasing what is available through subscription as well as offering cloud applications for purchase outside of the Subscription Program. However, this strategy would not consider moving Autodesk's core technology to the cloud or offering it as SaaS.

3: Chapter Three: Internal Analysis

This chapter will provide an analysis of Autodesk’s internal capabilities to determine the feasibility of the strategic alternatives proposed at the end of Chapter 2. This analysis will use the Diamond-E Framework to understand the link between strategy and management preferences (MP), the organization (O) and resources (R) (Crossan et al., 2009). Figure 3.1 shows a diagram of the Diamond E-Framework and the linkages between MP, O, R and strategy. The linkages between the environment and strategy were discussed in Chapter 2.

Figure 3.1 The Diamond-E Framework (Crossan et al., 2009)



3.1 Assessment of Strategic Alternative A

Strategic alternative A involves moving Autodesk's key products to cloud solutions and improving the VARs capability and capacity so they are better able to support customers under the new business model.

3.1.1 Management Preferences

This analysis will consider the required management preferences for each of the strategic options and what is needed for the strategy to be successful. All of the proposed strategic options will require the support of Autodesk's CEO, Executive Officers, Regional Vice Presidents and Mid-level Management who are responsible for ensuring their teams successfully implement the strategy. A move to cloud computing will affect all divisions within the organization requiring support from management at multiple levels. Senior executive buy in, support is critical in helping to shape the vision and direction for this strategy, and a top down approach is necessary to ensure all aspects of the organization are moving along the same path. An improvement in the VAR channel also requires greater investment, focus and resources aimed at helping educate and increase the skill of the channel. This involves restructuring existing programs, affecting multiple groups in the organization.

3.1.1.1 Management Objectives

Table 3.1 compares the required preferences against the actual preferences and identifies the gaps with management objectives.

Table 3.1 Management Objectives for Strategic Option A

Management Subject	Required Preferences	Observed Preferences	Major Gaps	Gap-Closing Analysis
CEO	Lead the organization to support the move to cloud and investment in VARs and be a driver for change	Entrepreneurial mind-set with a focus on innovation, cloud solutions and technology	Need to improve company focus on VARs and improving the channel and capacity	Invest resources to identify problems with VARs and potential solutions
Executive Officers	Lead all divisions to work collaboratively and align with overall corporate strategy	Work together to present united strategy and corporate focus Supportive of technology innovation and cloud solutions	Corporate strategy does not have a large focus on improving channel Introduce global initiatives for technology and process changes with cloud	Increase the focus in each of the divisions to address VARs and reduce conflicting messaging
Regional Vice Presidents	Interest in working across divisions to support success of all teams and regions	Interest in own divisional and regional success drives focus	Divergent goals can lead to misalignment and conflicting actions among groups	Increase cross-divisional teams to collaborate
Mid-level Management	Strong communication with employees to engage in change process	Limited communication with employees on important changes	Employees not involved in the process or aware of changes until last minute	Empower managers to share more with staff and engage in process early on

3.1.1.1.1 Gaps in Management Objectives

The move to cloud computing for Autodesk’s core technology and increased competency in the channel will result in changes that affect all divisions within the organization; as such, it is

important that management preferences be closely aligned with what is required to be successful. To ensure alignment there are a few moderate gaps that have been identified. One gap is a lack of focus from senior executives on improving reseller capability and conflicting messaging around the approach in working with the channel. Although VARs are an important part of Autodesk's overall corporate strategy, there are no big initiatives for driving change and decisions are sometimes made that seem to be in conflict with the reseller channel. For example, the company will introduce programs that reduce margins for the resellers, hurting their profitability and jeopardizing their overall success. However, Autodesk does invest resources to help the VARs and has teams of people within the company dedicated to the partner business.

The CEO and Executive Officers are supportive of innovation and new technology and they drive this view throughout the organization. Carl Bass has been leading the company in the transition to offering Subscription services in the cloud and increased focus on consumer applications. Senior management seems to support moving Autodesk's core technologies to the cloud and will need to lead the global product teams in overcoming the current technology gap required to put the products in the cloud. The executive team will also need to focus on the global changes required to introduce the new revenue and pricing model, as this will have significant impact on the organization.

The regional management teams will be responsible for rolling out these changes to the staff. Some moderate gaps will need to be overcome to ensure success. The regional divisions seem to prefer to work in silos and do not understand the impact of the actions of one group on another. The move to cloud computing is a change that will affect the entire organization and it is critical that each division work together to understand the impact on all groups so they can be

most effective. There needs to be alignment within the teams to support the changes made by the executive and the changes should be flexible to support regional issues that may arise and modifications that might be required. Regional Vice Presidents will need to focus their teams on implementing changes for these gaps. Finally, mid-level management will need to communicate these changes to employees in a timely and effective manner. The move to cloud computing will result in many operational changes for staff and will transform how Autodesk goes to market with their products. Most employees are used to working with the VARs so improving the channel capacity and capability would not require a big shift in thinking, making it easier for management to implement. The change to cloud computing will be a bigger transition and management needs to ensure proper communication and support for employees.

3.1.1.1.2 Suggested Gap-Bridging Solution

First, the CEO will need to shift the company focus towards the VARs and ensure it is the mandate of each division to help improve the capability and capacity of the channel. This increased focus should come from the executive leadership team and a change is required at senior levels of management to change the preferences of the executive and the rest of management. . As well, the sales organization should move away from direct led sales activities to increased collaboration and partnership with the VARs on top tier accounts. The executive leadership at the company needs to implement these changes and introduce global VAR initiatives for all the regions. The regional management teams will have to invest resources to identify the problems with the existing channel and recommended solutions. This analysis is critical for the senior executives to ensure they have the right information and are putting the right programs in place. Future investments should be focused on the opportunity to bring new VARs into the channel and to help provide funding to improve existing ones.

Along with increased attention on the VARs, there will also need to be an increased management focus on how Autodesk can move its technology to the cloud. The move to the cloud will affect all aspects of the company and it is critical that cross-functional teams work together to share information across all divisions and come up with a strategy for the transition. Each team should be made up of executive leaders, regional VP's, managers and key employees who can offer insights into the transition and how this will affect each group. To ensure a smooth transition and reduce confusion, the company will need to involve employees in the change process.

3.1.1.1.3 Cost

The company will incur a cost to change management objectives towards the re-alignment of the divisions to support the VARs and move to cloud. The more tangible costs would be the additional salaries required to hire people to fill management level positions in the departments that currently do not have someone to focus on the channel. If we consider Sales Operations, Marketing and Industry Strategy, the costs to hire additional personnel could range from approximately \$450,000 - \$650,000. The less tangible costs are the time and internal resources required to develop the strategy, as management would need to be very involved in this process. The longer it takes this strategic plan to come together and implement, the greater the intangible costs would be.

3.1.1.1.4 Benefit

There is a great deal of benefit from aligning management objectives with the requirements for this strategy. Leveraging knowledge from all divisions will enable the company

to make a better plan on how to approach the move to the cloud. In order to be successful, this strategy needs to have a top down approach with senior management driving the success and the vision. This will only be achieved if Autodesk invests in the management staff to ensure alignment with the goals and objectives of the company.

3.1.1.2 Management Experience

Management experience considers the skills and background of existing managers and the experience needed to implement this strategy. Autodesk is a global organization and has a large number of managers at all levels that would be involved in rolling out this strategy, offering a diverse cross-section of experience that the company can leverage. If the implementation is approached properly, access to this group of diverse personalities and backgrounds should benefit the organization and provide a great deal of knowledge and expertise for the planning process. Table 3.2 identifies the required and existing preferences, the gaps and the requirements to close these gaps.

Table 3.2 Management Experience for Strategic Option A

Management Subject	Required Preferences	Observed Preferences	Major Gaps	Gap-Closing Analysis
CEO	Experience managing external stakeholder expectations and leading global organization towards common goal	Has held multiple C-level positions (CFO, CEO, SVP) and on board of directors for McAfee, E2open et al. (Forbes, 2011)	None	None
Executive Officers	Experience in developing complex strategic plans that include multiple internal stakeholders and rigorous planning	Experienced in high level positions with cross-collaboration and strategic planning	None	None
Regional Vice Presidents	Experience with leading regional teams and large scale implementations	Large number of regional VP's with diverse experience and knowledge	None	None
Mid-level Management	Experience in communicating with staff, running day to day business activities and change management	Management experience and styles vary greatly	Communication and approach not consistent	Consistent training, coaching, messaging from Regional VP's and Executive

3.1.1.2.1 Gaps in Management Experience

Autodesk has access to a large pool of management expertise throughout the organization. This allows the company to leverage certain individuals for tasks where they may have more applicable knowledge and skills. There are no gaps in experience at the senior levels of the company as everyone has the background to implement this strategy. At the mid-manager

level, the experience tends to vary more and this can cause inconsistency when working with the teams, resulting in confusion among staff. This could be an issue when rolling out a new cloud strategy or trying to improve the VARs, which requires clear communication to help with faster adoption and overall success.

3.1.1.2.2 Suggested Gap-Bridging Solution

To address the gap at the mid-management level Autodesk should allocate time for additional training and coaching from the regional VP's and senior executives. This will ensure that all levels of management have the same information and are able to communicate this to the staff in the field. It will also help to ensure middle managers are consistent in their approach.

3.1.1.2.3 Cost

The cost to bridge this gap would be the additional time and investment required for training managers across the organization. The company already allocates annual budget funding for employee training and improvement programs and managers are already meeting with regional VP's so this would not be a large incremental cost for the company.

3.1.1.2.4 Benefit

The benefit for improving the experience of mid-level management is greater consistency when implementing the strategy across the organization. In addition, it provides a stronger link between management and the executive leadership, enabling greater communication and openness across the organization.

3.1.1.3 Management Team

The management team at Autodesk responsible for the development of this strategy includes the CEO, Executive Officers and likely some of the Regional VP's. The Regional VP's and mid-level management will be focused on the implementation of the strategy across all of the divisions. The executive leadership will come up with the high-level plans with the regional teams looking at the tactical requirements in each of the countries. In order to be successful, these groups will need to be willing to engage in critical planning sessions to ensure all roadblocks and potential issues are considered. It will take a great deal of hard work and motivated individuals to be successful. Table 3.3 shows the required preferences, actual preferences and the gaps as it relates to the management team.

Table 3.3 Management Team for Strategic Option A

Management Subject	Required Preferences	Observed Preferences	Major Gaps	Gap-Closing Analysis
CEO	Strong leadership skills and motivates executives and staff to follow his vision	A strong believer in Autodesk with a great deal of drive to be the industry leader	None	None
Executive Officers	Work together to come up with a collaborative plan and execution	Strong interaction and planning between groups at this level	None	None
Regional Vice Presidents	Collaborate with other divisions, communicate plans and receive feedback from mid-level management	Strategic plans developed at top levels with minimal communication and interaction at mid-level or lower	Limits the flow of information and communication and creates confusion when new strategy is introduced	Involve all levels of the company in the change process and be open to suggestions and feedback
Mid-level Management	Need open communication style and collaborative approach with employees	Communication is filtered to employees	Need to be able to provide important information to employees to ensure success of strategy	Greater support from Regional VP's and Executives to share information

3.1.1.3.1 Gaps in Management Team

For strategic alternative A, there are no significant gaps at the CEO and Executive Officer positions. The CEO displays passion and enthusiasm regarding the move to cloud computing and is a strong advocate for this strategy. One challenge is that information sometimes stays at the top level of the company and is not communicated past Regional VP's to mid-level management and their staff. This can cause frustration as new processes or strategies

are introduced without proper communication and employees are unable to prepare for the changes and support the initiatives. It is sometimes unclear if this lack of communication is happening at the mid-level or with the VP's and above. As Autodesk is a global organization, this could also be the result of having so many employees in multiple locations and an inefficient process in place to share strategic details.

3.1.1.3.2 Suggested Gap-Bridging Solution

To address the challenge of information staying at the top levels of the company, it is important that the Regional VP's support a culture and environment of open communication with staff. This should begin with mid-level management and filter all the way from top to bottom. The management team should also understand change management practices and be open to following methodologies that will help reduce the risk of individuals within the organization not adopting the new strategy. The management team should be engaged in an open and collaborative approach with employees as this will help to get buy-in across the organization and will reduce the chances of change fatigue among staff.

3.1.1.3.3 Cost

The cost to address the challenges with the management team is hard to quantify. It would require a change in process and possibly the replacement of managers who do not agree with the requirements needed to make the implementation a success.

3.1.1.3.4 Benefit

Having the right team in place is critical to the success of this strategy with benefits throughout the company, as individual employees will be more likely to agree with and adopt any changes. All levels of staff and management will also have a clear understanding of how the

move to cloud will affect all divisions and will be able to communicate this to the VARs and other external stakeholders.

3.1.1.4 Management Leadership

Management leadership considers the style and approach that is required to implement the strategy. As discussed earlier, the move to cloud computing and the improvement in the VARs is anticipatory change as the company considers future opportunities and changing market conditions. With this type of change, the most effective approach is a participative leadership style. Participative leadership requires the involvement of individuals and groups to provide feedback to management, collaboration on the changes required, internal training on new tasks, delegation of responsibility and incentives or non-incentives for staff (Crossan et al. 2009). This style of leadership will benefit Autodesk as there are large numbers of highly skilled staff and a participative style will allow employees the opportunity to make recommendations and provide valuable insights. Table 3.4 compares the required and actual preferences, identifies and makes recommendations to remove the gaps.

Table 3.4 Leadership for Strategic Option A

Management Subject	Required Preferences	Observed Preferences	Major Gaps	Gap-Closing Analysis
CEO	Support and expect a participative style among all management and be willing to make critical decisions	Uses videos, articles, panel discussions to communicate strategy	Increased two-way collaboration with staff at all levels	Meetings with smaller groups to allow for more intimate interactions
Executive Officers	Leverage participative style to ensure collaborations among divisions	Strong interaction between divisions at an Executive level	Increase two-way collaboration with staff at all levels	Meetings with smaller groups to allow for more intimate interactions
Regional Vice Presidents	Engage in collaboration with teams and delegate responsibility to mid-level for implementation	Use global conference calls, team meetings to discuss implementation plans	Plans are told to mid-level management and staff with limited interaction prior	Greater collaboration on issues and solutions
Mid-level Management	Need open communication style and collaborative approach with employees	Communication is filtered to employees by some managers	More consistency in the flow of information and collaboration	Greater support from Regional VP's and Executives to share information

3.1.1.4.1 Gaps in Management Leadership

There are a number of gaps in management leadership that should be considered to ensure this strategy is a success. At the CEO and Executive Officer level, there is limited collaboration or communication with employees. Often, these leaders of the company speak to employees when there are hundreds or thousands of people in the room. They also use videos, articles and panel discussions to address questions and talk about the company strategy. This restricts the quality and quantity of engagement from employees, limiting the ability for these

executives to engage in a participative leadership style. In order to implement this strategy, all levels of management will need to be participative and look to build commitment from all internal stakeholders. If the senior leaders of the company implement a vision of participation at the top, this will have a cascading effect throughout the organization, resulting in greater adoption from all staff across the organization.

3.1.1.4.2 Suggested Gap-Bridging Solution

As we have discussed, all of management should consider a participative leadership approach when developing and implementing this strategy. Senior executives will need to collaborate more with employees to understand the challenges and opportunities that face the company. One way to do this is to hold meetings with smaller groups of employees for better feedback and to help get commitment from staff at all levels of the organization. Management can also put together cross-divisional teams to consider the impact of moving to the cloud on customers, VARs, and internal divisions such as IT and Finance. Although it is important to engage all levels of staff, management must also still be prepared to make decisions as needed, particularly when no consensus is reached among the group. Participative leadership is not the right approach for every strategy Autodesk undertakes, however it is well suited to this strategy as it looks to address anticipatory change.

3.1.1.4.3 Cost

The changes for management to move towards participatory leadership would likely increase the costs, however the overall benefit from the participation of skilled employees will outweigh these costs. The employees at Autodesk are some of the best in the industry and the

knowledge and expertise they can offer is invaluable, also making it a difficult strategy for the competition to replicate. Under this approach, the development of the strategy will take more time as it involves more individuals and requires greater analysis and collaboration. In addition, there may be extra costs if the company invests in management training to support this approach.

3.1.1.4.4 Benefit

The right leadership approach will help to ensure that the corporate strategy is successful. Senior executives should have a clear understanding on the approach they want to take to lead the organization through the next phase of the business. A participatory approach makes sense for this strategy and will result in less roadblocks, issues with an overall more effective strategy.

3.1.2 Organization

The link between strategic alternative A and the organization is important when considering the feasibility of this option for implementation. The organization considers those forces within the company that interact with each other to make things happen. This paper will consider structure, systems and organizational culture when looking at Autodesk's internal capabilities to move to the cloud and improve the VARs.

3.1.2.1 Structure

Organizational structure refers to how the company is configured in terms of divisions, roles and reporting structure. Autodesk is set up as a blend of a global functional structure and product organization. Autodesk's functional lines of business, such as Sales, Marketing and

Customer Support & Operations have one Senior Vice President who reports to the CEO and is responsible for the global business for each division. Product divisions, such as Design, Lifecycle & Simulation and Information Modeling & Platform also report directly to the CEO. Autodesk has a decentralized structure that allows employees to work autonomously towards individual and team goals. To be successful with a move to the cloud, Autodesk’s structure will need to support global teams and collaboration across divisions. Table 3.5 lists the required structure versus actual and what is needed to fix the gaps.

Table 3.5 Structure for Strategic Option A

Required Organizational Capabilities	Existing Organizational Capabilities	Capability Gaps	Actions to Close Gaps
Decentralized structure that promotes product and field innovation	Decentralized structure that promotes product and field innovation	None	None
Ability to support regional differences with external stakeholders	Emerging markets have own teams focused on each region	Regions outside emerging markets follow US head office	Promote increased interaction among staff in a region
Collaboration across teams to leverage best practices and share information	Use technology to promote communication and collaboration among staff	Information often kept in divisions and not always shared across the organization	Cross-divisional teams for sharing information

3.1.2.1.1 Gaps in Structure

With the implementation of strategic alternatives A, Autodesk’s structure will need to be able to support regional differences that may arise with external stakeholders. A move to the cloud for Autodesk’s core products can have different implications for customers depending on the laws of the country. For example, some government agencies in Canada are prohibited from

storing any data outside of the country. This would exclude them from purchasing a cloud solution that uses data centers stored in another country, such as the United States. In addition, the VARs in each country are unique and have their own ways of doing business. It is critical these differences are recognized and understood so the appropriate programs are implemented to improve the capabilities of the channel. It is also critical that the structure support collaboration across the teams so they can share information and best practices. Autodesk does promote teamwork and the sharing of information by using technology, such as webinars, blogs and an internal website accessible by all employees that promotes new information and ideas, however, individuals are not always proactive and information will not always be shared across divisions.

3.1.2.1.2 Suggested Gap-Bridging Solution

Autodesk employees in countries outside of the US need to be able to share information and the flexibility to come up with unique solutions. The company can help to promote this by encouraging country meetings and increased interaction between staff in these regions. To continue to encourage collaboration and communication across divisions, Autodesk should set up cross-divisional teams that are focused on the strategy and coming up with new ideas. The company may also want to form a new team at the product level to address the complex requirements of moving Autodesk core technology to the cloud. This move will affect all of the product divisions and it is critical they work together as this will bring multiple perspectives and ideas. Having these groups involved in the process will also allow for a faster transition once products are developed and the customer roll out begins.

3.1.2.1.3 Cost

There is not a great deal of cost for the proposed modifications since they do not require drastic change by management. Autodesk already invests resources in getting teams together to promote brainstorming, sharing of new ideas and R&D. The changes required to address the gaps in structure are modifications or new groups and divisions that should be meeting. This is not a brand new structure or approach for the company.

3.1.2.1.4 Benefit

Autodesk will definitely benefit from these changes, as it will promote an increase in collaboration and communication between the right people. This has the opportunity to provide Autodesk with increased competitive advantage, as it will be able to leverage industry knowledge from around the world and come up with new innovative ideas. A structure that promotes greater collaboration will also flow through to VARs who will benefit from increased access to important information.

3.1.2.2 Systems

Organizational systems include IT, Customer Resource Management (CRM), Human Resource Management (HRM), financial and all other programs used for important functions within the company. Autodesk uses a number of systems to manage global processes, people and information and has an advantage of being a technology-focused company, with staff generally open to trying new systems and recommending new tools. Autodesk will be able to leverage many of the existing systems already in place for the move to the cloud and improvement in the channel, however there are some changes needed. Table 3.6 lists what is required and compares to what the company current has, identifies the gaps and provides recommendations to address these.

Table 3.6 Systems for Strategic Option A

Required Organizational Capabilities	Existing Organizational Capabilities	Capability Gaps	Actions to Close Gaps
Increased IT infrastructure to support customer web interface and storage requirements for cloud	Subscription Center for customers to download products and some storage capabilities	Additional systems for greater volume of customers access products via the web Increased storage capabilities	Cross-divisional team that includes product division and IT Increase data center for storage
Systems to support remote communication with VARs (training, videos, support)	Partner Portal and Learning Center which provides resellers with access to multiple tools and information	None	None
Systems to support internal sharing and communication with staff and among teams	Systems for document management, financial, collaboration and internal website with a great deal of information	Staff not always aware of what or where the information can be access	Process to better direct and provide access to employees to relevant systems

3.1.2.2.1 Gaps in Systems

The biggest gap in systems for the implementation of this strategy is the requirement for increased IT infrastructure. Moving to the cloud means that more customers will be accessing Autodesk products through the web and back end systems will need to be set up to support this. Currently customers are able to download software through the Autodesk Subscription Center, however this would need to be upgraded significantly to support the increased volume of traffic. Autodesk has millions of customers worldwide that could potentially be accessing products through the cloud at the same time and the company needs to be confident that an efficient system

is in place that will not fail. Another requirement with the move to the cloud is the need for increased data storage. Clients will be storing more information in the cloud, which will take up a great deal more space. Autodesk currently has a large data center at its head office in San Rafael, California, but this will need to be upgraded. As Autodesk develops and implements this strategy, it will be important to have systems in place to communicate and share information with employees. Autodesk has a number of systems in place that hold a wealth of information for staff, however this material often resides in different locations, making it difficult for employees to find it.

3.1.2.2.2 Suggested Gap-Bridging Solution

Autodesk will need to put together a team of key individuals from the product divisions and IT to understand the back-end system requirements to support a move to the cloud. It is important this be carefully considered as the IT infrastructure plays a big role in the success of this strategy. The company will need to invest in new systems that can support a large volume of customers and will likely have to hire additional IT staff to run these new systems. Autodesk will also have to acquire new servers to support the increased data storage. Another option the company could consider is to outsource this function to a firm that already has data centres set up and available for rent. Autodesk could consider entering into a strategic partnership with a company that offers data storage, thereby reducing the need for internal systems and maintenance. Finally, to reduce the challenge of having information in multiple systems the company should provide a central location for staff to get the information they need that is easy to access and use.

3.1.2.2.3 Cost

The systems required to support the move to the cloud will likely be a significant cost to the company as it looks to implement this strategy. It will be important for Autodesk to create a pricing model that will support these costs and maintain profitability for the company. These costs are hard to quantify without greater in depth analysis and research. In addition, there will be the costs to hire any additional staff to support these systems.

3.1.2.2.4 Benefit

An investment in these systems is required to implement the move to cloud computing. It is critical that the company carefully consider the approach and the best systems as this will offer the company the greatest benefit.

3.1.2.3 Organizational Culture

Organizational culture refers to the values, beliefs and norms shared among employees in the company. The culture of an organization can have a big impact on the successful implementation of this strategy. Autodesk has a number of positive cultural attributes that will help to support this implementation. Table 3.7 lists the differences between the existing and required cultures and what is needed to address these issues.

Table 3.7 Culture for Strategic Option A

Required Organizational Capabilities	Existing Organizational Capabilities	Capability Gaps	Actions to Close Gaps
Motivated and hardworking staff	Staff are passionate about their jobs and strive for excellence	None	None
Very knowledgeable and experienced employees with autonomy to make things happen	Employees are very experienced and knowledgeable	None	None
Experiment with new ideas and efficient approaches	Constant innovation and new approaches that support the business	None	None

3.1.2.3.1 Gaps in Organizational Culture

There are no significant gaps in organizational culture as it relates to implementing this strategy. The corporate culture aligns well with an innovative approach of moving Autodesk products to the cloud and the ability to put programs together to help improve the channel.

3.1.2.3.2 Suggested Gap-Bridging Solution

There are no gap-bridging solutions required.

3.1.2.3.3 Cost

There are no additional costs.

3.1.2.3.4 Benefit

Autodesk will benefit from the existing culture as it implements the new strategy and look to drive future success, innovation and new approaches.

3.1.3 Resources

To implement this strategy Autodesk will have to ensure that the required resources are in place including operational, human, and financial resources. Autodesk is the leader in the industry and has a sound financial position in the market. The company has a great deal of resources at its disposal that it can leverage as it moves forward with this strategy.

3.1.3.1 Operational

Operational resources are the physical resources of a company and include such things as marketing, distribution, IT systems, and other processes used in the activities of the company. Access to strong operational resources is important to the success of this strategy. Table 3.8 lists the differences between the existing and required operational resources and what is needed to address these issues.

Table 3.8 Operational Resources for Strategic Option A

Required Operational Resources	Existing Operational Resources	Major Gaps	Actions to Close Gaps
Strong reputation and market share	Leader in market share and strong reputation within engineering market	Reputation of company not as well known outside of industry	Promote Autodesk brand outside of existing customer base and increase marketing efforts
Information Technology to support the move to cloud	Strong IT department with resources to support current requirements	Lacking the infrastructure required to move to cloud	Invest in additional IT resources

3.1.3.1.1 Gaps in Operational

When moving Autodesk technology to the cloud it is important that Autodesk have a strong reputation and brand recognition so customers embrace the change and consider moving to the new offering. The company will need to have technology that is stable, reliable and efficient. Autodesk is very well known with existing customers that it works with, but outside of this, most people do not know who the company is or what it does. This gap limits the market awareness of the full portfolio of Autodesk solutions and the opportunity to move into new markets. As discussed earlier under Organization Systems, IT infrastructure plays a very important role in this strategy and there currently is a gap from what will be required. This will not be discussed further as it was already covered in the previous section.

3.1.3.1.2 Suggested Gap-Bridging Solution

To expand brand reputation and awareness the company will need to consider new approaches that will attract different customers. Autodesk is looking to be a leader in Corporate Sustainability (CS) and this is helping to promote the company outside of the usual audiences.

For example, Autodesk has a Clean Tech Program, which provides free software for those companies that are developing new, clean and sustainable technologies. This has garnered a great deal of awareness in the press outside of the usual channels. As well, Autodesk's move to mobile apps has generated greater awareness in the consumer market. For example, Autodesk TinkerBox is a game played on a mobile device and is very popular with children. This is a complete divergence from the company's traditional customer, and it a great way to generate brand awareness for potential future customers. Autodesk needs to continue to use these innovative approaches to generate market awareness, as this will help to promote the move to the cloud.

3.1.3.1.3 Cost

There is a cost for the company to engage in CS and develop new ways of generating awareness in the market. However, since the company is already investing in this it should not cause a significant increase in the incremental costs.

3.1.3.1.4 Benefit

The initiatives to generate a stronger reputation and brand awareness can result in a number of benefits for the company. The first is that it offers an increase in awareness making it more likely that customers will move to cloud solutions. There are also unintended benefits that can arise. For example, the release of the mobile apps has generated millions of dollars in revenue for Autodesk. These apps were created to generate brand awareness and to try to tap into the consumer market. The success and adoption of the apps were well beyond expectations and is now a very promising revenue stream for the company.

3.1.3.2 Human Resources

Human resources (HR) refers to the people within an organization and human resource management (HRM) is about getting the right people in place with the right skills for the job. Autodesk has a large HR department that work towards getting the right people with the appropriate expertise and commitment to the company. Autodesk will need to have quite a few people with specific expertise and skill involved in implementing this strategy. A move to cloud requires people experienced with cloud computing at multiple levels in the organization. In addition, the improvement of the VARs will also need to have people with channel experience involved in developing the appropriate strategy. Table 3.9 lists the differences between the existing and required HR and what is needed to address these issues.

Table 3.9 Human Resources for Strategic Option A

Required HR	Existing HR	Major Gaps	Actions to Close Gaps
Managers at senior executive level to focus on Cloud and VARs	WWCS Management under WWSS that focuses on VARs	Senior management for cloud strategy and increased responsibility for VARs in Executive leadership	Hire new manager or promote from within for Cloud Add responsibility to Executive for VARs
Staff with Cloud experience in IT	IT staff that supports current systems	Need additional staff for the required IT infrastructure	Plan to understand staffing requirements and hire additional people
Staff with channel experience to create programs and improve communication	Channel teams in place for putting together programs and initiatives	None	None

3.1.3.2.1 Gaps in Human Resource

There are additional human resources needed to implement this strategy. First, Autodesk will have to add people in management to implement the move to the cloud as this strategy will have implications for almost all divisions in the company. It will be important that someone be in place that can help to drive the development and work with all of the groups to ensure a well-planned strategy. As discussed earlier there is also a gap in the staff required to implement the cloud strategy. This will require additional IT and labour to support these systems.

3.1.3.2.2 Suggested Gap-Bridging Solution

Autodesk will need to hire a senior manager to lead the cloud strategy. This will ideally be someone who has Autodesk experience as well as experience in implementing cloud solutions. The HR department will also need to work with the team who is responsible for the development of the cloud strategy to understand the additional staff required to support the IT systems. It is important that the strategic plan already be developed, as this will help to ensure that the right people with the right skills are hired. The company should expand the responsibility of the existing Executive leadership to include the VARs as a focus. For some of the key divisions mentioned above the company may want to consider hiring new individuals to drive a VAR focus within those specific groups and to collaborate with other divisions.

3.1.3.2.3 Cost

There will be a cost for the required increase in staff for the cloud solution. This will include the cost for new management staff with the highest cost being the increase in IT staff to support the systems. It will take greater analysis to determine what this cost will be. Autodesk

currently has 7300 employees worldwide, so it is unlikely that the increase in staff will be significant compared to the already large global staff.

3.1.3.2.4 Benefit

The increased focus from management on this strategy will be important in ensuring coordination across divisions and support from executive leadership. The increase in staff is necessary for the success of this strategy.

3.1.3.3 Financial

Financial resources refer to the cash flow, investments and capital of the company. Autodesk has a very strong financial position with \$2.2 billion in revenues in 2011, \$1.6 billion in cash and other liquid assets and zero debt (Autodesk Inc., 2012). Table 3.10 lists the differences between the existing and required financial resources and what is needed to address these issues.

Table 3.10 Financial Resources for Strategic Option A

Required Financial Resources	Existing Financial Resources	Major Gaps	Actions to Close Gaps
Cash for R&D for cloud solutions	27% of revenue in 2010 was spent on R&D	None	None
Cash (revenue) to pay for increase in staff focused on cloud	\$2.2 billion in revenue and \$1.6 billion in cash	None	None

3.1.3.3.1 Gaps in Financial

Autodesk is in a very strong financial position and should not have any issues supporting the implementation of this strategy. In 2010, the company invested 27% of revenues back into R&D with this ratio being consistent year over year (Autodesk Inc., 2012).

3.1.3.3.2 Suggested Gap-Bridging Solution

There are no gap-bridging solutions required.

3.2 Assessment of Strategic Alternative B

Strategic alternative B also considers moving all of Autodesk's core technology to the cloud, as in option A. However, instead of an increased focus on the VARs, the company would eliminate the channel and sell all products direct to customers. The move to cloud will enable the company to simplify the purchasing process and offer products directly online, eliminating administration requirements and costs. This makes it a good time for the company to consider moving away from the VARs and offering products direct.

3.2.1 Management Preferences

Management preferences related to moving to cloud computing were considered in the earlier section, so this discussion will focus on the move away from the reseller channel.

Autodesk has been selling products through the VARs for over 25 years and a move away from this would be a very big shift in strategy. It would require full support of management and a carefully planned approach. This change would affect all areas of the company and may be

viewed as risky by shareholders, which could be reflected by changes in the stock price. Both the move to cloud computing and the elimination of the VARs are very big strategic changes for the organization, unlike Strategic Alternative A, which introduced one major strategic change with the move to cloud. The elimination of the VARs is a much more contentious issue that would require careful consideration.

3.2.1.1 Management Objectives

Table 3.11 below compares the required objectives against actual and identifies the gaps.

Table 3.11 Management Objectives for Strategic Option B

Management Subject	Required Preferences	Observed Preferences	Major Gaps	Gap-Closing Analysis
CEO	Lead the organization to support the move to eliminate the VARs	Stated the importance of the VARs to Autodesk's long-term strategy	Different perspectives on the importance of VARs as part of the strategy	Need to endorse move away from channel and focus company on the new opportunity Strong communication plan for shareholders and analysts
Executive Officers	Understand the impact of changes across divisions and support the move across all teams	VARs are important to some executive groups resulting in different levels of support for the channel	Corporate strategy includes VARs as a primary distribution VARs play a large role in WWSS division	Change strategy and understand implications for all divisions and for existing VARs Eliminate management positions that currently focus on VARs
Regional Vice Presidents	Understand the impact of changes for each region and develop implementation strategy	Interest in own divisional and regional success drives focus Regional VP's provide direction to VAR executive staff	Divergent goals can lead to misalignment and conflicting actions among groups	Increase cross-divisional teams to collaborate Understand legal issues in each region and implications
Mid-level Management	Communicate changes with staff well in advance and engage them in process	Limited communication with employees on important changes	Employees not involved in the process or aware of changes until last minute	Empower managers to share more with staff and engage in process early on

3.2.1.1.1 Gaps in Management Objectives

The VARs are a very large part of Autodesk's strategy and a change will require a big shift in management thinking within the company. The CEO is heavily focused on the innovative technology that Autodesk can offer the market, making the move to cloud computing a great fit for his vision. Although he has not been as vocal regarding the VARs as a part of the vision, he recently stated that "they're an integral part of our plan going forward" and "you have to know how important our channel partners are to us and all the plans we're putting in place to make sure they're successful along with us." (Autodesk Inc., 2011) Bass has also supported an increase in the hiring of direct sales positions over the last year, which seems contradictory, but his statements reflect the fact that the VARs are an important part of Autodesk's strategy moving forward. The stock market analysts also look at changes to the VARs very closely as disruption in the channel could potentially have a large impact on Autodesk's revenues. Being a public company, shareholder expectations are very important and senior management is always ensuring their actions do not generate negative press.

To move forward with this strategy it will also be critical that the executive leadership teams support this change, as they will be responsible for ensuring a successful implementation across the organization. Currently, different teams have varying levels of interaction with the channel and there may be greater resistance by some groups to make this move. For example, the WWCS team in WWSS accounts for approximately 4% of the total employees at the company. This team is focused solely on the channel and a move away would greatly affect the structure of this group and change the focus of the staff. The CEO would have to drive this change in order to ensure a smooth transition and buy-in from executive leadership as there will likely be resistance by key members of the inner circle. The regional teams will also be affected by these changes,

particularly the WWSS teams in each country. The VP's and managers for these groups will have to work together to come up with a plan that will be clearly communicated prior to implementation and will leverage the expertise of key individuals in each of the regions. A strong communication plan would be required to try to avoid backlash from external stakeholders such as VARs, shareholders, and customers. Currently, the VARs serve an important function in supporting and training customers. Management would have to be prepared to address how Autodesk will ensure this support will continue when the company moves to a direct model. The regional VP's and mid-level management are more likely to interface with the VARs and would need to consider any potential legal ramifications from eliminating the channel. Autodesk is contractually obligated to the VARs and the details of these contracts will vary depending on the region and the laws of each country. It is critical that the regional management be aware of this as they are putting together the plans and communicating out any changes.

3.2.1.1.2 Suggested Gap-Bridging Solution

A significant amount of planning and consideration has to happen at multiple levels of the organization in order to make this successful. The CEO currently does not support the elimination of the channel, so to change that would require a major shift in his current thinking. This is the same for a number of individuals on the executive leadership team who run divisions closely aligned with the channel business. Senior management faces significant obstacles, such as concern from shareholders, market analysts and the legal challenges of eliminating the VARs, making it almost impossible for this change to happen immediately. Management will need time to address the internal changes, communication to external stakeholders and the ramifications with the channel. The VAR business accounts for approximately 85% of overall revenues and sudden changes without a strong plan could result in panic in the market and significant internal

disruption, resulting in a drop in profits and share price. As the blame for this would ultimately fall on senior management, this strategy increases their risk, making this decision one that needs to be considered carefully and approached with caution. This would make them less likely to undertake two major strategic initiatives at the same time, the move to cloud and eliminating the VARs.

To support this strategy Autodesk will also have to restructure management, as there will no longer be the internal resources required to deal with the channel and managing all of the programs. As mentioned earlier, this will affect at least 4% of employees and is something that management will need to consider and determine how to move people to other roles or look at layoffs. This will also build internal resistance to this strategy making it more difficult to implement. Autodesk management will also need to invest time and resources into improving internal support mechanisms to be able to support customers with a direct sales model. Further analysis of this strategy may show that eliminating the VARs could increase profitability and reduce costs, however at this time it does not align with management preferences and introduces too much risk. As such, this strategic option will not be considered any further for the purposes of this paper.

3.3 Assessment of Strategic Alternative C

The final strategic alternative that was proposed is for Autodesk to maintain a strategy similar to what it is today, which is to continue to offer its core solutions as only desktop products, and have some specific applications available on the cloud as part of Subscription. There would not be much change required to implement this strategy with the exception of new

applications and enhancements. The risk with this strategy is that Autodesk will miss the anticipatory change that is needed, resulting in a weaker market position. The company could eventually be forced to change if revenues were to decrease, resulting in a shorter timeframe to react and increasing the potential for problems.

3.3.1 Management Preferences

Option C requires management preferences to stay in line with the current direction of the company. The senior executives have experience with the existing strategy and the requirements to implement.

3.3.1.1 Management Objectives

Table 3.12 below compares the required preferences against the actual preferences and identifies the gaps.

Table 3.12 Management Objectives for Strategic Option C

Management Subject	Required Preferences	Observed Preferences	Major Gaps	Gap-Closing Analysis
CEO	Continue leading the company on the existing path with core solutions being offered on desktop	Entrepreneurial mind-set with a focus on innovation, cloud solutions and technology	Maintaining existing strategy limits ability to keep up with industry and continue with innovation	CEO would need to be replaced with someone more conservative
Executive Officers	Continue to drive strategy among divisions and support the move across all teams	Work together to present united strategy and corporate focus	None	None
Regional Vice Presidents	Continue to support regional teams and plan for future growth and opportunity	Current strategy has shown success among divisions	None	None
Mid-level Management	Provide support for teams and promote current technology strategy	Industry feedback includes the requirement for changes to support customer business challenges	Feedback from the field is not reaching senior executives	Increased communication to identify how current strategy can meet customer requirements

3.3.1.1.1 Gaps in Management Objectives

The biggest gap in management objectives is the preferences of the CEO, who has been very outspoken with his approach of leading the industry with innovative technology and the opportunity with cloud solutions. This is in stark contrast to the proposed strategy, which allows for some cloud applications but maintains Autodesk’s core technology on the desktop. The CEO would not align with this strategy, as his vision is to continue to lead industry and innovate.

There are not many observed gaps with the Executive Officers and the Regional VP’s, as they

would be continuing with the existing strategy. This proposed strategy would result in a potential gap with mid-level management, as these teams are in the field receiving feedback from customers and industry. Customers are looking for products that are less expensive, flexible and easier to use and implement. If Autodesk maintains the current strategy, it may miss the opportunity to capitalize on this business need, leaving the door open for increased competition.

3.3.1.1.2 Suggested Gap-Bridging Solution

The gap between CEO objectives and the requirement for the strategy is so great that it would require significant action to correct. Autodesk would have to bring in a new CEO whose vision is more in line with this direction. Senior executives will also need to increase communication with mid-level management to explain this approach so this information is communicated to customers to address industry concerns. It would be important to have a clear and consistent message to ensure all stakeholders understand the company position in maintaining this strategy. This strategy does not align with the CEO and could create an environment where customer feedback is overlooked, jeopardizing the leadership position of Autodesk. Since this strategy is likely to fail, this paper will no longer consider this as a viable option.

4: Chapter Four: Final Recommendation

Based on the implementation analysis in Chapter 3, the recommended alternative for Autodesk is Strategic Alternative A, the move to cloud computing for Autodesk's core technology and an improvement in the capacity and capability of the VARs. The requirements to implement this strategy align well with management preferences and are feasible based on the organizational structure and resources. Although changes are required, Autodesk is in a good position to embrace these changes and move the company forward with a strong strategy that will provide strong competitive advantages in the market.

4.1 Sub-recommendations

As discussed earlier, Autodesk will have to invest in some changes to fill the existing gaps and ensure the internal capabilities can support a move to the cloud and improvement in the channel. Table 4.1 provides a re-cap of these recommended changes required to implement this strategy.

Table 4.1 Sub-Recommendations for Strategic Alternative A

Recommended Changes
Increased focus by CEO and Senior Executive to identify problems with VARs, solutions and reduce conflicting messaging
Hire a new experienced manager or promote from within to focus on the move to cloud
Increased collaboration across the teams to identify issues and solutions
Develop a plan to understand staffing requirements and hire additional people
Cross-divisional team that includes product division and IT to focus on move to cloud
Empower managers to share more with staff and engage in process early on
Consistent training, coaching, messaging from Regional VP's and Executive
Involve all levels of the company in the change process and be open to suggestions and feedback
Promote increased interaction among staff in a region and meet with smaller groups for higher quality feedback for executives
Promote Autodesk brand outside of existing customer base and increase marketing efforts
Implement a process to better direct and provide access for employees to relevant systems
Invest in additional IT resources and increase data center for storage

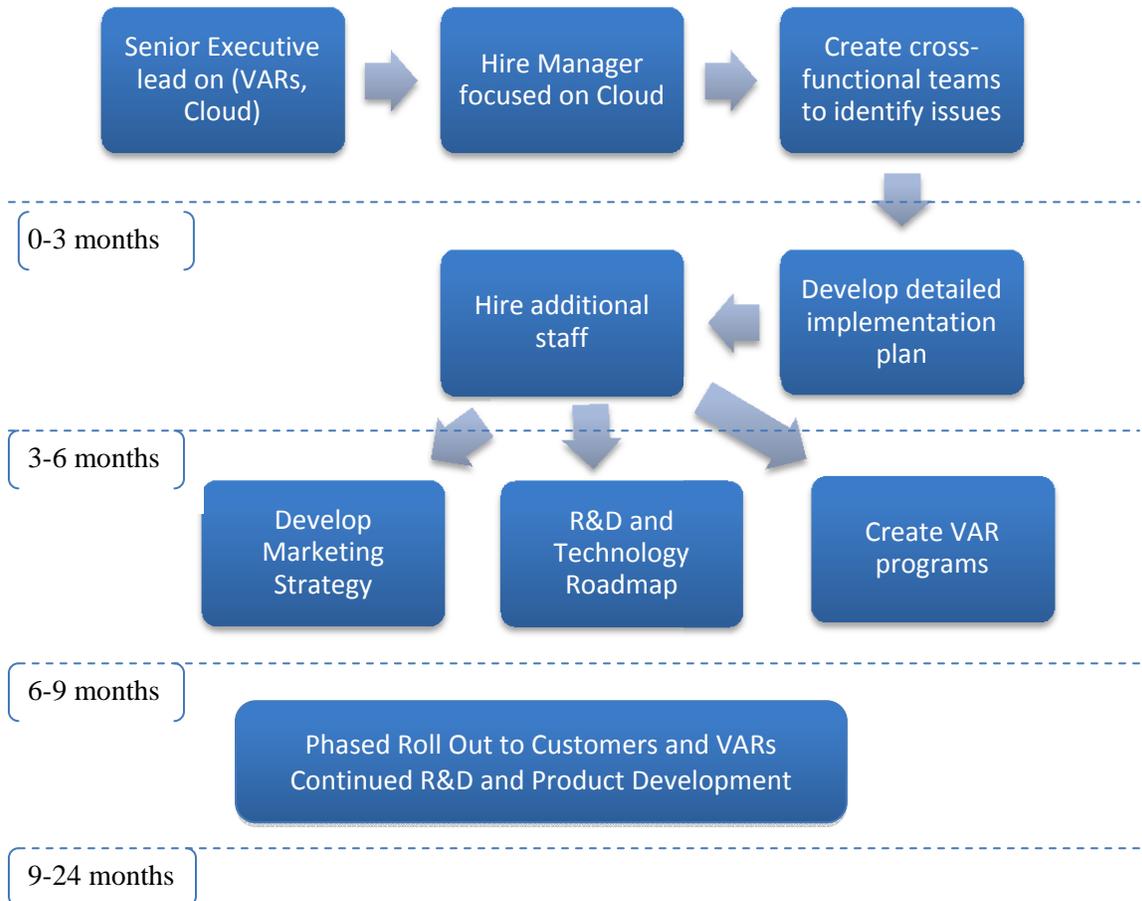
In order to implement this alternative the CEO and Senior Executive team will need to drive a top down approach by changing the direction of the company and the focus of the staff. An improvement in the VARs should begin with increasing the senior executive's responsibility for the channel across all divisions and having the teams work together to identify the issues and potential solutions. The senior teams should also work with the employees who deal with the VARs to develop a realistic and actionable plan. Once the gaps are identified, the teams can then come up with programs and initiatives that can be rolled out to the channel. The first step to move forward with a shift to the cloud is to hire a manager and leader who has experience in cloud solutions and can provide a higher level of expertise and knowledge that the company can use to its advantage. This person will be critical to the development of the detailed implementation plan and will lead the creation of cross-functional teams. The company will need

to continue to invest in R&D and develop a comprehensive plan, as this will define the requirements for the increased investment in IT systems, hiring of new staff and marketing to promote the new solutions. There will also be additional intangible costs with implementation requiring a process change in many of the divisions as new systems and approaches are used. It is also critical that there be communication between the team focused on improving the VARs and the team responsible for the move to cloud because having the channel ready to promote this change and support customers will benefit Autodesk. Another change required is the increase in communication and collaboration from all levels of management with employees. This needs to start with senior leadership who can help promote an open style of communication and encourage honest feedback from staff through increased collaboration. As well, training across all levels of management that focus on a participative leadership style will ensure consistency in the approach and communication to staff.

4.2 Timeline

Figure 4.1 provides a flowchart of the steps required to implement strategic alternative A as well as a proposed timeline for the implementation. As this strategy is driven by anticipatory change, Autodesk is not under pressure to implement this immediately and can take some time to ensure that a well thought out implementation plan is developed. However, due to the rapidly changing environment in the technology industry and the fact that it is critical to hold on to a leadership position, it would be in Autodesk's best interest to be first to market with this strategy and to take advantage of its already large customer base. Management will have to avoid the issue of complacency that can often arise with anticipatory change and ensure that these leaders continue to drive the company forward.

Figure 4.1 Flowchart and Timeline



During the first three months of the implementation, the Senior Executive teams will focus on communicating the strategy to the rest of the organization and will get the right leadership team in place to propel this forward. They will also identify cross-functional teams that will be responsible for coordinating across divisions and helping to move this forward. The next three months will be spent focusing on developing the detailed implementation plan and hiring people either externally or internally to help successfully roll out the implementation. After six months, the company should have a clear plan and can move into the actual

implementation, which will include the roll out of a marketing strategy, R&D to get the products ready to go to market and the development of the VAR programs. All of these activities will include people from multiple divisions who will be critical to the success of the implementation. These activities will also continue beyond the nine-month timeframe, as the company should be continually refining and updating the programs and strategy.

In addition, Autodesk is always investing in R&D and this will continue to include the cloud solutions well into the future. The delivery to the resellers and customers should be a phased approach. Autodesk will need to identify some key VARs to participate in the programs to ensure success before rolling them out across the globe. In addition, the company should begin by offering only one or two of the core products on the cloud to test the systems and address any challenges before rolling it out on a larger scale. Within two years the company's goal should be to have moved the majority of their solutions to the cloud and have these available to customers. Although the timeline may seem short for a company as large as Autodesk, it is attainable and will help to ensure Autodesk cloud solutions are first to market in the engineering design software industry and the VARs are ready to support the changing technology.

4.3 Conclusion

Autodesk is well positioned to benefit from the great advantages that cloud computing can offer both the company and the industry as a whole. As a leader in the engineering design software industry, Autodesk can build on its existing strengths by improving the success of the channel and continuing to lead with innovative technology solutions. The move to the cloud will provide important sources of competitive advantage and is a strategy that will help to ensure the Autodesk's success long into the future.

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