STUDYING THE DEVELOPMENT CONCEPTIONS OF A NEW COMPANY
AND ASSOCIATED INFORMATION SYSTEM USING THE STIN STRATEGY

A Dissertation in
Information Sciences and Technology

by

Michael E. Reinert

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The dissertation of Michael E. Reinert was reviewed and approved * by the following:

David L. Hall  
Professor of Information Sciences and Technology  
Dissertation Co-Adviser  
Co-Chair of Committee

Steven B. Sawyer  
Associate Professor of Information Studies  
Dissertation Co-Adviser  
Co-Chair of Committee

Andrea H. Tapia  
Associate Professor of Information Sciences and Technology

Dan T. Stearns  
Styer Professor of Horticultural Botany

Michael McNeese  
Professor of Information Sciences and Technology  
Professor-In-Charge

*Signatures are on file in the Graduate School
Abstract

Through this dissertation I contribute a more detailed understanding of the central social and technical design conceptions for developing an information system, in this case belonging to a company referred to here as Staying Green. Specifically, findings show that the current design conceptualizations for Staying Green’s information system are based on a combination of commonly held, explicit, views of technology and implicitly held assumptions about people and information. By developing an alternative view of technology and different assumptions about people and information - building on concepts from social informatics researchers and theories - new design conceptions emerge. These new design conceptions expand the definition of an information system and its relationship to Staying Green, their services, and their licensees.

This dissertation focuses on the dual nature of Socio-Technical Interaction Network (STIN) as both a conceptual frame and research approach. With this focus I both draw from then contribute to STIN development in three ways. First, I articulate that STIN focuses attention to social change rather than simply a technical change with social consequences. Second, I argue that STIN should focus on the values associated with information. Third, the STIN approach is developed here using a macro-micro design to situate the case study into a larger industry before addressing design conceptions.
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1.0 Introduction

1.1 Overview

Through this dissertation I pursue a more detailed understanding of the central social and technical design conceptions for developing an information system. The particular design conceptions and information system for this study belong to a company, referred to here as Staying Green, that provides business support services to the landscape contracting industry.

This research is framed by detailed conceptualizations of information, technology, and people through the Socio-Technical Interaction Network (STIN) strategy, because of its attention to interdependencies between social and technological structures, actions, and the situated nature of these connections. The STIN strategy is a conceptual approach that affords a view into socio-technical systems that is more nuanced than possible with other approaches.

Staying Green provides a unique, systems approach to the problem of business development issues in the landscape contracting industry. Staying Green formed to address this issue but brought a business model from other domains. The business model, along with expertise from those in the landscape industry, has resulted in a unique approach to the problem of business development for the landscape industry.

Taking the perspectives offered by social informatics and specifically STIN, combined with a systems approach to business development offers a view of design conceptions for information systems rarely available. The outcomes from this research are:
1. A review of current issues in the landscape contracting industry with a focus on business issues,

2. A review of the choices available to landscape contracting companies for seeking help with business development issues,

3. Detailing the standard model for the current development of Staying Green and their associated information system,

3. Developing an alternative model for the current development of Staying Green and their associated information system.

The outcomes for this research are made possible using the STIN strategy and a macro-micro approach. A macro-micro design approach focuses attention to first detailing the landscape contracting industry, its people, and the problems Staying Green and their information system are trying to solve. Then the research uses a case study of Staying Green and their clients to place the problems into further context. Placing the industry, its people, and problems into context, combined with a detailed analysis of the current design conceptions, allows for the development of alternative design conceptions.

The study includes seven semi-structured interviews and document analysis in the macro portion and one case study with ten associated semi-structured interviews, document analysis, and participant observation in the micro portion.

**1.2 Intellectual Merits and Motivation**

This research contributes to social informatics by extending the STIN strategy. Specifically, the STIN strategy is extended by taking a unique approach and by studying the development of Staying Green’s business model, and service, as well as the associated information system.
Various methods have been used to provide landscape contracting businesses with the ability to improve their operations with regards to growth, profitability, and productivity. The model Staying Green pursues is interesting because it takes a socio-technical approach from inception, a contrast from the more typical rationalist economic model pursued by many consultants. Staying Green is a small but growing company located in the eastern region of the United States. The company has been in existence for about five years and consists of a board comprised of industry professionals and experienced business people from other industries, with a staff of six. The company has twelve landscape contracting clients around the United States. Staying Green offers a licensing arrangement that assists their clients in sales and marketing, human resource management, operations management, and business management.

For at least six reasons this study is situated in Staying Green and the landscape contracting industry. First, Staying Green uses an innovative socio-technical approach to the problem of business development in the landscape contracting industry. Second, the industry has historically been structured around small and medium-sized businesses, a relatively under studied area of research. Third, the industry seems to be in the throes of changes including their own evolving views on the work in their industry, customers’ changing views of the value of the work in their industry, and global environmental concerns. Fourth, and more recently, inflated consumables and materials prices along with a weak housing market strain the industry’s capacity to survive an economic downturn. Fifth, many companies in the industry have underdeveloped conceptions about and implementation of business development practices. Sixth, many companies in the industry have difficulty selecting and implementing information and communication
technologies as a competitive advantage. These six reasons make this a superb time to study design conceptions for an information system situated in Staying Green and the landscape contracting industry.

At a personal level, interest in conducting this research comes from my background combining my undergraduate education in landscape contracting, landscape contracting industry experience, and years of teaching experience in the Pennsylvania State University’s landscape contracting program with my industry experience in information technology and formal education in Information Sciences and Technology focusing on organizations, business, and technology. I earned a Bachelor of Science degree in landscape contracting from the Pennsylvania State University, an interdisciplinary major including studies of horticulture, design, and business. After graduation, I worked for a landscape contracting company and observed many problems including a general lack of ownership business skills. Later, I taught in the Pennsylvania State University’s landscape contracting program and interacted with many industry leaders and their businesses. I also participated in a 2006 program review of Penn State’s landscape contracting program that included thirty representatives from the landscape contracting industry. The reviewers noted that the business skills developed by the Penn State students were unique to the program and important for their future work in the industry. They also noted that many landscape companies were missing these key business skills.

I have also worked as an information technology professional and experienced the effects of systems designed without taking social informatics principles into account. Not only were the principles of social informatics missing in much of the system development
work but also in the skill set of those implementing and maintaining the information systems, including me. My course work and research in Information Sciences and Technology affords me a broader understanding of the problems witnessed, allowing me to formulate potential solutions for the future. Combining knowledge of a specific domain, landscape contracting, along with experience and education in information technology results in enhanced ability to perform this study, interpret the results, and contribute to each domain.

1.3 Broader Impacts

Through this particular research I make two contributions, one to the academic literature of social informatics and STIN and the other to the landscape contracting domain, thus expanding the understanding of the relationships among information and communication technologies (ICTs) and people in context, as is consistent with social informatics research. Even though much research has focused on information systems design and use, we have a long way to go to understand the range and effects of social actions related to the design and use of technology (Bijker & Law, 1992; Kling, McKim, & King, 2003). Second, this study contributes to a broader research agenda centered on the relationships among information technology and people. Specifically, it contributes to the STIN strategy employed in social informatics research.

The findings of this research will be published not only for those involved with social informatics research but also for those in the landscape contracting domain, thus encouraging this community to deal with one challenge by providing information to enhance the awareness, detailing the issue, and providing one company’s potential solution.
1.4 Background

1.4.1 Information Systems and Socio-Technical Change

Information systems development continues to be an academic and professional issue, possibly because it is both a relatively new and very complex phenomenon. For all the knowledge we have accumulated about information systems development, research shows that we still have much to learn (Orlikowski & Baroudi, 1991). The literature is full of examples of failed information systems including a lack of understanding of the domain and particular situation for which the information system is being developed (Rosenbaum & Joung, 2004). One attempt from the research community to both understand and guide future information systems design comes from an area of research called social informatics.

Social informatics was advanced by the late Rob Kling and his close colleagues in an attempt to better understand the development and use of information and communication technologies as situated in social context (Kling, 1999; Kling, McKim et al., 2003; Kling, Rosenbaum, & Sawyer, 2005). Social informatics follows a rich development of theories and perspectives centered on the relationship between information and communication technologies and social organization. Placed between technological determinism (Grint & Woolgar, 1997) and the social construction of technology (Law & Callon, 1988), social informatics was developed from the principles of actor network theory (Latour, 1987). For the purposes of this research, the strategy called socio-technical interaction networks (STIN) is used in this research to provide perspectives pertaining to social informatics.

The STIN strategy serves as an alternative to the more common perspectives on information system development that come from the field of Management Information Systems.
Systems (MIS). These MIS programs are typically housed in business schools and have a focus on managerial choice from an economic perspective. A theory review of social informatics and STIN, along with competing perspectives from MIS is covered in chapter Two, Theory.

1.4.2 Landscape Contracting Industry – Literature Review

1.4.2.1 Green Industry

The words green and industry appear frequently together in the popular press today. One example is Business Week’s website section on green computing (Business Week, 2008). Typically the popular press is referring to the environmental movement as it relates to companies and industries. Long before these words were used in the popular press for today’s context, the green industry referred to the landscape industry. The use of the term green refers to the fact that most of the plant material used in the landscape is green.

For the purposes of this dissertation, the green industry is made up of businesses involved in the following:

“production, distribution, and services associated with ornamental plants, landscape and garden supplies and equipment. Segments of the industry include wholesale nursery, greenhouse and sod growers, landscape architects, contractors and maintenance firms, retail garden centers, home centers and mass merchandisers with lawn and garden departments, and marketing intermediaries such as brokers, horticultural distribution centers, and re-wholesalers. In addition to the commercial sectors, there are many state and local governments with significant urban forestry operations” (Hall, Hodges, & Haydu, 2005, pg. 1).

1.4.2.2 Economic Impact of the Green Industry in the United States

The landscape contracting industry is a rapidly growing and developing industry. The landscape contracting community, in 2002, contributed $147.8 billion to the U.S. economy (Hall et al., 2005). However, the average annual revenue for companies in the
industry is $630,000 (Wisniewski, 2007b). The economic impact of the green industry in the United States is displayed in Table 1.

### Table 1. Summary of Economic Impacts of the U.S. Green Industry by Sector, 2002

<table>
<thead>
<tr>
<th>Industry Group/Sector (NAICS)</th>
<th>Output ($Mn)*</th>
<th>Employment (jobs)</th>
<th>Value Added ($Mn)*</th>
<th>Labor Income ($Mn)*</th>
<th>Indirect Business Taxes ($Mn)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production &amp; Manufacturing</td>
<td>34,578</td>
<td>300,677</td>
<td>20,796</td>
<td>11,037</td>
<td>784</td>
</tr>
<tr>
<td>Nursery &amp; Greenhouse (1114)</td>
<td>26,053</td>
<td>261,408</td>
<td>18,076</td>
<td>9,612</td>
<td>647</td>
</tr>
<tr>
<td>Lawn &amp; Garden Equipment Mfg (333112)</td>
<td>6,281</td>
<td>37,343</td>
<td>2,610</td>
<td>1,346</td>
<td>129</td>
</tr>
<tr>
<td>Greenhouse Mfg (332311)</td>
<td>244</td>
<td>1,927</td>
<td>110</td>
<td>78</td>
<td>7</td>
</tr>
<tr>
<td>Horticultural Services</td>
<td>57,774</td>
<td>753,557</td>
<td>39,013</td>
<td>30,269</td>
<td>1,387</td>
</tr>
<tr>
<td>Landscaping Services (56173)</td>
<td>52,971</td>
<td>704,875</td>
<td>35,564</td>
<td>27,719</td>
<td>1,312</td>
</tr>
<tr>
<td>Landscape Architecture (54132)</td>
<td>4,803</td>
<td>48,683</td>
<td>3,449</td>
<td>2,549</td>
<td>74</td>
</tr>
<tr>
<td>Wholesale &amp; Retail Trade</td>
<td>55,475</td>
<td>910,104</td>
<td>35,275</td>
<td>23,044</td>
<td>4,701</td>
</tr>
<tr>
<td>Wholesale Flowers, Nursery Stock and Florist Supplies (42293)</td>
<td>2,879</td>
<td>68,969</td>
<td>1,907</td>
<td>1,130</td>
<td>440</td>
</tr>
<tr>
<td>Garden Equipment Wholesale (421820)</td>
<td>4,146</td>
<td>40,617</td>
<td>2,737</td>
<td>1,601</td>
<td>657</td>
</tr>
<tr>
<td>Lawn &amp; Garden Stores (4442)</td>
<td>22,859</td>
<td>347,916</td>
<td>14,806</td>
<td>9,747</td>
<td>1,810</td>
</tr>
<tr>
<td>Building Material Supply Stores (4441)</td>
<td>9,982</td>
<td>123,591</td>
<td>6,491</td>
<td>4,258</td>
<td>789</td>
</tr>
<tr>
<td>Florists (4531)</td>
<td>6,195</td>
<td>200,451</td>
<td>3,977</td>
<td>2,725</td>
<td>401</td>
</tr>
<tr>
<td>Food &amp; beverage stores (445)</td>
<td>2,263</td>
<td>35,117</td>
<td>1,385</td>
<td>944</td>
<td>156</td>
</tr>
<tr>
<td>General merchandise stores (452)</td>
<td>6,150</td>
<td>93,443</td>
<td>3,973</td>
<td>2,639</td>
<td>448</td>
</tr>
<tr>
<td>Total All Sectors</td>
<td>147,828</td>
<td>1,964,339</td>
<td>95,084</td>
<td>64,349</td>
<td>6,872</td>
</tr>
</tbody>
</table>

* Values expressed in 2004 dollars (GDP Implicit Price Deflator, U.S. Department of Commerce)

Source: (Hall et al., 2005)

### 1.4.2.3 Growth in the Green Industry

“The green industry is one of the fastest growing sectors in the nation’s agricultural economy” (Hall et al., 2005). As seen in the following figure, much of that growth is contributed to the Landscape and Horticultural Services sector.

![Figure 1. Growth in Output of U.S. Green Industry Sectors, 1997-2003](image)
1.4.2.4 Green Industry Sectors

The green industry consists of several sectors including production and manufacturing, wholesale and retail trade, and horticultural services firms. Each of these sectors is unique; however, the horticultural services sector is the focus of this research.

1.4.2.4.1 Production and Manufacturing

Production and manufacturing, referred to in Figure 1 as Nursery and Greenhouse, includes firms such as nurseries, greenhouses, and sod farms. Each of these types of firms grows specific kinds of plants for different uses. While these firms are a significant sector of the industry, they are not the focus of this study.

1.4.2.4.2 Wholesale and Retail Trade

Wholesale distribution firms, referred to in Figure 1 as Retail Nurseries & Garden Stores, are part of the industry supply chain. They act as intermediaries to facilitate the transactions of growers and retailers. They help to move plant material across the country and around the world. Again, although they are a significant sector of industry, they are not the focus of this study.

1.4.2.4.3 Horticultural Services Firms

One sub-classification of the green industry is the horticultural services firm, referred to in Figure 1 as Landscape & Horticultural Services. These firms provide design services, installation or construction services, and maintenance services to residential, commercial, and municipal clients. Design/Build firms typically perform a combination of services including design, construction, and maintenance (Hall et al., 2005). Another type of firm is the landscape construction firm, which focuses on the building of landscapes. Landscape maintenance firms provide a large array of...
maintenance services, some which focus solely on lawns. The horticultural services firms sector of the green industry is the fastest growing and is the subject of this study.

Hall (2005) lists 82,683 landscape contracting companies. The average company has approximately $625,000 in revenue per year (Wisniewski, 2007a). From the list of top 100 revenue-producing landscape contracting firms in the country, eight firms earned more than $100 million. By the end of the top 100 list, firm number 100 earned $15.5 million. The remainder of the firms rapidly decrease in revenue earned per year. A graph of revenue size compared to number of companies appears in Figure 2.

Figure 2. Landscape Company Tiers

<table>
<thead>
<tr>
<th>Tier</th>
<th>Number of Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 1 (&gt; $100 Mil.)</td>
<td>8</td>
</tr>
<tr>
<td>Tier 2 ($15 to $100 Mil.)</td>
<td>85</td>
</tr>
<tr>
<td>Tier 3 ($5 to $15 Mil.)</td>
<td>100+</td>
</tr>
<tr>
<td>Tier 4 ($2 to $5 Mil.)</td>
<td>1000+</td>
</tr>
<tr>
<td>Tier 5 (&lt; $2 Mil.)</td>
<td>10,000+</td>
</tr>
</tbody>
</table>
Figure 2 represents landscape contracting companies distributed by tiers broken into revenue amounts by the number of companies in that Tier. For the purposes of this study, Tier 4 is the group of interest. Tier 4 is the target business size for Staying Green licensees, due to their stage of development with respect to revenue. At Tier 4, companies have potentially experienced the issues Staying Green’s services attempt to address and potentially have the revenue to afford Staying Green’s services.

1.5 Staying Green

The landscape contracting industry has various supporting entities that seek to address issues of business development. For example, there are consulting firms like J.R. Huston Enterprises (http://www.jrhuston.biz), franchise operations like Lawn Doctor (http://www.lawndoctor.com/), and professional organizations like the Professional Landcare Network (http://www.landcarenetwork.org/cms/home.html) all focused on business development. As the industry matures, the leaders of Staying Green think that a new approach is needed to assist firms in business development.

Staying Green helps their licensees implement and monitor business development principles by creating a range of services supported by an information system, which is an integral part of the services they offer and is used by the company’s employees, and licensees. This company, their services, and their supporting information system are interesting because of the unique, socio-technical approach they take from the outset. Staying Green is not a landscape contracting company. Rather, Staying Green works on a licensing model chosen to encourage a long-term relationship between company and licensee. The long-term relationship allows for a continuous transfer of educational
information from company to client based on ongoing information collected by the client and Staying Green. The long-term commitment between company and client is unique in the landscape contracting industry.

Another reason for studying Staying Green is the unique individuals that were brought together to start the company. The board consists of experienced industry professionals, educators, and business people from other industries that have experience with business models similar to that of Staying Green. Overall, Staying Green provides a unique approach to a long-term problem in the landscape contracting industry by using a new model for operation as well as a diverse set of people to serve as board members.

The main issue for the company is education related to business development. They educate by translating general business development information into action in their licensees’ businesses and then monitor the progress with respect to economic issues like growth, profitability, and productivity and human issues like hiring and retention?

An important issue for the landscape industry is how companies provide employees with careers rather than jobs. The industry has expanded rapidly and provided many jobs, but many of these jobs don’t include health care and retirement benefits. Finally, how does Staying Green address the business development issues of their clients while also addressing the pressures from a changing client demographic, changing environmental pressures, increased fuel prices, continued labor shortages, and a weak housing market?

1.6 Research Questions

The broadest consideration for this dissertation is with socio-technical issues related to designing and using ICTs. This question is part of the central research agenda
in the trans-disciplinary field of social informatics (Kling et al., 2005). The main research question for this dissertation is: What are the design conceptions for the development of Staying Green’s information systems? A related question is: What are the design conceptions for the development of Staying Green?

As is the case with most field studies, and particularly for STIN-based studies, these research questions are used to construct the interview topics, questions, and list of interviewees. The responses provided allow for the construction of a standard model and alternative model to the conceptions involved with the development of an information system and related company. This research continues the tradition of discovering new methods in designing, using, and supporting information systems in context.
2.0 Theory Overview

Through this section I discuss three competing perspectives and associated theories relative to this work. These three perspectives and associated theories represent those of the researcher and Staying Green. I return to these in chapter five where I examine the competing perspectives in context of the case study. Second, these competing perspectives and associated theories represent views of information, technology, and people crucial for the analysis in chapter five.

2.1 Social Informatics and Associated Theories

Social informatics focuses on the relationships among ICTs and the larger social context in which they exist. Specifically, social informatics is defined as, “the interdisciplinary study of the design, uses and consequences of information technologies that takes into account their interaction with institutional and cultural contexts” (Lamb, Sawyer, & Kling, 2000, pg. 1614). Another way of understanding social informatics is described as, “…a descriptor to represent research that shares a common perspective (and often common findings), but is found in a range of disciplinary literatures. In this way, social informatics helps to give voice to common findings dispersed in various research” (Sawyer & Eschenfelder, 2002, pg. 429).

Social informatics scholars hold several premises. First, “…ICTs and the social and organizational settings in which they are embedded are in a relationship of mutual shaping” (Lamb et al., 2000, pg. 1614). Second, “their analyses frequently challenge commonly held assumptions about information technologies, and often attempt to improve the lives of the people who work and play with ICTs” (Lamb et al., 2000, pg. 1614).
Social Informatics research is often identified by a set of common findings. First, “ICT uses lead to multiple and sometimes paradoxical effects” (Sawyer & Eschenfelder, 2002, pg. 439). Second, “ICT uses shape thought and action in ways that benefit some groups more than others and these differential effects often have ethical and moral consequences” (Sawyer & Eschenfelder, 2002, pg. 439). Third, “a reciprocal relationship exists between ICT design, implementation, use and the context in which these occur” (Sawyer & Eschenfelder, 2002, pg. 439).

The second two findings are self-explanatory, but the first one requires more discussion. Sawyer and Eschenfelder’s review of contemporary social informatics research found that ICTs have an impact on a larger number of people than just the initially perceived users. Through social-technical links, larger groups of people are impacted by the technologies and must be accounted for in the research. Also, technologies are often viewed simply as tools used as designed. However, the review shows that unintended consequences often occur from ICT use due to unforeseen or unaccounted for socio-technical connections often left out of research studies.

Social informatics research encompasses normative, analytical, and critical orientations. This research is focused on a normative approach to social informatics rather than the analytical or critical approach. I choose the normative approach because it reflects my intentions. I intend to provide “...alternatives for professionals who design, implement, use or make policy about ICTs” (Lamb et al., 2000, pg. 1614). The goal of normative research is to influence practice by providing empirical evidence illustrating the varied outcomes that occur as people work with ICTs. One goal of this research is to
influence people developing a company and supporting information system that they will use for business development.

In contrast, the analytic orientation uses studies that develop theories about ICTs in institutional and cultural contexts where the goal is to contribute to a deeper understanding of how the evolution of ICT use in a particular setting can be generalized to other ICTs and other settings. Finally, the critical orientation examines ICTs from perspectives that do not automatically and uncritically “adopt the goals and beliefs of the groups that commission, design, or implement specific ICTs” (Lamb et al., 2000, pg. 1614). It challenges commonly held assumptions about the roles, values, and design features embedded into ICTs. The work combines the critical and normative perspectives with a larger emphasis placed on the normative perspective because the main goal is to influence design and decisions of use rather than only to challenge existing solutions. This approach is appropriate because the company and supporting information system are still largely under development.

To tie social informatics to core concepts of information, technology, and people the next sections explain approaches used in this research. People are viewed at the organizational level of analysis and as social actors. A social actor is an organizational entity whose interactions are simultaneously enabled and constrained by the socio-technical affiliations and environments of the firm, its members, and its industry. Social actors are not primarily users of ICTs. They have conflicting and often ambiguous requirements about the activities they perform, and the socially legitimate ways in which they perform their work. Social actors exercise limited discretion in ICT choice and use since they are members of a collection of actors. ICTs play a mediating
role in representing their work and the work of others they interact with (Lamb & Kling, 2003).

Information here is conceptualized as the structural data used for decision making in creating and sustaining organizational competitive advantage. I draw on Goguen (1997) to frame concepts of information. He said that by trying to explain everything in life with science and technology, we are devaluing human interaction and nature and we are missing a crucial piece in system design. Goguen said that by developing this social theory of information, we can begin to recognize the ethical dimension of information. Goguen’s social, ethical theory of information is used to frame the view of the different social groups and their relationship to one another and to information systems.

Social informatics research and researchers take a social constructivist or functional view of technology rather than the more common tool view. Sawyer and Tapia (2003) summarize the social constructivist view as “…the meaning, value, and ascribed outcomes of computer use are developed in relation to how they function in particular situations and not to the set of features that they (are) designed to support” (pg. 98). They continue by saying that “…this functional perspective suggests that computers are part of a web of meaning that includes the current understanding of both the computer’s and people’s roles, the roles and norms of use, and the larger work context and incentive structures in which all of these are deployed” (pg. 98). This functional view is in contrast to the tool view which Sawyer and Tapia (2003) summarize by saying that “…the computer is seen as an external force…” and that the features are “…easily understood (both in terms of use and outcomes)” (pg. 98). Also, “…a computer-based system need not be connected to the scenes of its use” and “do not change over time,” which
minimizes the “changing nature of tool use due to the context of its use” (pg. 98). The tool view is incompatible with the functional view and social informatics perspective.

Lamb and Kling’s (2003) view of the social informatics perspective on socio-technical networks summarizes the social informatics perspective. Socio-technical networks increase interconnections between the social and the technical aspects of our worlds. Interactions among people, organizations, institutions, and a range of technologies are linked in rather intricate heterogeneous arrangements in which what is social and what is technical cannot be readily isolated in practice. Kling’s work “made the unobvious, the taken-for granted, and the ignored explicit, problematic, and visible” (Robbin, 2005, pg. 24).

2.1.1 SCOT and SST

The first of the social informatics related theories that developed was the Social Construction of Technology or SCOT (Pinch & Bijker, 1987). SCOT was summarized by Klein and Kleinman (2002) as having four related components including: interpretive flexibility, relevant social groups, closure and stabilization, and socio-cultural and political development. The development of SCOT and the four components was crucial as an alternative to Technological Determinism. Another related theory, called the Social Shaping of Technology (SST), developed about the same time as SCOT and the two are examined together in this discussion.

Winner (1993) provides an excellent critique of SCOT. He notes that SCOT, “…tries to show why it is that particular devices, designs, and social constituencies are the ones that prevail within the range of alternatives available at a given time” (pg. 368). This leads to his first criticism against social constructivist writing, including SCOT, a
“…total disregard for the social consequences of technical choice” (pg. 368). He specifically says, “What the new introduction of artifacts means for people’s sense of self, for the texture of human communities, for qualities of everyday living, and for the broader distribution of power in society – these are not matters of explicit concern” (pg. 368). He believes that interpretive flexibility must not mean value neutrality.

His next concern is for irrelevant social groups. He questions the decision of which social groups are relevant and which are not relevant. Specifically, he expresses concern for those with no voice but who will also be impacted by the technology choices. He feels, “the corresponding problem for social constructivism is that its ways of modeling the relationship between social interests and technological innovation will conceal as much as they reveal” (pg. 369).

His final criticism concerns the concepts of structure and closure. He argues that social constructivist studies only look at the “immediate needs, interests, problems, and solutions of specific groups of social actors” (pg. 370). He says that by gathering evidence of only social activities connected to technological change, social constructivists miss “…deeper cultural, intellectual, or economic origins” (pg. 371) surrounding choices of technology.

To conclude, Winner offers some valuable thoughts for the future development of social constructivist research.

In the late 20th century, a great many people – scholars and ordinary citizens alike – have begun to realize that the key question is not how technology is constructed but how to come to terms with ways in which our technology-centered world might be reconstructed. Faced with a
variety of social and environmental ills, there is a growing recognition that what is needed is a process of redirecting our technological systems and projects in ways inspired by democratic and ecological principles. How that reconstruction might occur is an open question, one ripe for widespread study, debate, and action. I believe it to be the greatest challenge for cross-disciplinary thinking during the next several decades (pg. 376).

Winner argues that a meaningful theory of technology has not achieved closure and must instead begin anew. In response to these and other criticisms, other socio-technical theories were introduced.

2.1.2 Actor Network Theory (ANT)

Latour (1993) says that the world is full of hybrid entities containing both human and non-human entities and that actor-network theory was developed to analyze situations where separation of the technical and social elements is difficult. Actor-network theory then avoids questions like, ‘is it technical’ or ‘is it social’ (Latour, 1993).

As summarized by Tatnall and Gilding (1999), “ANT considers both social and technological determinism to be flawed and proposes instead a socio-technical account in which neither social nor technical are privileged” (pg. 958). Latour (1991) summarizes ANT saying, “Contrary to claims of those who want to hold either the state of technology or that of society constant, it is possible to consider a path of an innovation in which all the actors co-evolve” (Latour, 1991, pg. 117).

Two important constructs from ANT are inscription (Akrich, 1992; Akrich & Latour, 1992) and translation (Callon, 1991, 1994).
Akrich (1992) describes inscription by saying,

Designers thus define actors with specific tastes, competencies, motives, aspirations, political prejudices, and the rest, and they assume that morality, technology, science, and economy will evolve in particular ways. A large part of the work of innovators is that of “inscribing” this vision of (or prediction about) the world in the technical content of the new object… The technical realization of the innovator’s beliefs about the relationship between an object and its surrounding actors is thus an attempt to predetermine the settings that users are asked to imaging…(Akrich, 1992, pg. 208).

The concept of translation states that stability and social order are continually negotiated as a social process of aligning interests (Monteiro, 2000). “Latour’s 1987 actor-network theory (ANT) combines the broad scale thinking of the SST tradition with new conceptualizations that raise technologies (such as computers and networks) to an equal status with human actors” (Lamb et al., 2000, pg. 1615).

Scacchi (2005) summarizes actor network theory by saying that it, “draws attention to processes by which scientific disputes or technical design alternatives become closed or rationalized, ideas accepted, tools and methods adopted, or more simply how decisions are made about what is known” (Scacchi, 2005, pg. 2).

### 2.1.3 Socio-Technical Interaction Networks (STIN)

Kling’s STIN approach is “…an emerging conceptual framework for identifying, organizing, and comparatively analyzing patterns of social interaction, system development, and the configuration of components that constitute an information system” (Scacchi, 2005, pg. 2). The STIN strategy studies the relationship among information, technology, and people but also adds other components. For example, (Kling, McKim et al., 2003; Kling et al., 2005; Kling, Sawyer, & Rosenbaum, 2003) state that a STIN includes the relationships among “…people (including organizations), equipment, data,
diverse resources (money, skill, status), documents and messages, legal arrangements and enforcement mechanisms, and resource flows” (pg. 48). In this statement, the authors include people both as individuals and at the organizational level of analysis. Technology is called equipment. Information is called data, documents and messages, and legal arrangements. In addition, economic elements like money and the flow of money and political elements like status are included.

Other authors define STINs in slightly different but meaningful ways. For example, Eschenfelder and Chase (2002) call a STIN a heuristic tool and say that STINs are useful for “…understanding the mutual shaping between technology and social context and the consequences of ICT use” (pg. 3). They also say that the STIN strategy examines elements including actors and dependencies. Actors are defined as individuals, groups, or organizations that interact with the ICT. Dependencies are broken into two parts: resource dependencies and account taking dependencies. Resource dependencies are access to funding and people and account taking dependencies are links or interactions based on imitation or social benchmarking. Rosenbaum and Joung (2004) claim that the STIN strategy can help determine network boundaries, which is typically a difficult task in socio-technical analysis. Looking at the resource dependencies mentioned above does the constraining (Rosenbaum & Joung, 2004).

The STIN strategy has developed from the theories and perspectives discussed earlier including SCOT/SST and ANT. STIN is an attempt to address some of the weaknesses in these approaches when studying information and communication technologies. STINs build on the ideas from these theories by adding the concept called the web of computing (Kling & Scacchi, 1982b). This web concept refers to the complex
relationships between the people and technology in order to place the situation into context.

The goal in STIN research is to find more complete explanations and thorough understandings of the relationship between the social and the technical in socio-technical systems. Assumptions made in STIN research include: the social and the technological are not meaningfully separable; theories of social behavior should influence technical design choices; system participants are embedded in multiple, overlapping, and non-technologically mediated social relationships, and therefore may have multiple, often conflicting commitments; sustainability and routine operations are critical (Kling, McKim et al., 2003).

STIN is not traditionally referred to as a theory because it doesn’t lead to strong predictions (Kling, McKim et al., 2003). Instead, it is typically referred to as a framework or a strategy (Meyer, 2007). For the purposes of this investigation, the elements used in conducting a STIN study form the theoretical perspective in that they are arranged in a way that implies a pattern of relations among concepts – the basis of a theory. The elements define how the researcher perceives the issue and then how the researcher should address the challenge of answering the research questions. STIN research is implemented by following the eight steps defined by Kling (2003) and include:

1. Identify a relevant population of system interactors
2. Identify core interactor groups
3. Identify incentives (motivations)
4. Identify excluded actors and undesired interactions
5. Identify existing communication systems
6. Identify resource flows

7. Identify system architecture choice points

8. Map architectural choice points to socio-technical characteristics

From the eight steps, a standard model is built and then subsequently disassembled. The purpose of the standard model is to abstract a series of underlying commonly held assumptions about the information system design of study. In Kling (2003), the standard model was built from literature about electronic scholarly communication forums. For the remaining STIN studies in Table 2, the models are built by studying the information system design and use conceptions in the field. By building standard then alternative models, researchers can incorporate conceptions that are incomplete or left out of the standard models. “What is left out of the standard models are important features of very specific technologies and settings in which people try to use them, the organizational complexity in which IT-based services are provided and embedded” (Kling, McKim et al., 2003, pg. 49).

In contrast to the standard model, the alternative STIN model helps “…to map some of the key relationships between people and people, between people and technologies, between technologies and their infrastructures and between technologies…” (Kling, McKim et al., 2003, pg. 49).
Table 2. Standard and Alternative STIN Models from STIN Literature

<table>
<thead>
<tr>
<th>Author</th>
<th>Context</th>
<th>Standard Model</th>
<th>Alternative Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Kling, McKim et al., 2003)</td>
<td>Development and use of scholarly communication forums</td>
<td>Focused only on information processing capabilities</td>
<td>Must focus on relevant actors, groups and resource flows which impact use and sustainability</td>
</tr>
<tr>
<td>(Meyer, 2007)</td>
<td>Change from traditional to digital camera technology with a focus on the change process</td>
<td>Digital technologies would allow for the elimination of film and easier storage due to the elimination of physical prints</td>
<td>Must also account for new data processing measures and new methods of sharing information</td>
</tr>
<tr>
<td>(Scacchi, 2005)</td>
<td>Development of free/open source software</td>
<td>Traditional software development methods and procedures.</td>
<td>Begins to develop new models for how development occurs among a web of actors in a way that benefits those that chose to use and contribute to it</td>
</tr>
<tr>
<td>(Eschenfelder &amp; Chase, 2002)</td>
<td>Post-implementation impact of a web information system</td>
<td>Web information systems are information technology systems maintained only by a distinct group of IT professionals</td>
<td>Web information systems are only sustainable with the efforts of a wide variety of actors and groups reaching well beyond traditional IT</td>
</tr>
<tr>
<td>(Rosenbaum &amp; Joung, 2004)</td>
<td>Development and use of digital libraries</td>
<td>Digital libraries will be used due to the ease of searching</td>
<td>Initial and continual use of the library varies with the type of enrollment strategies and social context of those in the system</td>
</tr>
</tbody>
</table>

For example, an early STIN study looked at scholarly communication forums (Kling, McKim et al., 2003). The study enabled the development of a standard model that focused on the information processing capabilities of scholarly communication forums. The design concept focused on the amount and speed of the transactions. After following the STIN steps the authors developed an alternative model that focused on the relevant actors and groups and the social relationships that impacted the design and use of the system. The study was concerned with the sustainability of the system rather than simply an information processing approach.

Another STIN study focused on the movement from traditional to digital photography among a group of marine mammal researchers (Meyer, 2007). A standard model was produced to describe the conceptions behind the transformation. The
researchers accounted for perceived positives with the use of digital technologies but failed to account for potential negatives like information management and sharing.

What is consistent among the studies from Table 2 is the study of change. In some cases the change concerns the development of an information system and in others the change focuses on the shift from a traditional technology to a new technology. The authors focus on the assumptions made by the relevant actors and groups and how those assumptions impact the outcome. Often, the social consequences of the change are not accounted for in the standard model. STIN allows the creation of alternative models that link the social and technical worlds and allows a richer description of the change. This richer description permits the actors to change design conceptions or to consider technology choices and their potential impacts in a broader fashion.

The findings are consistent with those in STIN literature. For example, “One of the important consequences of adopting a STIN-based model is that it becomes clear that a rising tide of new technological developments will not wash away the issues of sustainability and integration into a social world” (Kling, McKim et al., 2003, pg. 63). “A second important consequence of STIN-based models for social scientists is that STIN-based analyses inject social analysis into all phases of planning, development, configuration, use and evolution…rather than merely the beginning (in determining users requirements of a system), and post-deployment (in determining the social impacts) of the system” (Kling, McKim et al., 2003, pg. 64).

Common questions about STINs include: are STINs entities that occur in the world, or are they models that reflect patterns of organization in the world and are STINs to be judged as successes or failures and by what criteria?
2.2 MIS and Associated Theories

Before continuing a discussion of social informatics, I discuss the economic theory called resource-based view (Bharadwaj, 2000). This view is being compared because it comes from a related area called Management Information Systems (MIS). This view has had more impact on information technology development and use, due to its longer existence, than newer areas of research like social informatics.

Within MIS, the resource-based view is a dominant approach according to Bharadwaj (2000) who notes, “the resource-based view is presently the dominant theoretical perspective in strategic management literature” (Bharadwaj, 2000, pg. 170). Bharadwaj further states, “the resource-based view of the firm attributes superior financial performance to organizational resources and capabilities” (pg. 169). This statement illustrates the economic underpinnings of the resource-based view. It also introduces the terms resources and capabilities. Researchers of the Resource-based view define these two terms slightly differently.

For example, within MIS, Grant (1991) defines resources as tangible, intangible, and personnel-based resources where tangible resources include the financial capital and physical assets of the firm; intangible resources include assets such as reputation, brand image, and product quality; personnel-based resources include technical know-how and other knowledge assets including dimensions like organizational culture, employee training, loyalty, etc. In another example, Bharadwaj (2000) defines resources as unique corporate resources that are valuable, rare, difficult to imitate, and non-substitutable by other resources. Finally, Wade and Hulland (2004) define resources as assets and capabilities that are available and useful in detecting and responding to market opportunities or threats.
All of these definitions include people as being part of the resource-based view. While this is an improvement over the previously dominant view, process-based theory, it still falls short of several important factors addressed by social informatics research. Some of the shortcomings are addressed by the term capabilities. Researchers’ definitions of capabilities begin to address the ‘web of computing’ defined by (Kling & Scacchi, 1982a).

For example, Bharadwaj (2000) summarizes capabilities as “…organizations’ ability to assemble, integrate, and deploy valuable resources usually in combination or copresence” (pg. 171). Also, Wade and Hulland (2004) define capabilities as “…repeatable patterns of actions in the use of assets to create, produce, and/or offer products to a market, capabilities which transform inputs into outputs of greater worth” (pg. 109). Capabilities are even further defined by Bharadwaj (2000) as IT capabilities stating, “the ability to mobilize and deploy IT-based resources in combination or copresent with other resources and capabilities” (pg. 171). Bharadwaj (2000) goes on to say that “IT is a resource that generates competitive value only when it leverages or enables pre-existing firm resources and skills” (pg. 174). The term copresent resources is an important development in the resource-based view, acknowledging the value of resources working together to become more than simply the inputs. However, resource-based studies still separate the inputs, not just between departments, but also between people and technology.

Some authors of resource-based studies extend capabilities to functional and cross-functional capabilities in an attempt to better understand the relationships not accounted for in previous work. For example, Bharadwaj (2000) states, “functional
capabilities integrate into cross-functional capabilities such as new product development and customer support by integrating groups like marketing, manufacturing, and IT” (pg. 171).

Despite these gains Bharadwaj (2000) states, “despite the widely held belief that information technology is fundamental to a firm’s survival and growth, scholars are still struggling to specify the underlying mechanisms linking IT to financial performance” (pg. 169). Many of the research studies in resource-based literature attempt to define dependent variables that show, from an economic viewpoint, the value of information technology (Bharadwaj, 2000; Clemons & Weber, 1990; Roberts, Brown, & Pirani, 1990; Warner, 1987).

The resource-based view made other important improvements in development as summarized by Wade and Hulland (2004). They discuss how the resource-based view developed over time and note an important distinction. Initial use of the resource-based view involved studies looking for direct effects of information technology on firm performance (Banker & Kauffman, 1991; Bharadwaj, 2000; Clemons & Weber, 1990; Floyd & Woolridge, 1990; Jelassi & Figon, 1994). However, after these studies failed to provide convincing evidence of direct effects, additional studies started to look for direct and indirect effects of information technology on firm performance (Wade & Hulland, 2004). Still not convinced, additional authors concluded there were only indirect effects of information technology on firm performance (Carroll & Larkin, 1992; Clemons & Row, 1991; Kettinger, Grover, & Segars, 1995; Powell & Dent-Micalef, 1997). Wade and Hulland (2004) call these indirect only effects, contingent effects, and state: “The
effect of strategic information technology on competitive advantage or performance depends on other constructs” (pg. 125).

While the concept of indirect or contingent effects again moves the theory closer, it still fails to address key concepts from social informatics including moral and ethical issues of information technology, paradoxical effects, and the concept of mutual shaping between information technology and people. The concept of context is present in these studies but left undefined. In the end, these studies fail to address the commonly held assumptions about the relationships between information technology and people. Rather than attempting to provide prescriptive explanations, social informatics attempts to understand the deep socio-technical issues involved with information and communication systems design, use, and management. Attempting to prescribe before developing a rich understanding has resulted in studies that have not fully increased our understanding of the relationships between information technology and people.

2.2.1 Technological Determinism

A central theme to theories that describe the relationships among people and technology is that of agency of ICTs. Different theories place the agency of information and communication technologies along a continuum between strong, represented by technological determinism, to weak, represented by the social construction of technology. Many other theories fall in between.

Many social theories of technology developed in contrast to technological determinism. As with social theories, technological determinism developed to address the relationship between technology and society. Kline (2001) summarized technological determinism as having two related claims: “the development of technology proceeds in
an autonomous manner, determined by an internal logic independent of social influence; and …technological change determines social change in a prescribed manner” (pg. 15495). Kline gives a historical explanation by stating,

…in the United States, the Enlightenment doctrine that improvements in the mechanical and industrial arts fostered social progress was replaced over the course of the nineteenth and early twentieth centuries by a more technocratic concept of progress, in which improvement in technical and economic efficiency became ends in themselves, instead of the means for creating desired social ends (pg. 15495).

Kline states that technological determinism meanings entered popular culture in part from “company advertisements that endlessly touted new products as the cure for social ills and the source of all happiness” (pg. 15496). The company advertisements of today offer much the same message as Kline discussed from the past. Kline summarizes his discussion of technological determinism with a motto from the 1933 Chicago World’s Fair which stated, “Science Finds, Industry Applies, Man Conforms” (pg. 15496). Much of the same rhetoric is still present in the messages offered to society today. While academic writings in some fields still contain much technologically deterministic rhetoric, areas such as social informatics continue to challenge these views through continuous development of alternative theories. Kline shows that even socially conscientious disciplines like social informatics must be cautious of the terms supported in the literature. Specifically, he notes the term ‘information society’ that supports the idea that new information technologies created a new society.

2.3 Core Concepts: Information, Technology, and People

The issues explained in this dissertation are framed at the broadest level by the relationships among information, technology, and people. These relationships are explored throughout the following sections and are in direct response to many traditional
analyses of computerization. For example, Sawyer and Rosenbaum (2000) state that many analyses assume that: ICTs have direct effects upon organizations and social life; these effects depend primarily upon an ICT’s information processing features; and the information processing features of new ICTs are so powerful relative to preexisting technologies that they effectively determine how people will use them and with what consequences” (pg. 92). The following section develops the core elements of information, technology, and people, relative to social informatics perspective.

Table 3. Research Perspectives and Associated Views of ITP

<table>
<thead>
<tr>
<th>Perspective</th>
<th>People</th>
<th>Information</th>
<th>Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Informatics/STIN</td>
<td>Social Actors</td>
<td>Decision-making with ethical consequences</td>
<td>Social Constructivist/Functional View</td>
</tr>
<tr>
<td>Technological Determinism</td>
<td>Conform to technology</td>
<td>Obvious Facts</td>
<td>Cause and Effect</td>
</tr>
<tr>
<td>Resource-Based View</td>
<td>Resources</td>
<td>Economic Decision-making</td>
<td>Tool View, Direct and Indirect Effects</td>
</tr>
</tbody>
</table>
3.0 Research Methods

Through this chapter, I develop and explain the research approach taken in my dissertation. For guidance, I refer to Crotty (1998), who posed four issues for designing a research study including issues of epistemology, theoretical perspective, methodology, and specific methods. He defined epistemology as a theory of knowledge embedded in theoretical perspective with the choices of objective or subjective. He defined theoretical perspective as a philosophical stance with choices of positivist, interpretive, or critical. He defined methodology as a strategy or plan that links methods to outcome with examples of experimental research, survey research, and ethnography. Finally, he defined methods as techniques and procedures with examples of questionnaire, interview, focus group, and observation. These four questions are addressed in this chapter.

To address the four questions at the broadest level, the study is developed as a subjective, interpretive case study; implementing the STIN strategy using semi-structured interviews, participant observation, and document analysis. To help position the study in a larger context and explore the landscape contracting domain in detail, I used a macro/micro approach for data collection.

3.1 Epistemology and Theoretical Perspective

The epistemological and theoretical perspectives for this research are subjective, interpretive and critical. An interpretive approach assumes a subjective perspective so the discussion focuses mainly on the interpretive and critical approaches. The STIN strategy assumes an interpretive, critical perspective and therefore fits very well with this research study and the general perspective of the researcher. The STIN strategy attempts to not
only provide a richer description of the phenomenon but also attempts to impact practice through the development of the standard and alternative models. The attempt to alter practice is what adds parts of the critical perspective and Orlikowski and Baroudi (1991) clarify this claim by saying that, “more than either the positivist or the interpretive research perspectives, the critical researcher attempts to critically evaluate and transform the social reality under investigation” (pg. 19).

**Table 4. Research Theoretical Perspectives**

<table>
<thead>
<tr>
<th>Theoretical Perspective</th>
<th>Premise</th>
<th>Primary Purpose</th>
</tr>
</thead>
</table>
| Positivist              | - a priori fixed relationships within the phenomena  
                          - Deterministic  
                          - Cause and effect  
                          - Reductionist  
                          - Objective  
                          - Deductive | - Theory testing to increase predictive understanding of phenomena |
| Interpretive            | - People create and associate their own subjective and inter-subjective meanings as they interact with the world around them  
                          - Complexity  
                          - Inductive | - To understand the deeper structure of a phenomenon to inform other settings |
| Critical                | - Evidence of a critical stance towards taken for granted assumptions about organizations and information systems  
                          - Dialectic analysis to reveal the historical, ideological, and contradictory nature of existing social practices | - Critique the status quo through the exposure of deep-seated structural contradictions within the social system and thereby to transform these alienating and restrictive social conditions |

Source: Based on (Orlikowski & Baroudi, 1991)

(Orlikowski & Baroudi, 1991) claim the interpretive perspective assumes reality is a social product and can not be understood independent of social actors. The social products and social actor concepts are congruent with the relevant system and group interactors from the STIN strategy. Orlikowski and Baroudi also claim that unlike the
positivist perspective, which assumes researchers discover an objective reality, interpretive researchers can only interpret a social reality. Unlike positivist research, which often uses surveys to collect information, interpretive researchers must get inside the world of those generating the information. To collect data, social researchers often conduct field studies. The field studies allow the researcher to understand the context of the specific phenomena under study.

It is also understood that the researcher can never be value neutral and can always be implicated in the object of study. Orlikowski and Baroudi say specifically, the “researchers’ prior assumptions, beliefs, values, and interests always intervene to shape their investigations” (pg. 15). Since social informatics and the STIN strategy are based on a social construction approach, the interpretive and critical perspectives and data collection methods are consistent with the approach for this proposed research.

Another important assumption from the critical perspective is the interdependence of parts with the whole. The authors say that, “organizations cannot be studied in isolation of the industry, society, and nation within which they operate, and which they in part constitute” (pg. 23). To address the issue of interdependence, this study includes a macro (industry) as well as micro (case) portion. The macro portion serves to place the micro portion within a national industry by uncovering contextual information about the industry, its impact on the national economy, and the companies and people that encompass the industry.

In contrast to the interpretive and critical perspectives, the positivist perspective produces studies that reflect a priori fixed relationships where the phenomena are studied with structured instrumentation. These studies serve to test theory in an attempt to
increase predictive understanding rather than descriptive understanding. The exceptions to predictive studies are objective, descriptive studies where the researcher is presenting straightforward, factual “accounts of events to illustrate some issue of interest to the information systems community” (pg. 5). Orlikowski and Baroudi acknowledge the contributions from the positivist perspective but also offer the following criticism by stating,

“The quest for universal laws leads to a disregard for historical and contextual conditions as possible triggers of events or influences on human action. The design and use of information technology in organizations, in particular, is intrinsically embedded in social contexts, marked by time, locale, politics, and culture. Neglecting these influences may reveal an incomplete picture of information systems phenomena” (pg. 12).

Another criticism of the positivist perspective concerns the attempt to explain and predict external reality. The concern is that this implies that people are not active makers of their physical and social reality. The authors feel that by focusing on the validity and control of the research procedures, this perspective is not conducive to the discovery and understanding of non-deterministic and reciprocal relationships. As stated earlier, the positivist perspective will not be used for this research because the goal is to discover a deeper connection between the relationship between people and technology, accounting for the context of a specific circumstance.

3.2 Method and Data Collection

To pursue the research I developed a qualitative macro/micro approach with semi-structured interviews and secondary source data collection for the macro phase and an interpretive case study with multiple data collection methods for the micro phase. This research design works well for the following reasons.
Social informatics research is most typically conducted using qualitative methods due to the level of interpretation of the information collected. Using qualitative methods to support interpretive research is also consistent with Trauth (2001) who lists two reasons for choosing qualitative methods. One reason is the nature of the research problem. This research takes a socio-technical approach where detailed contextual information is needed to address the social issues related to answering the research questions. A second reason is the degree of uncertainty. Trauth argues that the less is known about a phenomenon, the harder it is to measure. For this proposed research, many issues are not well addressed in academic literature. This research hopes to bring some of the issues undertaken into the limelight and to expose them for continued study.

The macro portion is meant to clarify the research problem and domain of study as well as position the micro portion within a domain. The micro portion uses a case study with semi-structured interviews, participant observations, and document analyses as the data collection methods. The goal of the micro portion is to study the development of Staying Green and its supporting information system in detail (see Table 4).

<table>
<thead>
<tr>
<th>Table 5. Data Collection Design</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Case Study</strong></td>
</tr>
<tr>
<td><strong>Macro (Landscape Contracting Industry)</strong></td>
</tr>
<tr>
<td><strong>Primary</strong></td>
</tr>
<tr>
<td>Interviews</td>
</tr>
<tr>
<td>Capture views of practicing professionals</td>
</tr>
</tbody>
</table>
In total, the research includes 17 semi-structured interviews and 20 hours of participant observation. It also includes a document analysis and review of all the information systems currently in use or under development and the supporting design documents. Since some of the information systems under development are already implemented, a review of their design conceptions was also possible and provided insight to creation of the standard model. The interviews were conducted either by phone or in person as time and cost allowed. The number of sites was six including: Staying Green headquarters, macro interview 1, macro interview 2, macro interview 3, Staying Green client 1, and Staying Green client 2.

The total number of interviews for the study was based on capturing input from the key stakeholders in the study. The amount of total data collected for the study was based on two items. First, the total data collected was sufficient when a point of saturation was reached. For example, when little to no new useful information was collected, then saturation was reached. Second, the total data collected was sufficient when the analysis was able to answer the research question.

This study used multiple methods for data collection to allow for triangulation of results (Mason, 2002). Triangulation, for the purposes of this research, is used to enhance the quality of data using different methods for data collection. Mason supports this use of triangulation when she states, it “encourages the researcher to approach their research questions from different angles, and to explore their intellectual puzzles in a rounded and multi-faceted way. This enhances validity, in the sense that it suggests that social phenomenon are a little more than one-dimensional, and that your study has accordingly managed to grasp more than one of these dimensions” (pg. 190).
3.2.1 Macro Phase

Semi-structured interviews were chosen for the macro portion in an attempt to collect the most appropriate data for the study. Since little information about the landscape contracting domain exists in the literature, the initial problems for the research come from mostly anecdotal evidence based on personal experience of the researcher, and from conversations with other industry members and educators. This data could be collected using surveys however, the fixed nature of a survey allows for no change to the structure based on the information being received from the collection mechanism. A document analysis was also conducted in the macro phase as a means to confirm or rebut the information gathered from the interviews. The document analysis consisted of a review of industry literature because little exists in academic literature.

The contributions of the macro phase included development and history of the landscape contracting industry, level of business development in the industry, education in the industry, information technology use in the industry, and other industry level issues. To properly cover these areas, a group of industry and professional organization representatives were chosen for the interviews. The industry representatives were selected from the Lawn and Landscape Top 100 list published yearly (Wisniewski, 2007a). The list includes landscape contracting companies from across the United States whose yearly revenue is in the top 100 nationwide. Representatives from Top 100 companies were chosen for the East, West, and Central parts of the country as defined in the Top 100 List. Interview requests were sent to representatives in each area of the country until all areas include at least one company. Representatives from the top 100 were used because of the perspectives they were able to provide on the history and development of the industry to help put this particular research in context.
The industry professional organizations were identified by the researcher and a committee member as being those with the most impact on the industry. The interviews were conducted with a representative from the Professional Landcare Network (PLANET), the Pennsylvania Landscape and Nursery Association (PLNA), the American Landscape and Nursery Association (ALNA), and the Program Coordinator for Penn State’s Landscape Contracting Program. Four interviews were conducted on the phone and three were conducted face-to-face. While face-to-face interviews are preferred, restrictions of cost and time required four phone interviews.

The interview questions for the macro phase were written according to the eight steps for conducting a STIN and adapted from Meyer (2007). In an attempt to begin to answer the research questions, the design of the interview questions attempted to collect data to clarify the development of the industry, general issues and the specific issue of business development practices. The domain likely has many issues of relative importance and these issues likely have specific characteristics to the domain. Understanding the issues and their specific characteristics allowed for the positioning of the research among the domain issues and helped to clarify the design and analyses from the micro portion of the study. Providing information about the domain also served to guide future research based on the expected and unexpected themes. The macro questions are provided in Appendix A.

3.2.2 Micro Phase
The micro portion was guided using the information and analyses from the macro portion to study the research question in depth with Staying Green and their clients. For example, the development of the industry helped provide insight into the companies and
people that are part of the industry. The degree of the problem of business development should place the work of Staying Green into greater perspective. Staying Green was studied using semi-structured interviews, document analysis and participant observation. Interviews were conducted with four company employees due to the smaller size of the company. Two of the employees were interviewed several times. Each employee’s input is significant because of the roles they play in a small business. Clients of Staying Green were also interviewed since the structure of the company and supporting information system impact their clients as well. Representatives from three clients were interviewed for a total of seven interviews.

Fifteen hours of participant observation occurred within Staying Green and between Staying Green and its licensees. The goal of participant observation is to detail the language and social relationships used in the discussions to help clarify information from the interviews. Some of the observation time happened as part of a quarterly training session that Staying Green holds for its licensees. The rest of the observation time occurred at the licensee sites.

The licensees were chosen based on an initial interview with the Staying Green CEO. A client matrix was developed by the researcher based on questions asked to the CEO. Three licensees were chosen that represented three levels of participation. One licensee was considered to have a high level of participation, another a medium level and a third a low level of participation. The third licensee dropped out of the Staying Green system. The goal was to gain an understanding of each client and why the level of participation was occurring between them and Staying Green.
### Table 6. Staying Green Licensee Matrix

<table>
<thead>
<tr>
<th>Licensee Name</th>
<th>Annual Revenue</th>
<th>Level of Participation</th>
<th>Licensee Issue of Interest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client 1</td>
<td>$3 Million</td>
<td>Medium-High</td>
<td>Generational turnover</td>
</tr>
<tr>
<td>Client 2</td>
<td>$2 Million</td>
<td>Medium</td>
<td>Owner social issues</td>
</tr>
<tr>
<td>Client 3</td>
<td>$1 Million</td>
<td>Low-Medium</td>
<td>Left network</td>
</tr>
</tbody>
</table>

The interview questions were again based on the eight steps for conducting a STIN and adapted from Meyer (2007). The questions were mapped to the steps in Table 4 and listed in Appendix B.

The STIN methodology has been distilled into eight illustrative steps (Kling, McKim et al., 2003). In this section, each step will be discussed so that they can be mapped to the research questions and to allow for easier work in the analysis phase (see Table 6). The research questions are listed in Appendix A.

#### 3.2.2.1 Relevant Population of System Interactors

Step one is about identifying a relevant population of system interactors. The main questions for this step include in what ways and roles the interactor would participate in the system, and what proportion of time the interactor would spend in the system. Interactors also include those that do not work with the system directly but who may play a role as funders or resource managers.

#### 3.2.2.2 Core Interactor Groups

Step two is about taking the results from step one and grouping people together with respect to their roles in the system. These roles may overlap but impact the persons interactions on the system and the system on the person. An example group for this study
might be the people at Staying Green responsible for direct communication with their clients.

### 3.2.2.3 Incentives

Step three is about identifying and making explicit the incentive structures involved with developing and working with the system. As with Kling’s (2003) study of communication forums, the business model used by Staying Green and their clients will probably play an important role in incentive structures. This step helped the researcher identify why an interactor would want to participate in the development and use of the system.

### 3.2.2.4 Excluded Actors and Undesired Interactions

Step four develops based upon the previous steps by identifying excluded actors and undesired interactions. For example, what do interactors not want the system to do? Do they perceive certain potential functions as counterproductive or overly controlling?

### 3.2.2.5 Existing Communication Systems

Step five is concerned with identifying existing communication systems or what Kling refers to as the communication ecology of the system interactors. This step also determines if the new and old communication systems will reinforce or compete with each other.

### 3.2.2.6 Identify Resource Flows

Step six is related to step 3, incentive structures. In step 3 the incentive structures tracked the business model behind the development of the system and why the interactors might participate in the use of the system. In step 6, specific resource flows inside the business model are identified. In Kling’s example, Promotion and Tenure committees
impacted interactor choices by identifying different publication methods as more valuable. The value placed on different publication outlets impacted the system interactors choices when using the online communication forum as a publication outlet. For this research, managers’ preferences for types of work or information may impact an interactor’s use of the system. For example, if the use is seen as valuable by a manager then the interactor may in turn use the system more often and as designed.

3.2.2.7 Identify System Architectural Choice Points
Step seven is concerned with architectural choice points. After the socio-technical characteristics of the system are identified in steps 1 through 7, developers can make choices from alternatives concerning social or technical features. In other words, these choice points are informed by the previous steps and are taken to enhance certain social or technical considerations and to hinder others.

3.2.2.8 Architectural Choice Points to Socio-technical Characteristics
Step eight takes the socio-technical information as well as architectural choice point information and maps them to each other. The information system developers should have a clearer understanding of how these mappings will relate to each other and what enhancements or limitations will be specifically addressed by the choices. The information from the first seven steps provides the information for the final development considerations for the STIN.

Three related but different sets of questions, listed in Appendices A and B, have been developed for the micro phase in an attempt to collect all the relevant information needed for the study. One set is for the CEO of Staying Green. These questions focus on the bigger picture items related to the formation of the company and the structure of the
business. Another set of questions is developed for the employees of Staying Green in an attempt to capture detailed conceptions of those developing and using the supporting information system. The last set of questions is written for the clients of Staying Green. These questions focus on the reasons for changing from their former business model to that prescribed by Staying Green and their impressions of the supporting information system.

Semi-structured interviews, participant observation, and document analysis were collected for the micro portion in the form of a case study. The data collection methods were chosen to provide the detailed contextual information needed for the STIN strategy. Combining data collection methods allowed the researcher a view not only into the conceptual ideas behind the design of the company and supporting information system but also the implementation of existing products and systems. The critical element of the research comes from an analysis of existing documents and especially of the existing information system. The existing information allowed for an analysis of how well the conceptual ideas are being translated into the products and systems being produced.

### 3.3 Data Analysis

To ensure accuracy, all interviews were digitally recorded and then transcribed using a professional transcriber. The transcribed interviews along with participant observation, and document analysis information were coded, with the assistance of NVivo software (http://www.qsrinternational.com), to assist with the analysis (Strauss, 1993).

The process of coding the data was very iterative. For example, I started to code the data according to the originally conceived interview questions, since the questions
were based on the STIN steps. As the coding process continued, I realized the originally conceived interview questions were inadequate to capture the most important themes. Upon reflection, the actual questions asked were based on the originally conceived questions, but were expanded and adapted based on the actual responses. The questions actually asked were a better guide for coding, however they didn’t capture the information from the document analysis and the participant observation. After review of other STIN studies, I focused the coding process on the STIN steps. My understanding of the STIN steps developed over the course of the dissertation as I had actual data to compare to the steps themselves. The next coding difficulties occurred when trying to understand the relationship among the macro and micro data. For several weeks, the focus of the analysis was on the macro data and therefore diverted my attention to the landscape industry and not to information system design. Eventually, the data was coded into two distinct but related STINs. Ultimately, the macro-micro approach along with the STIN strategy became the guide for coding the data.

Once deciding to break the data into two STINs, the micro phase analysis consisted of formulating the data collected in STIN steps one through six to inform STIN steps seven and eight. Understanding the architectural choice points was key both from a social and technical view. Understanding the choice points allowed for creation of the standard model. Mapping the choice points to the socio-technical characteristics allowed for the creation of the alternative model to reveal the hidden or ignored assumptions about the design of Staying Green, the services they offer, the clients they seek, and the system they build. Revealing the hidden or ignored social issues is a key finding from social informatics and likely some of the key findings for this study.
Another aspect of coding was to revisit the research question and social informatics literature repeatedly throughout the process. As I would get lost in the data and process, I would reread previous STIN studies, conceptual papers on STIN, and revisit the research question to seek clarification. It was often easy to start moving in other directions in the data. I had to realize that this dissertation was meant to answer my original research question and that other questions could be addressed with this data and augmented with new data as necessary in another study. This iterative process was part of the process to understanding the value of qualitative methods.

Even with a detailed analysis, some of the data did not fit neatly into the coding scheme and did not agree with the findings. This data is categorized by industry, methods, and STIN and displayed in Appendix D.

3.4 Field Observations
The data was collected from April to July, 2008. The research schedule envisioned the process of data collection and analysis as an orderly and sequential series of events. The actual process was quite different. Some of the macro interviews were completed first. However, due to the scheduling of the Staying Green training session, the first part of the micro participant observation occurred earlier in the process than anticipated. Also, due to the schedule of Staying Green’s clients, the site visits and related interviews and participant observation occurred later in the process. Some of the macro interviews happened after the other data collection was complete. The most important observation was how the training session conducted by Staying Green allowed for a deeper understanding of the company and its services and systems. This allowed for more informed questions while at the client sites and also impacted the remaining macro
interviews. The interplay among the data collection models served as a key contributor to the understanding of the phenomenon of interest. Each type and period of data collection informed the next and caused the researcher to slightly adjust the questions and areas of interest as the study proceeded.

Often during the data collection, the researcher had to reflect on the research questions and methods to ensure that the original intent of the study was being met. The reflection between data collection events was key to developing a deep understanding of Staying Green, their clients, and the resulting information systems.

The data analysis also started earlier in the process than originally conceived. Analysis started after the first interview and continued throughout the entire data collection phase. While a large part of the analysis occurred with the transcribed interviews, the continual reflection and analysis helped inform all the parts of the data collection. This unexpected occurrence was a benefit to the research process and will aid in the development of future research projects.

The remainder of the analysis occurred as interview data was transcribed. The transcription process occurred more slowly than anticipated. Overall the data collection and analysis was more chaotic than expected.
4.0 Macro Results: Landscape Contracting Industry – Their Own View

As discussed in Chapter 3, the data was coded into two STINs. The first STIN, based on the macro study, is focused on choices for assistance with business development education and places the social views of the industry, problem of business development knowledge in the industry, and Staying Greens approach to the problem in context. The second STIN, based on the micro study of Staying Green, their clients, and associated information system, uses information from the macro study to place its meaning into context.

This chapter serves to provide the macro level context of the landscape contracting industry, as shown in Figure 3. The findings in this chapter are based on primary data collection in the form of interviews with leaders in the industry along with secondary data collection in the form of document analysis of materials written by those in the industry. The context provided in this section is necessary for the micro level case study presented in chapters five and six.

Specifically, through this chapter I provide a description of how the industry views itself, its people, its own work, and its relationship to education. In addition, I provide a description of how the industry perceives the general public’s view of the value of landscapes and therefore the value of the industry. Lastly, this section discusses issues in the industry at the local, industry level, and national levels.
Figure 3. Master Dissertation Diagram
4.1 Industry Perceptions

The early STIN steps are concerned with social information about the actors and groups, and structural information about existing communication schemes, incentives and resource flows. This section provides insights into how the industry views itself, its people, its work, success, and information and communication technologies.

Table 7. Macro Cultural Views of the Landscape Contracting Industry

<table>
<thead>
<tr>
<th>Cultural View Categories</th>
<th>Views</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry (Groups)</td>
<td>• Tiers based on revenue</td>
</tr>
<tr>
<td></td>
<td>• Becoming more professional</td>
</tr>
<tr>
<td></td>
<td>• Services in higher demand by homeowners</td>
</tr>
<tr>
<td></td>
<td>• Group of business related issues including fragmentation, low entry barriers, lack of financial planning, labor</td>
</tr>
<tr>
<td>People (Actors)</td>
<td>• Salt of the earth</td>
</tr>
<tr>
<td></td>
<td>• Field workers</td>
</tr>
<tr>
<td></td>
<td>• Office workers</td>
</tr>
<tr>
<td></td>
<td>• Hard working</td>
</tr>
<tr>
<td>Work and Success (Incentives and Resource Flows)</td>
<td>• Physical transformation of natural and man made materials</td>
</tr>
<tr>
<td></td>
<td>• Amount of hours worked</td>
</tr>
<tr>
<td></td>
<td>• Amount of work accomplished per hour</td>
</tr>
<tr>
<td></td>
<td>• Amount and quality of production equipment</td>
</tr>
<tr>
<td></td>
<td>• Type of clients and projects</td>
</tr>
<tr>
<td></td>
<td>• Value of company land</td>
</tr>
<tr>
<td></td>
<td>• Value of owners car and house</td>
</tr>
<tr>
<td></td>
<td>• Amount of owners salary</td>
</tr>
<tr>
<td>ICTs</td>
<td>• Communication equipment assists production</td>
</tr>
<tr>
<td></td>
<td>• Computer equipment assists back-office work only</td>
</tr>
<tr>
<td></td>
<td>• Computers are sparingly used as support tools</td>
</tr>
</tbody>
</table>

STIN step two is concerned with interactor groups. This section will address interactor groups to provide an overview of the industry before proceeding with Step one, which is concerned with actors. For the macro portion and related STIN, a review of the internal cultural views of the industry is important. Table 8 highlights the cultural views internal to the industry. These views are crucial to understanding the current culture of
the industry and the resulting issues based on these cultural views. Each cultural issue is
addresses separately below.

4.1.1 Views of the Industry

The industry may be characterized by: tiers of companies based on annual
revenue, becoming more professional, more in demand, and having a group of related
business problems.

The tiers of businesses in the industry, introduced in chapter one, are important
for the following reasons. One, the tiers show that most of the businesses in the industry
are small or under $2 million. On the other hand, there are some very large organizations
in the industry with the largest around $1.5 billion in annual revenue. Second, the
companies represented by the tiers have different characteristics including annual
revenue, number of employees, number of locations, etc. These characteristics are
important for the micro portion of the study. Specifically, Staying Green sees the
companies in Tier 5 as hobbies. They tend to have certain cultural views of work that
impact their daily operations. Staying Green sees some companies in Tier 4 as those
attempting to make a transformation from a hobby to a business. Staying Green views
this transformation as a different understanding of their business and its priorities.
Finally, the companies in tiers one, two, and three are seen as fully functional businesses
at different stages of development.

The people in the industry believe that the industry is becoming more
professional. They look at the history of the industry, type of work performed and people
performing the work as improving over the years as illustrated below.

(Carl, an industry Top 100 executive) Well, I've seen a more -- a larger
trend toward professionalism, toward our industry being something that's
sought after from a professional standpoint. We used to be farmers basically, we used to be growers and we used to be peddlers and we use to sell plants. Now we're building relationships, we're selling concepts, we're selling architecture, you know, we're selling, you know, higher-end stuff… at least in our area.

The industry also believes its services are in higher demand.

(Carl, an industry Top 100 executive) So I would say just our whole industry is looking -- is going more toward us being considered on the same par as, you know, a lawyer, a doctor, or some sort of a specialist that people need.

(Carl, an industry Top 100 executive) Years ago it seemed to be kind of a luxury item, those who either got it or could afford it, now seems to be more of the norm because people are more and more expanding their living to the outdoors. I mean outdoor kitchens are huge, outdoor fireplaces are huge, extensions of their home into the outdoors. And so you know, we as landscape architects and professionals need to be able to offer these things and be proactive in it... Whereas years ago we were basically selling plants...

(Daryl, a senior industry educator) I think we go back to the whole, you know, call it the renaissance generation or whatever you want to call it but just an upgrade in how people view their environment and their surroundings, whether it's at home or at work or while they travel, I think there's a greater appreciation for what the green industry provides.

(Jeff, an industry professional association executive) For our members, with respect to sustainability, (it is a) very, very big issue for us, and this is not a bandwagon issue for us like it is for a lot of people, a lot of companies. This is something that is at the core of who we are and what we do as an organization, you know. We are the green industry, and we take that very seriously. So we're not, you know, looking at a whole lot of PR and marketing and fund-raising, all that for, you know, to change the "image" of our industry. That's an expensive proposition and it's, as I say, that's kind of a bandwagon approach... Our approach is more fundamental than that which is, you know, to be good stewards, don't just talk about being good stewards but actually, you know, live that ethic. So that's a huge issue for us right now.

Rising energy prices and their direct and indirect effects on other prices are also encouraging the green movement. These rising prices along with a general movement to green are affecting people’s behavior as shown below.
(Frank, an industry professional association executive) Well, I think there are several things going on that could have an impact on it. One is energy prices. And I think that energy prices have gotten to the point now where it's actually beginning to affect behavior. If they persist, I think it's going to impact behavior in a fairly dramatic way. I think you're going to see more people going to smaller lots, living in closer to the city, so just the amount of land area that, you know, is available to have professional landscaping done, that's going to stabilize, or it's not going to grow as fast, because people will be more in townhomes or homes with smaller lots and that sort of thing. So I think just the opportunity to do landscaping is going to be a smaller. So I think I could see that slowing, that growth in the industry slowing. I think there's still going to continue to be people are still going to want their place to look nice and demand on services in the landscaping of things, I think that will continue to grow.

The movement to green has also launched new areas related to the landscape area.

As homeowners and business owners put more value into their landscape, they want to ensure that value is sustained as shown below.

(Jeff, an industry professional association executive) One of the things you might want to look into is a product or service called Money Grows on Trees...there's a website, moneygrowsontrees.com or .org, I'm not sure what it is, but essentially what that -- the underlying trend or the underlying need there is to increase the -- not just the perceived value of plants, but the actual value of plants... They have developed a database that actually quantifies the plants in the installment of landscape... And they're now in the insurance areas, in other words, now people can actually buy horticultural assessment, Horticultural Asset Management is the name of the company... And you can actually get an assessment, you can get it insured, the realtors are onto it now so appraisers can then integrate, you know, horticultural assets into the value of the real estate.

They will just want to do so knowing they are preserving the environment around them and wasting little resources. So customers can hire this environmental manager to help them lead a greener life while keeping their property values up. After all, the company that cares for their exterior and interior green spaces should also be able to aid them in their quest for a greener tomorrow (Professional Landcare Network, 2007).

(Steve, an industry Top 100 executive) I think just the awareness, and the appreciation for the outside, the greater environmental sensitivity and awareness and, you know, dramatic increase in products available and ideas that have bloomed up, you know, you go to a Home Depot and they're selling plants, Lowe's is selling plants and flowers, and of course the outdoor kitchen now, and outdoor living spaces are...big. And I think
on the commercial front, people have realized that there's a connection between how the outside looks and how much they can charge for rent, and how, you know, how competitive their product is. So there's a greater appreciation and acceptance of an investment in landscape on the commercial side.

Industry documents acknowledge the large growth in population and changing priorities and interests and their impacts on all industries including the landscape contracting industry. They believe the changes are leading to unprecedented challenges and opportunities. For example, the large numbers of baby boomers with greater amounts of spendable income are seen as part of the increased need for services. They also claim that baby boomers and people in general allow less time to build and maintain their own landscapes. Companies are urged not to waste a customer’s time but instead to understand that assisting their clients with lack of time can be a real value added service called a concierge concept.

Demography is another big factor affecting change. The world population is now 6.5 billion people, and is expected to be at least 12.5 billion by the year 2100. It has taken the world millions of years to get this far and now we’re going to do it all over again in just less than 100 years. The implications are phenomenal. According to the U.S. Census Bureau, the U.S. alone has 301 million people today and is expected to have 308 million by 2010 and 335 million by 2020. By 2050, the U.S. population will top 400 million. Many historians say this surge in population marks a major watershed in American history, leaving people with unprecedented challenges and remarkable opportunities (Professional Landcare Network, 2007, pg. 5).

With the relative abundance of material goods available, the new scarcity is one’s own lifespan limit — time. In relative terms, two weeks to an 8-year-old seems like an infinite amount of time, but for an older person, time always seems to fly by. The reason? Their perspective on time is different (Professional Landcare Network, 2007, pg. 19).

Your customers see time the same way as you do, they don’t have enough of it. Historically, companies waste a customer’s time as if it was a free good. But for customers, landscape and lawn care professionals are not
significantly relevant to their time. In today’s society, both parents in a home work and two-day weekends usually don’t offer enough time to take care of all that needs to be done inside and outside of a home (Professional Landcare Network, 2007, pg. 19).

(Frank, an industry professional association executive) ...Landscape contracting side, that’s exploding and I think because mainly demographics and, you know, folks more and more want to have a nice looking yard and all that kind of stuff but not having the time to put it in, maintain it themselves, the whole movement toward outdoor rooms and outdoor living and being kind of the shift from focus on plant material to hardscaping, you know.

Another finding supporting the fact that baby boomers contribute significantly to today’s economy is research showing that today’s average American family is better off than the family of 30 years ago, meaning they can afford to outsource their outdoor work. In October 2006, just after the U.S. population crossed the 300-million mark, Forbes.com posted an article comparing the average family from 1967 to the average family today. The average couple’s $46,326 in annual income is 32 percent more than their mid- 1960s counterparts, even when adjusted for inflation, and 13 percent more than those at the median in the economic boom year of 1985. The typical American household has a net worth of $465,970, up 83 percent from 1965, 60 percent from 1985, and 35 percent from 1995 (Professional Landcare Network, 2007, pg. 20).

Then there is Generation X, the children of the baby boomers, or anyone born from 1965 to 1981. This generation is known for its use and experience with technology. While technology, such as e-mail and the Internet, has saved them time, this generation seems to have filled that time with other things, such as work and hobbies, some of which include the excessive use of this advanced technology. There is a much greater need for green industry businesses in this generation because the demand for leisure and available time has become incredibly stressed with 82 percent of households being dual-income today, where both the husband and wife are working. Another piece of good news for the green industry is that this generation doesn’t seem as interested in DIY projects as the baby boomers, meaning more work for landscape and lawn care professionals. But this generation is also harder to work with. While baby boomers like face-to- face contact, Generation X-ers would prefer to e-mail information back and forth, wasting as little time as possible. Because of the Internet, they are also more knowledgeable than their counterparts in previous generations, so they ask more questions and are pickier about final results (Professional Landcare Network, 2007, pg. 20).
Many in the industry believe that the industry as a whole has a number of significant problems based around different aspects of business with the first problem being a general lack of business knowledge. Business knowledge is grouped into issues related to sales and marketing, human resources, operations, and business management.

The following quote details the level of business knowledge and interest in the industry. He was specifically asked about the level of business knowledge and responded as follows.

(Lance, an industry Top 100 executive) It's fairly low...if there's low, medium, high, I'd say it's low. I think that -- my observation has been that most people that are in this industry are in it because they love plants or they like doing landscaping, they like the equipment, they like the process of doing a job and seeing the results and that sort of thing and so they're in it for that reason and the business part of it is almost secondary. And I think as a result of that, many don't do as well as they could.

The implications of the perceived low level of business knowledge are central to Staying Green’s business model and associated information system.

The first business issue for the landscape contracting industry is fragmentation and the results of such fragmentation. The industry considers itself to be fragmented based mainly on the existence of a large number of small businesses that don’t interact with each other as illustrated below.

Currently, the industry is a fragmented one because green industry business owners, for the most part, don’t know or reach out to each other – they live in fragmented boxes. But with the speed of information traveling over the Internet not just from state to state but across the world, the committee doesn’t see how the industry can remain fragmented in 13 years (Professional Landcare Network, 2007, pg. 15).

In an interview with Lance, he outlined the industry tiers, business development problems and fragmentation as follows.
(Lance, an industry Top 100 executive) …I think it is a problem for the industry because you have -- look at how fragmented it is. There's 50 companies probably in landscaping that do more than 20 million a year…In the whole damn country….And then between, you know, over 10 million, there's probably 150 of them, and from 5 million to 10 there's probably another couple hundred, and then there's just thousands upon thousands that never quite make it to a million or 2 million bucks. That's highly, highly fragmented. And why is it so fragmented, why is it happening; because these guys don't know how to drive their businesses to a more professional -- to the next level.

Lance continued to discuss the results of the business development and fragmentation by saying,

(Lance, an industry Top 100 executive) I think what's happening is you have a lot of people, they get into business and they can just barely keep it going, and you know, it pays their way, and they run it like proprietorships (or hobbies), and if that's what they want, that's fine but I think it's really about an underutilization of their skills and their potential... When it becomes a problem in the industry is people that operate ignorantly often band and at very low margins and so that's the proverbial guy with the mowers in the back, you have to compete against that, right, people that are willing to work for wages instead of run a business. And so the problem for the industry is that drags the industry down. The cost of entry is so low and people can come in, do work, make mistakes, go out of business and then re-enter again. That's where the problem is…It drags -- it's a lower quality that drags the whole industry down.”

Some of the companies join industry professional organizations because these organizations attempt to address larger industry issues like fragmentation by organizing a membership. Unfortunately, many of the companies join for reasons generated by short-term interests as illustrated below.

(Frank, an industry professional association executive) We've got a pretty wide diversity of sizes of business. I think it depends on the personality of the -- I mean a lot of folks, they want to distinguish themselves and say, you know, we're different than the other guys, we're professional so we offer certification programs, and I think a lot of companies use it for that, and that's really what they're interested in, is I can say I'm a member of PLNA and therefore, you know, we subscribe to higher standards, we're
not like the other guys that are just driving a truck around. You know, and then you have a small proportion, probably 10 percent or less, who are in it because they want to not only improve their company, but the whole industry, you know. They want to, they get kind of that larger view of things and these are people then that come to one of our professional programs, participate in the governance of the association and serve on committees and volunteer, do stuff like that.

The Professional Landcare Network, PLANET, is an industry professional organization. PLANET has a working committee called the Crystal Ball Committee that meets yearly and produces a report called the Crystal Ball Report. These reports vary in topic but are supposed to look into the future of the industry. The latest report outlines many of the issues faced by the industry, including fragmentation and the resulting image problem.

Math teachers are nerds, surgeons are arrogant, and only a fool trusts a lawyer. Every industry has its negative stereotype to overcome, and landscape and lawn care professionals are no different. Despite the huge strides the green industry has made to increase professionalism, the image persists of uneducated slackers who can’t hold down “real jobs.” …This is probably the biggest challenge the green industry must face. It was a factor when Crystal Ball Report #9: Landscape Contracting Today and in the Year 2000 was written in 1989. Then, image was defined as “what we are perceived to be, not necessarily what we are,” and this holds true today. While the green industry’s image does seem to be improving extremely slowly in some markets or with companies offering certain services that customers deem more specialized, the landscape market is still defined as an easy-entry business. This means anyone who enjoys working outdoors and is willing to make a minor investment in equipment can start his own landscape business in a weekend. These are the companies that typically don’t have uniforms or logoed trucks yet and usually aren’t extremely polished with customers. Unfortunately, they contribute to the industry’s unprofessional perception (Professional Landcare Network, 2007, pg. 11)

Another result of fragmentation is a lack of political lobbying as shown in the following dialogue with Jeff.
(Jeff, an industry professional association executive) People should get involved in politics, because there is a direct link between things that happen politically locally all the way to the national level that directly affect their business. And if they don't know the chairman of the local school board, the local water board, the people working in the zoning office, if they don't know where the office is of their congressman, they're really missing out on a key, key piece of their future…Political knowledge and political expertise is an integral part of business knowledge. Especially in our industry, Mike, if you think about it, the water issue. There are plenty of places in this country where there's a water problem, whether it's capacity, in other words, they've done an inadequate job of building infrastructure or it's weather based, two different things…You know, a place can have plenty of rain but still no water because the politicians haven't invested enough in building capacity. Well, they're looking for somebody to blame, they're looking for a quick easy solution that will protect the most votes. So what they're looking for is to pick on the landscape industry because it's a very visible form of water use. Whereas if you look at it, they'd be much better off mandating cutbacks in water use by the manufacturing sector, the brewerries, whatever you want to call them. And so if anybody in this business thinks that they can just sit back and let things happen to them, they're really being foolish. They've got to get involved, know the people that are making decisions regarding their resources that are made available to them.

Fragmentation in the industry has partially been helped by some consolidation. Several larger companies have purchased other companies, resulting in some very large companies, as shown in the following dialogue with Daryl.

(Daryl, an industry senior educator) So I think, I think in general in the past, I'll say 20 years, there's been a substantial shift to higher level professionalism in the industry. Partially pushed by these bigger companies that either rolled up or have amassed smaller companies to create big companies and they have, they have upped the bar. They've said, okay, we're running this as a business, landscaping is the business we're in, as opposed to, I'm going to be a landscaper, I'm going to have to learn some business skills…But I do think that it's been for the better. I think that these companies have, have helped the industry. I think perceptions of landscaping, certainly they're all over the map, but in general, I think people understand now that there were companies that are very, very well-run businesses and respectable businesses and it just happens to be landscaping that allows them to do it.
Part of the consolidations has come by means of outside investment in the largest companies in the industry. For example, Michael Dell’s investment firm has purchased a significant portion of one of the large companies. I asked Daryl if he thought this outside investment had anything to do with the reduced fragmentation.

(Daryl, an industry senior educator) Certainly that’s part of it. Whenever you get outside investors, they have demands...And professionalism and paying attention to the business side is right at the top, you know, they want payback, and I think that has had an effect. I think we go back to the whole, you know, call it the renaissance generation or whatever you want to call it but just an upgrade in how people view their environment and their surroundings, whether it's at home or at work or while they travel, I think there's a greater appreciation for what the green industry provides.”

While consolidation may help the industry, there are only a handful of large companies as compared to the many thousands of small businesses in the industry that have a large impact on continued fragmentation. The industry may reduce some of their problems by continuing to address the issue of fragmentation and associated results.

As inferred from the fragmentation section, there are a large number of companies in the industry with a lack of necessary business knowledge to run a profitable business. The industry believes it has a lot of small businesses because of low entry barriers. The low entry barriers combined with fragmentation and poor business skills means that many small businesses enter and exit the industry. These small businesses, tier five, are believed to cause lower profit margins because the owners are willing to work for wages, they don’t provide benefits or steady employment, and/or they don’t carry insurance as noted in the following statements with Daryl.

(Daryl, an industry senior educator) I think it hurts the industry if they're not professional, there's a lot of them that aren't. They're, you know, mower in the back of the truck and probably aren't paying workers comp or aren't insured, not members of professional organizations like PLANET or PLNA, and I do think that they hurt the industry if they're not doing top
quality work. The other place it hurts is that they probably, or may not understand enough about their business to know how to charge, so you got people who are -- don't understand the overhead and overhead recovery methods and so they'll come in and say, well, you know, I'll mow this property or maintain this property for $40 a visit when, you know, a more professional company comes in and looks and says, well, my break-even point on this property is $42, I can't possibly do it for anything less than $52. So, you know, in that sense it does hurt because you get these -- I don't really want to label them fly-by-night because they're not really necessarily fly-by-night, but less than professional companies out there mowing doing maybe not great work, they may not have the horticultural background to know what to do, you see it all the time with tree work. That was just -- just last couple days, and I saw trees were topped, just horrible, horrible horticultural stuff, just, you know, haircut, all these sprouts coming up and I thought, you know, it's really too bad there's people around like that that will do that kind of work...So if you look at that as the average, we know that there's some really big players, that means there's a lot of small players. And there are. Because you can get into it, that entry threshold is low, you can call yourself a landscaper with $200 Sears mower and, you know, you walk it down the street, mow your neighbor's yard, you can call yourself a landscaper with basically no knowledge other than follow the stripes...

The number of small businesses plus the method of operation is seen as impacting those companies that wish to make the jump from tier five to tier four. In other words, those companies that desire to move from entry-level stage into the market to a more established industry position. These are the companies referred to as tier four in this research or the companies attempting to move from hobbies to businesses. An interview with Pete provides an example of this point.

(Frank, an industry Top 100 executive) Well, it's a problem for those companies particularly in landscape contracting that kind of want to begin to professionalize because what happens is their entry barriers to starting a landscape company are so low, you get a truck, you get a lawn mower and you know, you're in business... You know, and so these guys are not paying their Workers' Comp., they're not paying their sales tax, you know, and all this kind of stuff. They're kind of flying under the radar and some of them are also part time, very seasonal, just work during the summer and they'll do something else like sell firewood in the winter or, you know,
something like that. So when you take a look at, okay, here's a company and its revenue is $25,000 a year, you figure how can anybody make a living like that? Well, they're not, they're doing other things as well.

Another business issue for the industry is a lack of financial planning. Many of the people interviewed believe that the average landscape company reacts only to day-to-day issues rather than operating on a sound financial plan. For example, sales in the industry are often driven by phone calls from potential clients. The clients tell the company what work they'd like to have completed and when they'd like it to be completed. Operating on a reactive sales approach means that projected revenues and other financial indicators are difficult to estimate. As a result, companies have limited information with which to conduct financial planning and other resource related issues.

Carl discussed planning in detail as represented below.

(Carl, an industry Top 100 executive) Well, any time you're running a business, if you're lacking business knowledge, it's got to be up there and pretty important. As I look into business knowledge being more than just numbers, I mean it's a whole planning process, it's a -- you know, it's a strategic plan, it's, you know, being proactive, it's being -- it's being, you know, kind of ahead, trying to anticipate the problems that might happen in the future, that's all part of good business... And I think a lot of people in our business seem to be reacting as opposed -- reactionary as opposed to being proactive and saying, okay, what are my -- what do I need to overcome five years from now to be successful. And I think that's an area where it's kind of unusual to find the understanding of that... You know, if you're just looking at numbers, you know, you can have a business person who's very satisfied making 2 percent profit on their investment, all the bottom line goes to the owner, they have their employees and they move on, you know. I mean, you can have other people that have, you know, a 90-year history that intends to be around for another 90 years and how you going to go about doing that?

A lack of financial planning is often expressed through human resource decisions. For example, since many companies don’t have a sound financial plan and earn the majority of their revenue in the nine months of Spring, Summer, and Fall, they spend
money only during these periods as well. In human resource terms, this means they hire and train only during these nine months of income. An example of this issue is discussed below.

(Carl, an industry Top 100 executive) I see a lot of companies that refuse to hire other than during the busy season which to me is ludicrous because the best time to train someone is when you're not so busy. I'd rather hire someone in December and put them out on the road in May than hire them in May and have them, you know, floundering. And so I have a lot of companies and recruits that come to me and say nobody's hiring, and again, part of the mentality is, well, we're slow in the winter so we can't afford to bring people on. To me, again, that's kind of a lack of a big picture, that's lack of understanding of how, you know, how things really run. Anybody you bring on is going to take time for them to be able to produce for you. So the quicker you can accelerate that learning curve, the quicker they're going to be beneficial to you.

A lack of financial planning and the resulting reactive nature of the industry is a major business issue that should continue to be addressed by industry leaders. Financial planning driven by proactive sales and hiring processes is an important part of the services offered by Staying Green.

As with other agricultural fields, much of the labor force in landscape companies across the United States is often Hispanic. While the Hispanic labor force has been extremely helpful to the industry, it can be unreliable due to changing immigration laws. The industry continues to raise issues with labor force because of problems now and potentially for years to come. The PLANET Crystal Ball Committee discussed the issue of labor as follows.

...the green industry has had problems finding adequate labor for years. In addition to recruiting and hiring quality workers, other recurring challenges include finding middle management personnel, conducting regular training in order to grow each worker’s skills and promotion potential, and dealing with rising health insurance rates (Professional Landcare Network, 2007, pg. 14).
Another issue with the Hispanic workforce is that it is very dynamic. As Hispanic workers spend more time in the United States their needs and desires change and hence, may not provide a complete solution in the future as discussed below.

Also, today, a healthy percentage of green industry companies have grown to rely on Hispanic or H-2B workers as their American labor force dwindled. This was not the case 13 years ago but has become more relevant over the past five years. The committee members feel that 13 years from now, Hispanic or H-2B labor may not be an option due to economic improvements in these workers’ home countries and demographic shifts in the American population. While the industry is focused on fighting immigration law battles now to maintain this workforce, realistically this may only be a short-term battle. The loss of this workforce is a major threat to the green industry’s future, but, … it also forces landscape and lawn care professionals to prepare for who might replace these workers down the road (Professional Landcare Network, 2007, pg. 14).

In one of the macro interviews Steve also discussed the changes in the use of Hispanic labor with the following statements.

(Steve, an industry Top 100 executive) I think what -- I think the next major change in our industry is going to be the next generation of Hispanic workers, who start their own businesses. That's happening now. There's a dramatic increase in Latino and immigrant-owned businesses. I thought it would happen quicker than it has, you know, Martinez Landscape Company. But I think that's a dynamic that is one to watch. I think that could affect all companies. I think they'll be hungry, hardworking sort of new generation of companies that are growing across the company. They have one huge advantage on every other, most other companies, the owners speak the language… And they understand the culture. And that is something that could change the rules of the game a little bit across the board… I don't know, but I think that's -- and I could be the only one in the world that thinks that, but I thought we'd see more of it five years ago, even ten years ago, I thought that that was going to happen quicker than it has. It's gone slower than I think, but it's beginning to happen. Maybe it will be ten years before it really has an impact, but then you're going to have the second generation of those workers, the sons and daughters of the guys that work for us for 15 years are going to be coming out and speaking English and Spanish and, you know, thinking about their career.
The Crystal Ball Committee suggests alternative ways to cope with workforce issues by thinking beyond traditional methods of Hispanic labor as discussed below.

Additionally, when dealing with the threat of a shrinking labor force, the committee thinks the industry must reposition and market redefined career opportunities for both first and second career workforce candidates. This repositioning must emphasize the unlimited industry entrepreneurial opportunities, the desirability of the green industry work lifestyle, and the contribution that green industry careers make to the quality of life in communities across America. This marketing must promote these positive career attributes while communicating that green industry careers command high wages for a highly skilled workforce… The industry must also promote a flexible, redefined workforce that will include workers at all stages of their work lives and in all types of part-time/flexible work arrangements, including working a few days a week, working from home, working half days, and working from remote, out-of-the-area locations. The industry must consider attracting women, young and old, for many of the traditional male jobs. With advances in equipment, the industry will be able to consider employing older workers who have retired from their careers as teachers, government workers, public sector workers, auto workers, etc., and have a desire to work to add to their retirement income (Professional Landcare Network, 2007, pg. 15).

The Crystal Ball Committee has considered lifestyle changes of all workers and continues by making the following recommendations.

Finding and retaining an adequate, quality labor force has always been a landscape and lawn care professionals gripe. And as technology improves and today’s children go to college looking to start in a white-collar versus blue-collar career, the labor pool continues to shrink. Today’s worker wants a lifestyle, one where work is not something to be planned around. Instead, offerings like flex time and part-time will become vital. Enjoying one’s personal life and having a career have become goals that need to be attained simultaneously instead of separately or singly. As Fast Company magazine points out, “tension doesn’t come from what goes on at work or what goes on at home. It comes from the relationship between work and home. People are fighting to keep work from taking over their lives (Professional Landcare Network, 2007, pg. 25).

The changing work force of the landscape industry is a critical component of any organization offering business services to the industry. Staying Green and other companies must account for the current and future work force issues when designing
their services and associated information systems. With an overview of the cultural views and associated issues in the industry, the next section addresses cultural views of people in the industry.

### 4.1.2 Views of People

STIN step one is concerned with people or system interactors. Step one provides guidance on seeking to understand characteristics of people. These characteristics of people are important when designing a business model and/or information system, both important for this study.

The previous section talks about a portion of the people in the industry, the Hispanic labor force. While this labor force is important for the industry, there are other important groups as well, namely the remainder of the labor force and the owners of the companies.

Many of these people enter the industry in the same way. As discussed earlier, the industry has a low entry barrier. Many people take advantage of the low entry barrier to start landscape businesses. They purchase a pickup truck, trailer, a few mowers, and various other equipment. They seek out a few clients and begin to mow grass.

They have varied educational backgrounds, but typically possess a high school diploma. Educational backgrounds have changed over the years based on the number of programs and students studying landscape related programs in college. While more college-educated people have entered the industry in the last twenty years, the vast majority of owners and workers possess a high school diploma. A high school diploma continues to be all one needs to get started in the industry (Daryl, an industry senior educator).
Workers in the industry are often categorized into three groups. The assumed characteristics of these groups are the important element for this study. The groups are owners, field workers, and office workers.

Each of these groups performs different kinds of work. The owner shifts his or her time between the office and the field, often connected to both through a cell phone. The field workers perform the physical manipulation of the industry and the office workers perform the information manipulation.

Office and field workers are typically quite different based on the type of people drawn to each type of work. Office workers are typically women who receive phone calls from clients, potential clients, suppliers, employees, and owners. Overall, they perform coordination duties among entities in the business and process basic financial information. Field workers are typically younger men. They tend to be younger because of the extreme physical nature of the work. These workers also tend to enjoy working outdoors to physically manipulate the natural and man-made worlds.

The difference between the types of workers is important not only based on the characteristics of the people but also based on the view of work. This view of work and success is discussed in the next section and summarized by Pete.

(Frank, an industry professional association executive) I love this industry and I think the thing is that people that get into it are pretty much salt of the earth, pretty much say what’s on their mind, plain speaking, you know, that sort of thing which is what I like about it. They tend to know how to have fun too which is always good. They work hard.

The idea of hard work is an important concept that is explored in detail.
4.1.3 Views of the Work and Success

STIN step three is about identifying incentives. In other words, what motivates the organizations as a whole and what motivates each group and person. In the landscape industry the major incentive is based on their view of work and resultant success. These views of work and success are a major differentiator between the business tiers. Since tier four is of interest for this study, this section focuses on that group.

In the previous quote, Pete discussed the idea of working hard. Many of those interviewed described people in the industry as hard working. Because this idea was so prevalent in the interviews and literature it deserves more discussion here.

When asked to describe what hard work means, the response was always related to physical activity. The hard work was related to the field workers performing the strenuous physical work of manipulating the natural and man-made worlds. However, mental work, such as might be performed in an office, was not generally thought of as being part of the description of hard work. People in the industry take great pride in their hard work and even the idea of outworking each other. Steve, when asked to describe the people in the industry summarizes this view of work.

(Steve) …people that are attracted to this enjoy being outdoors, that sense of having the job, you know, that craftsmanship, doing it well, being able to then, when you step back and say, that’s what I did... And the job’s done, you know, and it’s like, okay, on to the next one…

Landscape companies also refer to the difference in field work and office work as production work and non-production work. Since the dominant view of work is the physical manipulation of the physical world, then production work is physical work. On the other hand, since office work is not the physical manipulation or hard work then it is called non-production work. The production workers are producing the product and the
office workers are supporting the production of the work. This view is very important in understanding a firm’s notion of success.

If hard work is the physical manipulation of materials then success is based on this same view. Success therefore is based on the firms that work the hardest, manipulating the most materials with the most equipment. In other words, a successful firm completes either the most landscape jobs or the biggest landscape jobs. They do so by having either more equipment than their competitors or by having better equipment, newer or more powerful, than their competitors.

Success is often translated by the owners through the type of vehicle they drive, often a large truck or expensive car. Long-term financial success is often not taken into account. The owner often works for wages, just like employees or simply takes what is left over after the bills are paid.

Depending on the level of success of the firm success may also mean owning a nice property for the business. The property, referred to as the yard is the place where equipment and materials are stored and the office workers are housed. Again, because of the view of work, the office is typically very modest, often in the basement of the owner’s home.

The idea of enjoying the physical work, valuing the results of the physical work, and owning large amounts of equipment are central to the industry’s view of itself. Many industries seem to have their “toys” and in the landscape industry, the important equipment or “toys” are not computers, but rather the equipment that helps to physically manipulate the environment. Computer equipment is not considered to be “toys.” Equipment like dual wheel pickup trucks and backhoes are interesting and considered to
be both valued for what they can do and a sign of success. Again, the running of a business is often not discussed as a motivator, rather the outcomes of the physical manipulation is focused on as the reason for running a landscape company.

4.1.4 Views of Information and Communication Technologies

STIN step five is concerned with existing communication systems in the organizations of study. The STIN strategy is concerned with an introduction of new ICTs and the potential for competition with existing ICT based systems. Because this study is ultimately about design conceptions of an information system associated with the landscape industry, it was important to gain the industry’s view of ICTs.

For this industry, separating information technologies and communication technologies is important. For this industry at tier four, information technologies are analogous to small or stand-alone computer-based office systems, whereas communication technologies are analogous to cell phones. Since email use is typically low, communicating with computers is not a priority. ICT use and the separation of computers and cell phones are summarized below.

(Frank, an industry professional association executive) But it’s funny, we got a call from a landscape contractor just this week who wanted to join the association and the person that took the call said, well, I’ll send you a link to our website with our – where our application is, (and he) said, I don’t have any access to the web or e-mail. Well, okay, we’ll fax it to you, (and he said) well, I don’t have a fax machine either. Can you mail it to me? So there’s still – there are still those out there. But I think the rate of adoption is, I think it’s behind other small businesses and I think one of the reasons for that is our folks tend not to be sitting down much in front of a computer, so if you – you look at the landscape contractors and they were the early adopters of the PDAs and cell phone usage and – because they were on the move all the time but needed to stay in touch with their office and the crews and stuff like that.
Since the hard work happens in the field, cell phone based communication technologies seem to have faster adoption in the industry as noted above. Many of those interviewed said that their mobile technologies were more important to them than their stationary information technologies. The adoption of mobile communication technologies is evident in the following discussion with Steve.

(Steve, an industry Top 100 executive) When we started business in early, you know, from 1972 to 1981, if you wanted to talk to someone, you pulled over, you took out a dime, you got on the phone...You know, and that’s, and your – when you sent your crews out for the day, you had to be very thorough because there was no “I forgot the rake” opportunity, they had to have everything. In a way, it forced you to be more organized; you had to have it all right. They went out, they came back done, and communication was very limited, you know. So then in the early ‘80s, you got the two-way radio, you paid $2,000 for the base unit, and 800, $900 at that time for the radio that went in the vehicle. But boy, what a technological advancement that was at the time. Of course by seven, eight, ten years later, cell phone came out, I don’t know what it cost in the beginning but it wasn’t cheap, it was far cheaper than the mobile phones, and you know, after about 12, 13 years, those have disappeared out of the trucks and mobile phones took over. And of course before mobile phone really got going, it was the pager in between, and then the mobile phones and now these things which allow so much greater communication, at such a fraction of the cost...I mean, most of our mid-level guys are carrying these, a lot of them, lot of our field level guys now are carrying them.

A detailed sense of ICT usage in the industry was provided by several of the people interviewed. The industry is quite varied so people were asked to provide a glimpse across the different tiers of companies according to size.

(Daryl, an industry senior educator) As a whole, the larger companies (tiers one) are pretty good, I mean they’re pretty much up to date, they’re using information technology to their advantage. Not in all cases, but pretty much they’ve had to, they wouldn’t be billion dollar companies or $500 million companies without it. Some of them were I think actually pioneers, back in the early 70s, realizing that computers were the way that they were going to be able to grow and, you know, one company in particular now, they still are using data that they’ve compiled since 1972 on production rates and costs and, you know, they’ve just got an incredible
database and reliable database of everything they do. Yet there are some large companies in the bottom landscape top 100 (tier 2) that I think are minimally equipped in information technology, and you know, they may have, I think they probably all at that size have got, probably everybody in that top 100 list is using back office technology of accounting programs, they have to, accounts receivable and accounts payable and all that stuff.

Asked about the companies outside the top 100, tiers three, four, and five;

Daryl continued as follows.

(Daryl, an industry senior educator) That’s a problem because you get into the smaller companies, and number one, if the owner doesn’t have the skills to work those information systems, then they’ve got to hire somebody that does. So that’s expense. And smaller companies got to look at that expense and say, okay, that person, I’m going to hire a person for $30,000, what’s my return on that person? If I put them in the field, I know what the return’s going to be, they’re going to make money for me, if I put them in working on the computer, I’m not sure if I’m going to get my money’s worth out of them. Or they look at it and say, for $30,000, I can go out and buy a new truck, I know that will make money for me, then I’ll have another truck. So I think there’s some issues there with owners being wary of the cost. They may know they should be doing it but they’re just not sure, you know, and part of that’s not being sure of what they need. Do I need something other than Excel, do I need somebody who can actually do Excel, do I need accounting software, do I need a bidding package, do I need accounting software, do I need to have these things talk to each other? You know, what is the – what’s the whole picture? There’s a lot out there and it’s scary, and you know, I know I need to do it but I just don’t know what to do.

In the lower tiers, Daryl believes the owners view of work, along with a general discomfort with information technologies, leads the owner to focus on production people and equipment rather than information technologies and non-production or back office people.

These industry-centric views of ICTs are an important consideration when designing information systems for the industry. Based on the view of work and lack of general knowledge with computers systems, cell phones have a much higher rate of adoption and are seen as more useful than computer systems. Essentially, cell phones
have become part of the production equipment but computers are part of the non-
production or supporting equipment.

4.2 Excluded Actors and Undesired Interactions

Figure 4 represents a typical Tier 4 landscape company with respect to excluded
interactors and undesired interactions. Figure 4 also includes items representing existing
communication systems.
STIN step four concerns excluded actors and undesired interactions. Typically this step refers to actors and interactions as they relate to the information system. Since this STIN analysis is happening at the industry level, the actors and interactions concern
general perceptual issues in the industry. Excluded actors and undesired interactions will be discussed in relation to the information system in the micro analysis of the study.

Excluded actors at Tier 4 include other landscape companies, clients, and employees (see Table 8 and Figure 4). The actors are chosen because most landscape companies in tier four are owner centric. The owners make most of the significant decisions at tier four companies. Owners are attached to the cell phones because little happens in the company without them.

As noted in the fragmented section, few owners at this level know or interact with each other and few companies join industry professional organizations. This interactions is represented in Figure 4 by a dashed line, indicating little to no interaction. Therefore, potentially useful interactions between landscape companies rarely or never occur. For example, the sharing of best practices concerning financial planning or employee hiring are rare.

Employees are also excluded actors. Their communications with the owner are represented in figure 4 by the size of the arrows between the owner and different employee groups. The arrows pointing towards the different employee groups are large, indicating the majority of the communication and information transfer. On the other hand, the arrows pointing from the employee groups to the owners are small, indicating less communication and information transfer. While the employees work for the company, they are rarely involved in any significant decision-making. Potentially useful insights from employees often go unheard. An owner centric business also leaves little room for employee growth and promotion. Therefore, the company can go only as far as the number of hours an owner can work and stops when the owner runs out of new ideas.
Table 8. Excluded Actors

<table>
<thead>
<tr>
<th>Excluded Actors</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competitors</td>
<td>• Few owners know or interact with each other</td>
</tr>
<tr>
<td>Employees</td>
<td>• Not involved in significant levels of decision making</td>
</tr>
<tr>
<td></td>
<td>• Not able to share potentially useful ideas</td>
</tr>
<tr>
<td></td>
<td>• Little room for growth</td>
</tr>
<tr>
<td>Clients</td>
<td>• Communication with licensee owner only</td>
</tr>
</tbody>
</table>

The last group often excluded in the Tier 4 companies is the clients. While this may seem odd, it has to do with how owners view their clients. During participant observation of a Staying Green training session, employees from new licensees were asked to describe the ideal client. Ideal clients were described as those that paid their bills but had little interaction with the company and its employees. Client interaction was seen as annoying and distracting from the work. Field workers typically don’t enjoy interacting with clients. The interaction is typically done between owners and clients as much as possible. This interaction is represented in Figure 4 by a direct line from clients to owners, indicating the lack of interaction between employees and clients. This is another industry view that must be addressed by the business model and information systems of Staying Green.

The other portion of STIN step four is undesired interactions. Again, these are undesired interactions at the industry level of tier four companies. These companies have two main undesired interactions (see Table 9 and Figure 4).

The first undesired interaction is that of the owner working in the office. This undesired interaction is represented in Figure 4 by the two colors in the owner circle. The purple color represents the amount of time the owner spends in the field and the green the
amount of time in the office. Typically the owner of the company enjoys the physical work of the landscape industry and attempts to avoid the “office” as often as possible. The “field” represents problems that can be solved. For example, solving a technical issue with the installation of a patio is relatively simple. However, solving an accounting issue in the office or calling an upset customer is unappealing. The cultural view of work at the owner level is critical for companies trying to transition from tier four to tier three or from hobby to business. This may be the biggest issue for Staying Green to tackle and is summarized by Daryl below.

Table 9. Undesired Interactions

<table>
<thead>
<tr>
<th>Undesired Interactions</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owner</td>
<td>Working in the office</td>
</tr>
<tr>
<td>Owner</td>
<td>Non-production inefficiencies</td>
</tr>
</tbody>
</table>

(Daryl) Certainly the whole picture of company management, whether that's financial or whether that's HR or whether that's operations, those are all the ability of owners who got in, got into business with a very low threshold who don't have the business skills, they might have great landscape skills, they may be very good in some aspects, but other aspects of business management, they may not be schooled in, may not have the knowledge, the background, the even experience at running a business, making that jump from the field to the office. That's the critical spot, when the owner needs to get out of the field and start working on the business instead of in the business, that's where the -- that's where things typically start to break down...I think that happens around the million-dollar mark, give or take. Part of that is the ability to, and the willingness to delegate, realize that you can't have your thumb on every aspect of the business, because other people are going to have to take responsibility, you're going to have to give them that responsibility, going to have to train them, monitor them and that changes the whole dynamic of what that business owner does day to day. It's tough for some people.

The second undesired interaction, operational inefficiencies, happens in companies at all tiers in the industry. Several books and methods of industry practice
discuss operational inefficiencies. Removing operational inefficiencies is seen as the biggest way to improve profitability in many landscape companies. While these inefficiencies are important to uncover and eliminate, they often use resources that might be more useful in other areas. The use of resources is the topic of discussion in the next section.

**4.3 Resource Flows**

The last section of chapter four concerns resource flows. With an understanding of the self-perception of those in the industry related to industry issues, people, work and success, and the roles of ICTs, a discussion of resource flows becomes possible. Each of these elements is important for understanding how companies in tier four allocate resources (see table 10).

Since hard work is defined as the physical manipulation of the natural environment, resources tend to flow to the production portions of the company. To a certain extent the production portion of the company should have the highest amount of resources due to the cost of the equipment involved in the physical manipulation. For example trucks, skid loaders, and mowers cost relatively large amounts of money compared to computers. However, back-office or supporting equipment is often neglected.
Table 10. Resource Flows

<table>
<thead>
<tr>
<th>Resource</th>
<th>Flow</th>
</tr>
</thead>
</table>
| Equipment | • Equipment costs for physical manipulation are high  
            • Office resources are often neglected |
| People   | • Favors production due to the need for large inputs of labor  
            • People for planning are often neglected |
| Money    | • Directed towards production equipment and labor  
            • Naive understanding of the financial position of the company |
| Time     | • Directed to production labor  
            • Not directed to planning functions  
            • Inconsistent throughout the year |
| ICTs     | • Cell phone usage is high  
            • Computer technology usage is low |

Human resources typically favor production as well. Again, to a certain extent this is understandable. Most of the human resources in a landscape company go to the physical manipulation of the natural world. However, the non-production human resources are critical to the company. While production workers are implementing, owners and office staff should be planning. Often, proper planning is neglected in tier four companies.

Monetary resource flows are typically directed to production equipment and labor. As noted, these costs are typically high. The issue with financial resource flows is that the company is unaware of their true financial information. With the company being owner centric and the owner spending the majority of time in the field, little time or resources are directed to financial matters. The owners assume that if all the bills are paid and there is money left over to pay them then the company is indeed making money. A true picture of overall incomes and expenses or income and expenses per client does not exist.
The majority of time in a tier four company is directed to issues of production in the field. Since production only happens during nine months of the year, the allocation of time is non-uniform. During the busy months, production time is high. This often translates to spending sixty to seventy hours a week, typical in Tier 4 landscape companies during the busy season. However, in winter months, production time is low to non-existent. The inconsistencies in the allocation of time create a work practice that is difficult for the owners and workers. Assisting companies with the allocation of time is another crucial factor for Staying Green to consider.

The last resource flow to consider is that of ICTs. As discussed earlier, cell phone usage in the industry is quite extensive. This is somewhat understandable since much of the workforce is mobile and these technologies are both relatively inexpensive and versatile. An important consideration is the level of cell phone resources needed due to a lack of planning. As represented in Figure 4, owners of typical Tier 4 landscape companies use cell phones extensively to communicate. Potentially significant amounts of time are spent communicating by cell phone due to the previously discussed owner centric nature of these companies. Computer technologies are used but typically for basic financial spreadsheets or financial software like Quicken. Since computers are not considered production equipment, they are not resourced appropriately. Any work with these companies must consider the current implementation of ICTs as part of the future planning process. Staying Green must consider the cost of adding computer technologies to their clients. They must also consider the cultural view of computer technologies as non-production equipment.
These commonly held perceptions of the industry, people, work and success, and ICTs influence the resource flows and frame the working environment of a typical Tier 4 landscape company. These perceptions frame how one might work with these companies on issues of business development. Not understanding these rich contextual issues would lead to an incomplete and possibly naive design of a business and associated information system to support this industry. The options for help with business development issues in the industry are discussed in the next chapter.
5.0 Translation

Through this chapter I present and discuss the architectural choice points (STIN step six) that landscape companies have with relative to business development assistance models in the industry. This chapter outlines the pros and cons of the different choice points with respect to the social and structural issues in the industry (Figure 4).

Figure 5. Dissertation Master Diagram Ch 5
5.1 Client Socio-technical to Architectural Choice Point Mapping

Several models exist within the landscape contracting industry with respect to business development assistance. The models discussed here are franchising, licensing, consulting, training, and landscape business related software, and landscape related business books. Companies and professional organizations provide a range of services to landscape companies looking for help.

Again, the landscape companies of interest here are those in Tier 4, companies that can choose to transition from a hobby to a business. In other words, the owners can decide to run a landscape business rather than do the traditional hard work of the landscape industry.

Owners of Tier 4 companies decide to attempt this transition for several reasons. While the reasons for attempting this transition weren’t the focus of the study, the two most discussed by those interviewed were owner burnout or owner retirement. Owner burnout happens when an owner runs a typical Tier 4 company in “hard work” mode and often results in inconsistent revenue and hours, high employee turnover, and relentless cell phone calls to put out the next fire. The owner grows tired of more of the same from his or her business and wants a change. Owner retirement happens when an owner or owners start considering their retirement. These owners typically want to sell their business to a third party or transition the business to the next generation of family members.

Tier 4 owners do not typically have a vision of what they want their business to become; they simply know that they want it to become something other than what it is today. Whatever the business becomes, they want higher and more consistent pay, more
consistent work hours or to sell the business for enough money to retire. How to transition from what their business is presently to the business that will provide them with what they want is a mystery to them.

In order for the transition to occur at least two changes must happen. The first and perhaps most important is that their implicit view of work and success must change from working “in” the business to working “on” the business. In other words, the owner must transition from doing the traditional hard work of the field to doing a newly defined hard work of the business. The second change that must occur is the translation of general business guidance into the realities of social and structural context of a landscape company. Specifically this translation must occur in the context of the company seeking the services. Both of these changes must happen for the company to have a chance at successfully transitioning from a hobby to a business.

Other changes are also important. For example, the company must change from an owner-centric operation to one where a larger number of employees are empowered to make daily business decisions. The owner must allow this shift of power to occur and the employees must accept the added responsibilities as well.

As shown in Table 11, several options for business development assistance exist specifically for the landscape industry. The focus on these models for this table and for this research is translation. Translation is defined as placing general business development information into the specific context of the landscape company. Further details of these different models are not the focus of this research.

Of course, a Tier 4 landscape company could choose other options as well. For example, a company could hire additional employees with the necessary business
knowledge and a different cultural view of work. While this option and others are available to landscape companies, they are not the focus of this work. The focus for this work is on the options available specifically for the landscape industry.
<table>
<thead>
<tr>
<th>Model</th>
<th>Assumptions</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Franchise</td>
<td>• Owners are proactive, motivated, enjoy meeting people, have basic understanding of sales and marketing but willing to give up significant control</td>
<td>• Start and run a business with reduced risk</td>
<td>• Reduced risk means less control</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Access to time tested procedures, products and equipment</td>
<td>• Territories are controlled by franchisor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Use of a brand for marketing purposes</td>
<td>• Typically pay a percentage of revenue as a fee</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• May have long franchise contract terms</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Individual firm context is not accounted for or allowed in the franchise agreement</td>
</tr>
<tr>
<td>License</td>
<td>• Owners want to transform their business based on the information provided by licensor • Owner can translate information from licensor to their specific context</td>
<td>• Access to intellectual property with less control by licensor than franchise • May also consist of a brand • May account for individual firm context and culture</td>
<td>• Not as helpful in starting a business • Business must have certain amount of revenue to become licensee • Continual licensing fees • Owners are held to licensing agreement in full</td>
</tr>
<tr>
<td>Consulting</td>
<td>• Companies have the ability to translate general business information to their specific context with minimal contact with consultant</td>
<td>• Consultants come on-site to address specific contexts of landscape businesses</td>
<td>• A few days is not long enough to translate large amounts of information • Approach may be piecemeal rather than addressing larger business issues • Crucial, detailed context is missing • Costs are by the day</td>
</tr>
<tr>
<td>Training</td>
<td>• Companies have the ability to translate general business information to their specific context</td>
<td>• Training materials are created specifically for landscape companies</td>
<td>• Each landscape company is not the same • Crucial, detailed context is missing • Crucial cultural views of work are missing</td>
</tr>
<tr>
<td>Software</td>
<td>• Companies have the ability to translate general business information to their specific context • Companies specific contexts meet with the assumptions of the software</td>
<td>• Landscape specific business software takes some industry context into account</td>
<td>• Each landscape company is not the same • Crucial, detailed context is missing • Crucial cultural views of work are missing • Companies specific contexts meet with the assumptions of the software</td>
</tr>
<tr>
<td>Industry Specific Books</td>
<td>• Companies have the ability to translate general business information to their specific context</td>
<td>• Other landscape professionals share business knowledge within the context of the industry</td>
<td>• Each landscape company is not the same. General industry context may not be enough</td>
</tr>
</tbody>
</table>
5.1.1 Franchising
Several landscape franchisors exist in the United States, such as Lawn Doctor and U.S. Lawns. Lawn Doctor, the largest with approximately 500 locations in 40 states, has existed for approximately 40 years.

Franchisors make certain assumptions about potential franchisees. For example, they are expected to be proactive, motivated, enjoy meeting people, have a basic understanding of sales and marketing, but be willing to give up significant control of their company. The franchisor provides an operating system, marketing materials, time tested products and materials and a brand in exchange for royalty fees and certain operational controls.

The franchisor is less interested in issues of translation than other models. The franchisor expects the franchisee to operate as instructed by the franchising agreement. An operating system is provided and the franchisor is expected to follow the guidelines. As such, the franchising model does not account for specific cultural factors of individual firms.

Franchises were not a focus of this study. I am interested in Tier 4 organizations attempting to make the transition to Tier 3 while maintaining more control of their operations. This research is interested in information system design conception within specific cultural contexts.

5.1.2 Licensing
The licensing model is of interest here because it allows the licensees more control of their organizations. Therefore, building an information system associated with a licensing system must account for more contextual information in each client. Staying
Green selected the licensing model specifically to offer their clients detailed translation while maintaining more control of their organizations.

The licensing model assumes that owners want to transform their businesses based on information provided by the intellectual property of the licensor. The model also assumes the owners and employees of the company are capable of translating business information with continual assistance. Licensing may account for more detailed individual context because the licensor has less control over daily operations of its licensees. Licensor success depends on successful transformation of the licensee with less control making detailed contextual understanding and translation is crucial when designing the licensing model and associated information systems.

In the case of Staying Green, licensing is available only to companies that meet certain guidelines including a minimum revenue requirement. Unlike franchises where the fees are based on revenue, a licensee fee is standard for all companies desiring access to the license.

### 5.1.3 Consulting

The landscape industry has a group of consultants who focus on a range of business issues ranging from the more general to the more specific. Because of the nature of their business models, consultants have little control of their clients. The consultants provide contextual business information that the clients choose to use or ignore. Consultants are typically paid by the day as needed by the client rather than through an ongoing contract. Individual firm contextual detail can only be provided through continual consulting days. Typically, a minimal level of contextual detail is acquired by the consultant who then makes specific recommendations based on the standard best
practices. Companies are then on their own to implement the suggestions unless they are willing to pay for more consulting days.

Some landscape companies may be able to make the desired transformation by implementing the consultant’s recommended changes using best practices while other landscape companies will require a higher level of translation than provided by the consulting relationship.

Results of consulting relationships varied between Tier 1 companies interviewed at the macro level and Tier 4 companies interviewed at the micro level. Typically, the companies that participated in the macro level study spoke of very positive results based on consulting relationships. These Tier 1 companies had people in house capable of translating the consultant’s information to their specific business needs. For the companies interviewed at the micro level, transformation from consulting relationship was negligible. While the landscape companies believed the information delivered by the consultants to be impressive, they were unable to translate much of the information to actual practice within the organization. They failed to translate the specific recommendations using best practices into tangible results.

5.1.4 Training

Trade associations provide another source of information, primarily in the form of courses and materials related to business issues for the landscape industry. Some of the programs and materials are more specific than others. Due to the nature of the relationship with their clients, trade associations can provide only industry level context in the materials. For some organizations, these training courses and materials may provide the information necessary for their clients if the clients are able to properly
translate the information into their specific contexts. This level of translation depends partly on the knowledge and motivation that exists within the landscape company and partly on the design and quality of the courses and materials. Trade association courses and materials were not of specific interest for this study as this research seeks a more detailed contextual understanding of the clients and their relationship with an associated information system.

5.1.5 Industry Specific Business Software

Industry specific business software is another possible source of assistance for landscape industry companies attempting to transition from tier four to tier three. Business software can range from something as simple as Excel spreadsheets to QuickBooks to larger, more detailed industry specific packages.

Many assumptions must be made to design software to support business operations in a landscape company. These assumptions can only account for industry level context at best. Specific contextual details and cultural views in a firm may not be well represented by the software.

Translations of general business practices into detailed context are difficult. Customization of the software, sometimes extensive, is typically required for use in each specific company. Companies are forced to fit their business model and cultural views into those made by the original designers.

Typically these software products are marketed with strong sense of technological determinism. Company representatives often tell potential buyers that purchasing and installing their software will significantly improve the operations and profitability of their companies. The ideas embedded into the software sound compelling to potential owners.
who typically lack an understanding of the significant amount of work and time required to fit their businesses to the needs of the software.

Problems with software are a particular interest for this research since it considers the design conceptions of Staying Greens information system. The naïve, technologically deterministic assumptions often made when designing or using prepackaged software should concern landscape companies looking for assistance with their business development needs. The potential downfalls of this software are discussed by Daryl below.

(Daryl, an industry senior educator) I think that for a company that has someone, and it doesn't have to be the owner but it has someone who can take that silver disk (software) and implement it, install it and use it, that's maybe all they need. Where that breaks down is when you go out and you buy it and you get it home and you say...now what? ...There are setup routines that you don't understand and you don't know how to input the initial data to get the system up and running, to prime it and nobody ever comes in to update costs...for job costing or whatever, and then the silver disk becomes nearly useless... A lot of people I think get frustrated halfway through and throw up their hands and look for a new disk to buy.

Industry specific business software is not likely a good option for tier four companies. A company should have sound business practices and a more expansive view of work in place before attempting many of these software products. Tier 2 and 3 companies can serve as the testers of industry specific business software, whereas Tier 4 companies a typically small enough to use more generalized business software to meet their current and developing needs.

5.1.6 Books

There are an increasing number of “how-to” books written about varying business issues for the industry including the recently published book entitled *Green Side Up* (Laflamme, 2007) written by Ed Laflamme, an industry practitioner and *Business*
Principles of Landscape Contracting (Cohan, 2006) written by Steve Cohan, an academic supporting the industry. These books offer solid general advice about business issues in the industry and are certainly a good starting point for those interested in increasing their knowledge in the area of business development. The authors of these books argue that continual education in business skills is both an ongoing and important process. These books and others like them can’t provide detailed insight relevant to the context of particular owners and readers. If detailed translation of business development knowledge is needed, these books fall short.

The different models outlined above for translating general business information to specific uses and practices inside landscape contracting companies each have their strengths and weaknesses. The important point is that the client must choose the method that will work for their organization by carefully examining the method of delivery and potential success of translation. For example, the excellent experience of the consultant may not mean a successful translation and resultant transformation. Often times, the transformation is simply not that simple.

For many companies in tier four detailed, contextual methods of translation may be necessary. One method potentially able to deliver the detailed translation is that used by Staying Green. Staying Green’s licensing method and its specific details are of interest for the remainder of this study. Their choice of business model has significant implications for the design conceptions for their information system.
6.0 Micro Results – Design Conceptions

Through this chapter I provide both the standard and alternative models of Staying Green’s design conceptions for their business model and information system as shown in Figure 5. The standard and alternative models are compared and recommendations are made to influence Staying Green’s design conceptions for the future of the business model and information system.
Figure 6. Dissertation Master Diagram CH 6
6.1 Micro Social and Structural Comparisons

This section introduces some of the specifics of Staying Green’s licensees. It discusses how these companies got started, their level of business knowledge before working with Staying Green, what methods of help they sought in the past to change their level of business knowledge, and why they chose to continue the quest to change. The rest of the specifics are detailed in the next section where I discuss changes that happened as a result of using the Staying Green system.

The simple description presented here reflects the most common approach to company formation in this industry. Often, one or more people get the idea to start a lawn mowing service. Typically, they start with a few mowers, a truck, and a trailer. They may enter and exit the industry several times before being able to sustain their business as a going concern.

(Ron, an owner of a Staying Green licensee) I started doing this when I was in grade school... I worked my way through high school, private high school doing this. I decided at that point in time there's -- life has got to be better than this, because that was when we did everything by hand, went through Western Michigan University, got a degree in business, graduated in ’73 during the great recession where jobs were nonexistent. Came back, we had a chance, my brother had a chance to pick up a large contract, long-term contract so I jumped on board, said, okay, I'll work for you a little while. I was always interested, always frustrated by, we did some design/build at that point in time but very rudimentary, by the challenges that we had because my brother would do the design, I was supposed to implement it. And so I went back to school and got an associate's degree in hort. and design.

In some cases, one person starts a company, runs it for a few years and then joins that company with another of similar background.

(Paul, an owner of a Staying Green licensee) So, but I got into this back in '93, when I got out of school, there was no teaching jobs so my buddy's
like, hey, …let's get involved in landscaping and …cut grass, so that's when (my business) started.

Paul ran his business from 1993 until 2000 when he merged his organization with another. Two years later, another landscape company joined the operation. The result is the combination of three businesses into one.

The combination of the three businesses led to some advantages but still lacked the necessary business knowledge necessary for long term success as demonstrated below.

(Paul, an owner of a Staying Green licensee) Basically, well, I went partners with (Joe) in 2000, so me and (Joe) went partners and then we picked up (Harry) in 2002 to run our brickscape, our brick division and stuff and landscaping. And as far as the company, …we were hoping to have enough money at the end of the week to pay us, you know… We knew nothing about business or the banking end of it or the billing, it was basically my wife did bills and then (Joe's) wife did the billing and it was just go to work every day, cut grass, plant a few trees and -- hope we get paid, you know.

To attempt to survive, the company focused on the technical details of the work as demonstrated below.

(Paul, an owner of a Staying Green licensee) The one thing I did always really, really make sure everybody never left, you know, my striping had to be perfect, real particular and neat and clean about, you know, everything, about mowing.

In other words, to keep their existing clients, they focused on mowing straight lines, in which they took great pride. This same company worked 60-70 hours per week in the busy season mowing as many lawns as possible. A basic summary of their business plan was to mow as many lawns as possible to bring in as much revenue as possible and to keep the lines straight to retain their customers.
Another Staying Green client was able to build a larger business with a better understanding of basic business skills; unfortunately they were still extremely limited. Eventually, they chose to work with Staying Green for two main reasons. First they wanted to transition the daily operations of the business from one generation to the next. They wanted to structure the business so that,

(Ron, an owner of a Staying Green licensee) …anybody can do it. And my other…guy that runs our commercial turf division, been with us 25 or 6 years, has the same kind of knowledge, does it the same way, walks on the job site, says, oh, it's this much. How come? I figured out it's basically this question, he's good at it, but no justification, if it was wrong, it was wrong; it was right, yeah, I was right. That's the way we ran the business. It wasn't…run it by numbers.

Second, since the business hadn’t built any significant financial value, the owners needed to continue to draw a salary from the organization in retirement.

Both of the organizations discussed above used consulting help in the past, one a firm specifically in the landscape industry and the other a general consulting firm. Both firms focused on financial issues of business and had the same results. The companies were unable to translate the information presented into significant transformation. Currently, both organizations are working with Staying Green as another attempt to transition their businesses from hobbies to businesses that provide long term value with a lifestyle that is livable for the owners and employees. The details of the Staying Green model are discussed in the next section.

### 6.2 Standard Model

This section serves to construct a standard model of Staying Green’s design conceptions for their information system. To construct the standard model, it is also
necessary to understand their current business model, which is explored through the STIN steps outlined in the methods chapter.

Their design conceptions are based on their views of their own work, their views of the landscape industry, licensing business model, and information technologies. These views have influenced not only their design conceptions, but also the current implementations of their business model and information system, which are explored below.

As discussed in chapter five, Staying Green operates using a licensing business model. In effect, they license their intellectual property, referred to as the Staying Green Business Operating System, to their clients for a set period of time. They chose this model by comparing the pros and cons of the different business models in chapter five. Ultimately, they chose the licensing business model because they wanted the current owners to retain ownership and control of their organizations while implementing the structure and processes of Staying Green.

The other model considered by Staying Green was that of franchise. They decided the franchise model was not acceptable due to the loss of control of the original owners. The choice of licensing over franchising has significant implications that are discussed in the strengths and weaknesses sections that follow.

Staying Green positions their work to potential and current licensees through a value proposition, as follows. First they attempt to “identify and partner with the most highly qualified regionally based landscape contracting companies in territories with strong growth potential.” Essentially, they attempt to identify and target companies that meet a list of criteria they feel necessary to use their model successfully. Next Staying
Green seeks to “empower them (licensees) with the best processes, systems, technology, and support services in the following: sales, human resources, operations, and business management.” These processes, systems, technologies, and services are the heart of Staying Green’s business model. Finally, their ultimate goal is to transform their clients through “cultural change, focus, profitable growth, dramatically improved productivity, exciting career paths, terrific customer experiences, and a nationwide network” (Staying Green, 2008, pg. 52).

Staying Green was founded in 2003 to address business issues of the landscape contracting industry. The members of the board and the company employees all have experience with either transforming companies through the Staying Green methods or directly with the landscape contracting industry. They are, therefore, very aware of the major issues and cultural views of the industry explained in the macro section of this research.

As stated, the goal is to transform their licensees from their current operation to that developed, proposed, and implemented by Staying Green. They guide their licensees through the different areas outlined previously by presenting information, as the clients are prepared, and by applying continual pressure through measured results. The delivery of organized information over time along with continual evaluation of the results is the key to Staying Green’s differentiation from their competition. Staying Green believes that transformation comes in continuously measured steps that are applied to each client following a similar process, but with enough flexibility to account for the original social and structural differences of each client.
Staying Green has a set of priorities, such as attracting and retaining profitable customers to create capital for growth, job security, and overall financial success. They believe that the typical landscape company is “positioned as a commoditized vendor that sells mulch and cuts grass” rather than “positioned as an expert in landscape management that can help them (customers) achieve their goals.” They believe the typical landscape contracting company uses “informal, inconsistent and antiquated selling, planning and management tools” rather than using “consistent, repeatable and predictable processes and goals.” Finally they believe the typical landscape company has limited visibility rather than “tremendous visibility and performance metrics” (Staying Green, 2008, pg. 23). These views and others of typical tier four landscape companies are contrasted with Staying Green’s views of a desirable landscape company in Table 12.
### Table 12. Characteristics of Typical vs. Staying Green Powered Landscape Company

<table>
<thead>
<tr>
<th>STIN Step</th>
<th>Typical Tier Four Landscape Company</th>
<th>Staying Green Powered Landscape Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incentives</td>
<td>Typical industry view of success and work</td>
<td>New view of success and work</td>
</tr>
<tr>
<td>Excluded Actors:</td>
<td>Typical industry view of success and work</td>
<td>New view of success and work</td>
</tr>
<tr>
<td>Employees</td>
<td>Structured based on a company organization chart around owner with limited visibility</td>
<td>Structured based on a company roles chart with tremendous visibility</td>
</tr>
<tr>
<td>Excluded Actors:</td>
<td>Attract any customers - Positioned as a commoditized vendor that sells mulch and cuts grass</td>
<td>Attract and retain profitable customers - Positioned as an expert in landscape management that helps customers achieve their goals</td>
</tr>
<tr>
<td>Customers</td>
<td>Fragmented – company works alone</td>
<td>Connected – company works with other Staying Green and other Staying Green clients</td>
</tr>
<tr>
<td>Excluded Actors:</td>
<td>Use titles typical to Tier 4 landscape companies</td>
<td>Fill defined roles</td>
</tr>
<tr>
<td>Other landscape</td>
<td>Hope there’s money left over to get paid</td>
<td>Create capital for growth and job security based on performance metrics</td>
</tr>
<tr>
<td>companies</td>
<td>Use informal, inconsistent, antiquated selling, planning, and management methods and tools</td>
<td>Use consistent, repeatable, predictable processes and goals</td>
</tr>
<tr>
<td>Undesired Interaction:</td>
<td>Hires and trains reactively during busy season</td>
<td>Hires and trains proactively throughout entire year</td>
</tr>
<tr>
<td>Social Change</td>
<td>Unorganized paper and basic computer systems managed by cell phone</td>
<td>Organized paper and enhanced computer system managed by processes</td>
</tr>
<tr>
<td>Undesired Interactions:</td>
<td>Too much equipment ineffectively used</td>
<td>Necessary amount of equipment efficiently used</td>
</tr>
<tr>
<td>Financial Planning</td>
<td></td>
<td></td>
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<tr>
<td>Hiring and Training</td>
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<tr>
<td>Communication Systems</td>
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<tr>
<td>Resource Flows:</td>
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<tr>
<td>Equipment</td>
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</table>

### 6.2.1 Incentives

Staying Green targets companies in tier four that are looking for change in their organizations. As noted, these companies typically want change because they are stuck at their current size, burned out from years of hard work for little stability or pay or
considering retirement in the next few years. Often the companies don’t have a complete understanding of what change they want or need.

The sales people of Staying Green begin by understanding and discussing their potential licensees’ current operation, problems and desire for change. The sales people of Staying Green discuss the typical downfalls their potential licensee face today and may face in the future based on current operations. Next, the sales people of Staying Green paint a picture of another possible view of success by offering the potential licensee owners a view of their existing companies based on a more livable work—life balance where they have not only more time to spend with their families, but aren’t constantly connected to their cell phones to be putting out today’s fires. Staying Green sales people also discuss the increase in long-term value of the company where retirement becomes a reality instead of simply a dream. The sales people focus on one of these issues in more detail depending on the current state of the potential licensee.

If the landscape company owner decides to become a licensee, Staying Green sales people use the incentives offered during the sales process as an attempt to change the owners and employees view of work. Because of the choice of licensing model rather than franchise, Staying Green has little control over the implementation of their model so they rely not only on time and measurement but also on a potential vision of the future in an attempt to usher in change of a new view of work.

The change in view of work is difficult but critical for the successful transformation as envisioned by Staying Green and translated through the incentives to the landscape companies. The change of work is from the standard focus on transforming
natural and man made materials to a focus on more business related issues of the company.

This change in work has substantial implications to the owners and employees of the business. For many of the owners and employees, their view of work and success in the landscape industry is socially implicit. The suggested changes by Staying Green are often seen as counterintuitive. For example, for years the owners have demonstrated their physical toughness by working alongside the employees in the field. Office work is seen as less rugged and less important than the work in the field. The change from fieldwork to office work is often seen as decreasing the legitimacy of the owner and the owners often enjoy working outdoors. Simply being outside and moving from job to job are part of the initial attraction of the owners and employees to the industry.

By moving the owners from the field to the office, Staying Green attempts to transform the clients from being reactive to proactive. Essentially, Staying Green attempts to change the focus of the work from being designed around the work of landscaping to being designed around the information related to the work of landscaping.

Staying Green introduces the core concepts, called pillars, that make up the Staying Green “Business Operating System.” These pillars include sales, business management, human resources, and operations. The pillars and their associated details are introduced and implemented as phases over time as the client reaches certain milestones that suggest they are ready for the next step.

For Staying Green sales is the first and most important of the pillars. They believe that by proactively generating sales that represent the type of work desired by the licensee and the type of clients, their licensees can increase profitability and at the same time
reduce the number of hours required to produce that profit. While this concept seems simple, it may be difficult for owners to grasp. Going back to how most companies started, sales are usually reactive, driven by phone calls or referrals. After a business starts with its initial clients, the company often seeks more of the same because these clients are producing revenue. The most obvious problem is a lack of understanding of costs. What are the costs associated with performing the services for the initial and ongoing clients. In other words, how much profit is actually being produced?

Staying Green uses the proactive sales process to introduce their licensees to financial terms and systems for calculating and tracking costs. Often, Staying Green shows their licensees, for the first time, the licensee’s actual revenues vs. costs, and the resulting profits. Licensees are shown which services and which types of clients are actually producing profit. What’s important is that Staying Green is using licensee’s data to explain the message. Licensees can learn the general business information from other sources, but they cannot often translate that information into the detailed context of their own companies. Not only does Staying Green use the actual licensee data, but also because of the Staying Green business model using a licensing structure, they can track the progress made from understanding the licensee’s financial data in an ongoing process. Licensees learn, over time and using their actual data, not only how to collect the data, using the Staying Green systems, but then how to interpret the data and make future decisions.

Ultimately, Staying Green uses a business model that allows them to interact with their licensees in the detailed context of their own businesses. For many of the companies
in Tier 4, this allows for the translation and ultimately the start of transformation of their businesses from reactive to proactive.

Based on the information gained from understanding the reason for proactive sales, which leads to an understanding of their financial data, Staying Green can then begin to address other issues their clients must face to implement the recommended changes. This model is in stark contrast to the model typically used in the industry, which is to improve operational efficiency to reduce costs. Reducing costs can play an important role to the profitability of the client, however, only when a client understands their costs and how they relate to the type of work performed for the type of client.

6.2.2 Excluded Actors

Staying Green translates their own view of work by changing the owners and employees view of working in a landscape company. Part of the change involves including previously excluded actors, company employees, customers, and other landscape companies and organizations.

The structure of most of the tier four companies is owner centric, built around the knowledge and experience of the owner or owners. This owner centric structure has several implications. First, the owner-centric Tier 4 company can only grow financially based on the knowledge, experience, and amount of time invested by the owner. Other employees contribute significant amounts of physical effort but little else as shown below.

(Ron, an owner of a Staying Green licensee) We are a successful company, we been here for 40 years, we had good financial stability, all those kinds of things, we had this piece of property, so yeah, we're successful, but we're stuck. We have reached that point of success and
that's as far as we were going to take it, I think, you know. Yeah, maybe we could have grown a little bit, maybe the other guys would have nuzzled their way into getting some more responsibility…

Second, the owner-centric Tier 4 Company would likely go out of business if the owner were incapable of continuing to serve as the hub of the organization. Without the daily input from the owner, operations slow or cease because the employees aren’t empowered to make decisions. Also, employees don’t have any criteria to make potential decisions. Third, important financial information is visible only to the owner. Employees have little knowledge of the financial health and stability of their organization. As such, the results of their efforts on a daily, weekly, monthly, or seasonal basis are largely unknown.

The owner centric model excludes employees from fully participating in the operation and success of their company. For the business to grow and achieve financial success and stability beyond their current capacity, Staying Green’s model focuses on shifting the licensee from owner centric to employee centric by introducing the concept of defined roles. Staying Green has defined a roles chart to be used at each client site. These roles, often implicit at many landscape companies, are well defined with measured outcomes to determine success.

For the purposes of this study, the concept of defined roles with defined responsibilities is extremely important. In many landscape companies, positions are relatively undefined. People are placed into roles based on performing work in areas of responsibilities. Staying Green defines their roles concept as follows:

(Mark, a Staying Green trainer) (The) …roles concept, again, basic set required for any business, …set of roles particularly required to operate in (Staying Green) licensed location or (Staying Green) licensed business,
and each of these roles is assigned a clear set of responsibilities, we know where one person lays the role down, where the next person picks it up. (It is) ...scalable, repeatable.

Each role is then given specific responsibilities based on a forty-hour workweek. Each role must be completed within the confines of a forty-hour week. The number of employees is based on the number of people needed to fill the appropriate roles. In a smaller organization, one person can fulfill more than one role. If the responsibilities of a role grow to require more time than is currently allocated a new person must be hired to meet the needs of the role.

In a small business people may often fill several roles as shown below.

(Tina, an employee of a Staying Green licensee) I do the scheduling for the irrigation and lighting department.
(Mike) Which is one of three or four departments?
(Tina) Three. Well, no, four, I guess, there's the turf, hardscape, softscape, and then the irrigation... There's a complex that we do maintenance at called (Sunnydale) and it's 282 homes... The turf department is responsible for maintaining the grounds but each individual homeowner can request different services, so I'm usually the main point of contact for all of them.... That's a full-time job in itself... Homeowners can be, you know, they're quite challenging, and all the people in that community are 55 and over, so they're at home a lot and they see everything, you know, my neighbor's having this done, could I have that done too, could you maybe give me a deal. So a lot of that, and just really coordinating with the different, like I said, my husband is the one that does the commercial turf so, you know, I do a lot of coordinating with him and that facility -- that site. I guess that's the major portion of it... Oh, and I do the newsletters too.
(Mike) Newsletters for inside the business or to clients?
(Tina) Both. We do a newsletter quarterly for customers and quarterly, we try to do it a little bit more often for the employees, but the way things have been lately, it will be quarterly.
(Mike) That's a printed newsletter?
(Tina) Yeah.
In addition, Tina serves as the Staying Green coordinator, a position responsible for coordinating the activities between Staying Green and clients.

Staying Green uses the concept of roles rather than titles for the following reasons:

(Mark, a Staying Green trainer) Difference between roles and job titles, roles again, absolutely essential that every role on the chart is filled, not necessarily so with a job title. Each set of role, each role has its clearly defined definition of what they do, we've got our tasks, we've got our goal, we've got our vision with the individual role. Again, not necessarily true …within that job title world, okay. An individual can fill, may fill more than one role within the (Staying Green) model, within the (Staying Green) roles... Most of the time, although I've seen business cards with multiple titles on them, it's usually difficult to have more than one job title. Ever seen a business card with more than one job title? Ever had one?... Works on full-time equivalent standard or full-time equivalent concept.

Staying Green differentiates between a roles chart and an organizational chart in three ways. First, Staying Green believes that someone must perform each role in each business, that roles definitions will be the same for each business location, and any individual may perform more than one role.

Second, Staying Green contrasts the roles view with the job title view by saying that a business does not have to include every possible job title; job titles may vary by business and location, and that more than one role may be performed by an individual with a particular job title (Staying Green, 2008). In this way, the roles chart allows Staying Green to treat each licensee the same with respect to roles while allowing for size and structure differences with their licensees. It allows the licensees to avoid using job titles, which are often ambiguous and unclear.

Each licensee employee is assigned one or more roles and fit into the following groups, including sales, human resources management, operations, and business
These are the basic groups of system interactors for the STIN model and are shown in figure 5. Each of these groups can be broken down into detailed roles, however for the purposes of confidentiality, the above chart and roles will suffice.

![Roles Chart](image)

**Figure 7. Staying Green Roles Chart**

The general manager role is defined as follows:

(Mark, a Staying Green trainer) ...general manager is that individual that we've decided between the organization and (Staying Green) is...accountable for all the actions and results of that organization, they're responsible at the end of the day to make sure the sales reps meet their sales goal. At the end of the day they're responsible to make sure that the company's profitable at the goals that we set out at the beginning of the year. They're responsible for the growth targets, they're responsible for the operations targets from standpoint of efficiency, from the standpoint of number of crews or number of individuals we decide it's going to take to get those jobs in the ground, to keep those maintenance customers happy.

It is important to note that the general manager role is focused on the business of the company rather than the specific landscape work.

The Staying Green success coordinator is a person who works for the client but is the liaison between the client and Staying Green. This role directly interacts with the Staying Green success coach. The role is defined as follows.
(Mark, a Staying Green trainer) We have what we call a (Staying Green) success coordinator. This is a role that we fill within the first two to three months in the (Staying Green) licensing process in the relationship that we start. It's a role that's, it's an individual that's generally identified by and chosen in conjunction with your success coach. The success coach will look at ADAs, they'll interact with individuals within the organization, determine personality, determine access to the real scoop, that's what this person does. That's the point of contact for the (Staying Green) success coach that we can call at any given point in time within reason and get the real story. Get the story behind the story... If I call Art and say, Art, how's that gross profit margin worksheet going? Art may say, great, we're using it every time. I pick up the phone, I call Jonathan back, I say, hey, Jonathan, how's that gross profit margin worksheet doing? Well, having a little bit of challenge getting Art to use that, or having a little bit of challenge getting employees to use that, but we're getting there. Okay. That's what it is. It's my -- it's the extension of my right arm so to speak, okay. So if I need Art to do something or I need Chris to do something or I need Jamie to do something and I'm having trouble interacting with them over the phone, over the internet, or even in person getting them to do that, that's the individual that I can go to and say, look, here's my goal, here's the action steps that we've set out for that goal, here's the progress I'm making, you think you can help me out?

An important note about this role is that this person cannot be one of the owners, because Staying Green found that the relationship with the owner was not conducive to a successful transformation when the day to day contact was in a direct relationship.

Another role an owner is not allowed to fill is the role of sales. The role of sales is considered a special role in the organization because Staying Green believes the personality needed for sales is typically different than for ownership. This is in contrast to a typical landscape company and is shown in the following quote.

(Mark, a Staying Green trainer) Took us a little while to figure that out because as I think somebody clearly identified earlier when Tim asked a question, do you think, how many of your owners do you think would make good proactive sales rep? We thought we could change those owners at the beginning, we'll make them proactive sales rep, they'll get it, they're smart guys. Again, totally different personality, totally different set of responsibilities, totally different set of things that we're good at. Owners of landscape companies are typically not good at the type of
things a proactive sales rep need to be good at, just the way they are, way they're wired.

Many of the Staying Green clients believe that the sales people must have landscape specific knowledge to be able to sell landscape services. The early results of sales people placed in these firms shows that this belief is not true. As with other types of organizations, sales professionals are hired and learn the language of the industry as part of their training. The key trait, however, is that they first and foremost know how to sell. This is shown in the following example.

(Mark, a Staying Green trainer) (A licensee) in (the mid-western part of the country) (hires a) gentleman by the name of (Fred), (Fred’s), I'm going to guess in his upper 60s, early 70s, lived and worked as an entrepreneur almost his entire life, owned, operated, managed multiple businesses throughout the course of time, he sold in most of those businesses in some shape or form, was involved in the commercial office furniture business, sold office furniture, that's what he did. (Fred) has sold $200,000 worth of recurring revenue since the beginning of the year, since April 1st. Doesn't know a thing about landscape. He can tell you the grass is green, and shrubs are those things they plant in the bed close to your house, that's about the most he can tell you. He might know a little bit more than that today, after being on the job three, four months but that's pretty much all he could tell you the day he started, and how to fly airplanes because he was in the Air Force, because he retired from the Air Force as a colonel, I believe. Okay. So again, these individuals aren't typically, or these individuals don't typically have the same set of expertise, the amount of knowledge, the background, the history that most of the people that are good designers and estimators have, they don't have that degree in ornamental horticulture, they don't have that design degree…

Sales people also do not fill the role of designer. This goes against a traditional role found in landscape companies where either the owner or landscape designer is also the sales person as discussed below.

(Mark, a Staying Green trainer) There are certain roles that we don't allow an individual to hold a grouping of. For example, our proactive sales reps, we strongly advise almost to the point of not allowing proactive sales reps to also be designers and estimators. Two different, totally completely
different sets of responsibilities, totally different personality types, totally
different roles in reality... Proactive sales reps should be out selling every
day, that's what they do. They go out, they find that piece of meat, they
knock it over the head, they drag it back to the cave, they go find another
one. If they're spending a bunch of time drawing nice pretty pictures...and
selling that pretty picture to the customer, and then putting that pretty
picture in the ground, they're not spending their time actively finding
multiple new customers to grow that business.

Another key role for each landscape company, the estimator, reports to the sales
manager. This position is defined as,

(Mark, a Staying Green trainer) These are the people that are responsible
for helping that sales rep determine how many hours it's going to take to
get the job done. How many hours of labor, how many equipment hours,
what pieces of equipment are going to be able to be utilized on the job
versus what we're going to have to do by hand. What's the general list of
materials that we're going to need in order to perform the service or in
order to install the project?... They're going to build what we call a job
budget, utilizing various tools, information provided in take-off sheets or
the client profile forms as they're called, turning that, putting that
information into the gross profit margin worksheet which will develop
budget and allow the sales rep to determine sales price at the end of the
day. Again, needs to be an individual that understands the business, they
need to have that gut, have that industry knowledge, some experience in
the field, they got to truly know what it takes in order to do this
accurately. I wouldn't expect to hire a stuffed animal salesman, no offense to stuffed
animal salesmen, put him out in the field selling landscape services and
ask them to do this. Wouldn't be fair to them, wouldn't be fair to you,
wouldn't be fair to your owners, wouldn't be fair to us.

The estimator position is responsible for pricing a job correctly, which is a crucial
piece in the business part of the landscape company. Often, in Tier 4 companies, this
position is poorly defined or undefined. The designer or owner likely fills this role.

One final role is that of business systems manager. This role is often
missing in most Tier 4 landscape companies. This role exemplifies that importance that
Staying Green assigns to the office work of the industry. The role is defined as follows.
(Mark, a Staying Green trainer) Business systems manager, again responsible for all the back office systems, usually accountable for QuickBooks, accountable for making sure that CRM system is kept up to date as much as they can, billing goes out on time, checks come in on time, payroll or dealing with payroll company…

In many Tier 4 landscape companies roles are assigned based on who’s available and potentially qualified to handle the responsibilities. For example, the owner’s wife is often responsible for running all or parts of the office work. This is convenient in the beginning stages of the business, but potentially becomes problematic as the company grows. This problem is illustrated in the following conversation between a Staying Green representative and one of their licensee’s employees.

(Mark, a Staying Green trainer) How, as far as management staff, how have things been developing from that standpoint?
(Bob, a manager of a Staying Green licensee) I think (Danielle) needs to spend more time here. It's difficult for her to do at this point. (Danielle is the HR manager and the majority owner’s wife)
Mark: In what respect, spend more time on?
Bob: Well, no one here knows the schedule (for Danielle), I don't know if you know the situation with (Danielle), she's (Tom’s) wife who's the general manager here, I know you probably talk to him, I don't know if you have or not. And she takes care of the three kids, yes, she has babysitters here and there, but it's just -- you never know what day she's going to be here. I've told her already this, so it's nothing I'm trying to hide or anything but I told her my base issue with her and I don't know a general schedule of her and I don't think she's spending enough time in here so we can address questions and -- as we need it. But I think she's a great person for the job, it's just if she doesn't have the time, then is she really the right person?... So, but other than that, I think she's doing a lot of development plans for people, but, and I know she does stuff at night, you know, so I can't really say anything about her hours because I don't really know what they are, but you know, just being regular is more of the issue.

This conversation reflects a typical situation at many small businesses. The problem grows as the business grows in size and complexity.
Another example of this problem is shown below.

(Mike) Is there anything else that's happened with the business that would be really important to discuss for me to understand what the changes either with computer systems or with (Staying Green) or anything else that's happened that's been kind of a shakeup or a big deal?
(Ron, an owner of a Staying Green licensee) Yeah. Bob's wife worked here for, I mean she was the bookkeeper forever, from the beginning. As we have gone and become more sophisticated, her skills could not keep up. She was still on the payroll doing work in the office making mistakes, and we had to let her go as a business decision versus a family decision.

As illustrated here, the changes suggested by Staying Green can have significant familial implications.

Another group largely excluded from the operation of the company are the customers. Most contact with the customers comes through the owner. Employees do not have the information about, or knowledge of how to interact with, the clients. As such, clients often view landscape companies as commoditized vendors that sell mulch and cut grass.

Staying Green adds a role called account manager. This role is responsible for maintaining contact with their assigned clients.

(Mark, a Staying Green trainer) They're responsible for managing not only that customer, but the crews as well that are responsible for performing services on their site, maintain that continuity of expectation, understand what the customer is looking for, understand the nuances of that particular customer, to a degree we're going to allow those nuances to affect our discussion decisions, make sure those relate effectively to the crews. When the crew comes back at the end of the day, says, hey, (Harry), I was over at (the Stevens residence) …and I notice he's got two palm trees in the back that are looking like they're getting pretty bad, we should probably think about going over to look at them, may need to replace them. (Harry) can now call Mr. (Stevens) before Mr. Stevens calls (Harry), says, hey, Mr. (Stevens), we noticed two of those palm trees in your backyard are starting to look a little sickly, I'd like to come out, take a look at those, like to talk to you about some options about what we can do to start making those look better, we may have to replace them. Think
that would have a better result at the end of the day than Mr. (Stevens) seeing them first?

Not only does the account manager interact with the client but also with the crews. He or she encourages the crew to be proactive when working on the property to look for and report potential problems. Staying Green helps their client not only do a better job of attracting more clients with proactive sales but also of retaining clients with proactive account managers.

The last group excluded from most landscape companies is other landscape companies or organizations, one reason why many industry leaders see the industry as fractured. Staying Green engages this excluded audience in two ways. First, Staying Green works with licensees to introduce them to issues that impact the industry and specifically their clients. This introduction exposes the licensees to information previously unknown by most Tier 4 landscape companies. Second, licensees are encouraged to interact with each other through the Staying Green network. Since the clients are assigned regions, they are not competitors and often share important information with each other. In one case, a client moved from one town to another and their hired landscape company passed them on to the Staying Green powered company in the next town.

6.2.3 Undesired Interactions

Tier 4 landscape companies face at least three undesired interactions, made necessary by moving from a Tier 4 to Tier 3 company or from hobby to business. These undesired interactions include financial planning, organizational change, and hiring and training.
Tier 4 landscape companies typically do a poor job of financial planning for three reasons. First, the owner has little knowledge of how to financially plan. If the bills are paid and there’s money left over then the company is considered financially sound. Second, because the owner has little knowledge of financial plans, the owner delays or ignores the planning process. Third, even if the owner has the desire to tackle financial planning, they have little information with which to plan.

Staying Green addresses these issues with their licensees. First, Staying Green teaches owners and other employees how to plan financially. This process happens within the context of each organization. Second, Staying Green assigns time for the owners to plan and monitors the progress through monthly meetings. They slowly encourage the owners to continue the process, despite the difficulties. Third, Staying Green provides information systems to aid in the collection of information needed for planning. The role assignments all have information responsibilities.

The information collected by people performing their roles is then used to make decisions concerning client interaction, equipment use, cash flow, etc. With this new information collected, analyzed, and shared properly, licensees are now in a position to target their preferred clients and types of work, which often results in higher profits from fewer clients. The licensees can also change or remove relationships with non-profitable clients and non-profitable types of work.

By developing more profitable relationships with target clients, companies can stabilize cash flow while working fewer hours. For example, instead of working 70 hours a week during the busy season and occasionally missing paychecks, one licensee now
works 4 - 10 hour days and gets paid regularly. This change alone has improved not only their work relationships but also their family relationships.

The lack of financial planning in tier four companies is the root cause of many problems. For example, the imbalance of work hours from busy season to slow season is one example of poor financial planning. People are not able to find a consistent work-life balance, often desired by today’s workers. These challenges are exemplified in the following quote from an interview with an industry owner.

(Ron, an owner of a Staying Green licensee) That's what we want to do, we want to be able to start out as a young person and still be able to do it when we're 50, or 60. Maybe you're doing the same things, maybe you're not, but if you -- even if you were doing the same things, if you only did it 40 to 45 hours a week, you could do it when you're 50, you wouldn't have to be, you know, hunched over and everything else like our industry, look at the older guys in the industry when you go to the trade shows.

Ron continued to describe the imbalance of work in the industry by saying,

(Ron, an owner of a Staying Green licensee) …you take the winter off, work your butt off in the summer, take your winter off, and that's not the way it should be. You should be working on a regular basis year-round, shouldn't be 80, 90 hours and then 10. It should be -- we should be able to make this a livable industry... We should be able to live while we do what we like doing...versus dying in April, May, and June, and then wondering how you're going to eat in December... And that's what our -- that's where we're at

Another result of poor financial planning is that costs are often poorly conceived in the industry. Revenue generation is typically the motivating force and costs are often not fully recognized. Cost discussions typically involve operational issues of efficiency. More and more materials are available in the industry that show the benefits of increasing efficiency and reducing labor costs.
One such efficiency system used in the industry is called Lean Management. The goal of Lean Management is to identify operational inefficiencies and to eliminate as many of the inefficiencies as possible. While operational efficiencies are important to the companies in the industry, often they are placed above other financial priorities such as understanding the relationships between revenues and costs. For example, a project may be run efficiently, but if the true costs are not understood, the project may lose money.

For example, one licensee had employees working seventy hours a week to generate as much revenue as possible. What the company hadn’t realized was that any time worked over forty hours a week, and therefore paid as overtime, was actually costing more money than the revenue generated. The company actually became more profitable by reducing the work hours to forty hours per week. They hadn’t accounted for overtime pay when pricing the jobs they were performing.

Collecting, analyzing and displaying financial information can actively involve owners and employees in the daily activities of the company. The ultimate goal is to change the cultural behavior of the company by empowering the owners and employees with information that can potentially improve the stability of their companies and eventually their own quality of life.

Another undesired interaction in Tier 4 landscape companies is changing roles. Even when licensees begin to work with Staying Green, they are often unprepared for the changing roles necessary to implement the Staying Green model. The owners typically want the rewards of change without the making the sometimes difficult associated changes.
If the owner does want to change the company, the first issue that Staying Green must and does consider is that of social change. Staying Green focuses on the pain of the owners and attempts to show them another lifestyle based on how they operate their businesses. It is difficult for these owners to desire change; it is more difficult to actually achieve change. The greatest challenge Staying Green faces is the very issue of actually achieving social change in the ownership, even when change is desired. Often, the owners would rather just do what they have been doing but achieve the change they desire.

Incentives for the owners of Tier 4 landscape companies that want change often come in the form of time or money. These owners typically work very long hours, especially during their busy seasons. Their work is often chaotic as they constantly attempt to put out fires and eventually they experience some type of burnout. The burnout may be based on family pressure or simply the desire to pursue other interests besides running their businesses. In many cases the incentive is to achieve financial stability or perhaps increased financial stability.

A more detailed study could be done to better understand what triggers an owner to want change and what traits are necessary for the owner to actually achieve change. Certainly, the people of Staying Green work diligently to find companies and owners that fit their criteria as potential clients, but that list of criteria is far from complete or accurate. Continuing to define that criteria is one of Staying Green’s biggest challenges for future success.

One compelling story of role change by an owner at one of Staying Green’s licensees was exhibited in an interview. The owner was asked about the limits of the
company’s future success. He said that Staying Green was helping put in place all the pieces his company needed to be successful for the future and that the biggest impediment to the future success of the firm was himself. He realized that his inability to change was the greatest limiting factor for the future success of the company. He exemplified the type of owner often found in Tier 4 landscape companies. He described himself as:

(Paul, an owner of a Staying Green licensee) …I'm more of a laborer, you know, not -- I'm more of an outdoor, I'm not an office person so the computer things and this and that, it's hard to change and get acclimated to that. Even our billing processes and these crew tracking sheets are all -- I mean they're just paperwork but it's still, to follow them and to follow the CARE call process and this, I'm not good at going to talk to these people as an account manager. It's really hard for me to go in and sit down and talk to these people, unless they were customers of mine, you know, for the last 15 years I been doing this. I guess you kind of -- you get comfortable with certain people, you know, so it's hard to go meet new people and I can't bullshit, I can't -- I can't mingle with someone, you know, unless I have similar interests I guess it is… Oh, I have full confidence in (the other owners), it's myself that I don't -- it's hard for me to change, come from the field into the office.

Even though Paul has a college education, he sees himself as a field worker who enjoys the challenges of performing landscaping work but not the challenges of running a business. Whether he can make the changes necessary for future success is yet to be seen, but he has started down the road to change.

Another example of role change for owners was exemplified in the following interview with an office support person responsible for enacting procedural changes in the company. She was asked what impediments she was facing to enact the changes and responded by saying,

(Tina, an employee if a Staying Green licensee) I guess the keeping people on track, you know, (the owners) have done things one way or so long,
and that's their first instinct is to do it like that, so just reminding them, you know, this is the way we need to do things now so that everything else follows the process. That's probably the biggest.

She was then asked if the owners were the biggest offenders of reverting back to the old ways of business and she responded,

(Tina, an employee if a Staying Green licensee) Yes… (Tony, an owner of a Staying Green licensee) is, (Ron, an owner of a Staying Green licensee) is pretty good... He's pretty good, his wife… I think helps him quite a bit though and keeps him, you know, moving on that path. (Tony), it's, you know, he's just done it that way for so long and he does have -- he's been good, but he, like I said, his first instinct is, well, just do it real quick by myself.

Role change is a very significant issue for Staying Green. Without the ability to force change in a franchise model, Staying Green must continually face the issue of social change.

Another undesired interaction in many tier four landscape companies is hiring and training. Tier four landscape companies don’t typically have someone filling the role of human resource manager. An owner or their spouse typically performs this role as an extra duty. As a result, hiring and training rarely receive the needed attention and results are often less than desired.

Staying Green addresses the issues with hiring and training by assigning someone to the role of human resource manager. This role must fit within the forty-hour week and the hours required by the person’s other roles. Staying Green personnel educated as human resource managers train the licensee human resource manager.

Staying Green uses personality tests to help place the right people in the right roles as shown below.
(Doug, an employee of Staying Green) We use those ADAs (personality tests) that we had everybody take as a -- as part of that process, determine what personality traits or behavioral traits that individual has, what roles do they best fit into, okay. Make sure we've got the right person trying to get them to do the right job. Second step, identify those individuals that will perform those roles, and then put them in there. Again, we have those same functional groups, sales, operations, business management, human resource management; they fall within those principles of the (Staying Green) transformation.

The following is an example of Staying Green helping to place people into proper roles by introducing the concept and allowing people in the company to begin to address the issues.

(Bob, an owner of a Staying Green licensee) At this point we're considering him a sales assistant and ultimately we definitely feel he could move up into that role, it's just -- we really want him in that role, we have other, ultimate goals for Jeff that is just a matter of how he proceeds and what he can handle. At this point we are definitely utilizing him, at least I am, to my full extent as a sales assistant, and he's going to a lot of meetings with me, taking down notes which I have never ever taken down a note at a job site when I'm talking to somebody. As soon as I get in the truck I write down everything. And it's been actually a little bit helpful but I personally would like to get myself out of sales a hundred percent, I don't really enjoy it. I like talking to customers, I like explaining things, I like being technical support and I like handling someone that's already established. So it works out well if I'm moving into account management, but even that I don't think I can do full time because if I'm doing technical support which right now it's probably two days a week right now that I'm helping everybody else do their stuff.

Human resource training has a nearly immediate impact on their licensees. Before Staying Green, people were hired if they filled out an application as shown when Bob stated,

(Bob, an owner of a Staying Green licensee) Well, the new guys we hired this year...went through quite a more strenuous...hiring process... we had three different stages that (Danielle) has basically taken on. First off was she would do a little phone interview with them, if she thought they were okay, she'd bring them back in, they'd do a group interview with multiple
people… But again, they'd passed all the criteria that she had, which she has listed out… Then she would have an interview with the actual foreman and at that point -- or not foreman, the appropriate manager which is at this point, at that point was (Paul) and (George) were doing most of the hiring, occasionally (Tom) would fill in as necessary. And usually if they got past (Daniel), they were hiring them. So we've had only great -- every single one of the foremen this year has been ecstatic with the new people that we've got this year and usually if they had a pulse and they were filling out an application, we were hiring them in the past.

After Staying Green human resource training, the quality of new employees is significantly higher. Staying Green’s impact in the hiring process was an impressive component in the business operating system.

6.2.4 Existing Communication Systems

Existing communication systems at Staying Green’s clients are often limited. Their communications systems were typical to those discussed at the industry level. Often, information is communicated by cell phone based on poorly managed systems. For example, information is often not captured or stored in any manner that allows it to be transmitted or reproduced as needed.

Staying Green addresses informational issues with processes and use of computer systems and printed documents stored and processed. The change from existing systems to those implemented by Staying Green is a continual process that is designed to give licensees more control over the flow and reuse of information.

Before implementing their suggestions, Staying Green develops a detailed understanding of the existing systems in place. They must also understand the experience of the owners and employees with the technologies they recommend. This experience plays an important role in conceptualizing the information systems for the context of the landscape contracting industry.
Generally, use of information technologies by companies and their employees in Tier 4 and 5 is low. One employee was asked about her computing experience and responded it was “next to none.” She followed by saying that she’d used WordPerfect but that was about the extent of her knowledge. She was asked if knowing how to use a computer was important and responded by saying that,

(Tina, an employee of a Staying Green licensee) If you don't use a computer, you're, you know, people look at you very strangely. My husband when he went to the training in October (Staying Green Transformation Training), that was the first time he had even pushed a button on a computer... Oh, yeah. So I think in general if you don't use computers in some way, you know, you're like an outcast, really, you know.

She was asked how her computing experience had changed since working with Staying Green and responded as follows.

(Tina, an employee of a Staying Green licensee) Oh, tremendously. You know, you're immersed in it every day and so yeah, I mean, I think there's no comparison what I used to know and what I know now. (Mike) ... Were you, as you were going through that, were you concerned, were you glad to be doing it, were you scared, well -- (Tina) Oh, all of that. When you don't know much about computers, you're always afraid you're going to do something and it's going to just affect the whole company, you're going to press the wrong button or it's going to blow up or, you know, things like that, but oh, yeah, I was anxious to learn, it's something that, that's the way the world is now, so yep.

Next she was asked if learning the computer system felt forced or if she really wanted to learn. She responded by saying,

(Tina, an employee of a Staying Green licensee) I didn't feel like I was forced to at all, you know, I mean if you're going to work, you really don't have a choice, but no, I was anxious to learn more... I guess when you work, you know, it's a little bit of both, you don't have a choice, but usually you want to too.
The Staying Green communication systems consist of computerized and non-computerized components. One of the non-computerized components is called a project schedule board. While many Tier 4 landscape companies have project schedule boards, the one introduced by Staying Green expands on the base concept. For example, people, equipment, and time are often tracked by project. Staying Green takes this concept further by linking the information on the project schedule board to the financial information of the company and displaying that information for all the employees of the company to see. For example, when a project fails to be completed as scheduled, it costs the company more to perform the work than anticipated. The higher costs reduce or eliminate the profits for the project, which impacts the profits for the week, the month, etc. This information is displayed on the project schedule board so the employees can understand the impact of the problem and how that impacts the profitability of the company. The employees can then attempt to ascertain the reasons for the missed deadline and attempt to correct the problems for the future.

Staying Green has considered the experience of their clients with computer systems and information management. Some of the information collected, stored, and processed by the computer systems is also printed and stored in specific places in each company. This information is accessible even by those with limited computer experience. By having the information printed, it is also readily available for financial planning sessions with Staying Green. The details of the computerized portions of their communication system are discussed in the section entitled architectural choice points.
6.2.5 Resource Flows

Resource flows in typical Tier 4 landscape companies are solely focused on the production functions of the company. Staying Green expands the decision-making process for resource flows with information by placing people in proper roles, and providing systems to capture, process, and store information. The information can then be used to provide resources to areas based on actual need instead of perceived need.

The key resource flow involved is information. Each company studied exhibited the characteristics of an organization with a lack of information organization and an inability to make informed decisions, which often led to poor financial issues like unknown profit and loss information, poor cash flow, poor use of human capital, and overspending on equipment.

6.2.6 Architectural Choice Points

Much of the document up to this point has focused on the earlier STIN steps concerned with social and structural issues. This section adds technical issues by focusing on STIN step seven, architectural choice points, or the technical features or social arrangements in which the designer can select alternatives. These technical and social choices are listed in Table 13.
Table 13. Architectural Choice Points

<table>
<thead>
<tr>
<th>Choice Point</th>
<th>Technical/Social</th>
<th>Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Model</td>
<td>Social</td>
<td>Licensing – Original owner retains complete control of the company while incorporating Staying Green intellectual property</td>
</tr>
<tr>
<td>Business Areas of Concern</td>
<td>Social</td>
<td>Sales, Operations, Human Resources, Business Management – Key areas needed to run a successful landscape business</td>
</tr>
<tr>
<td>Amount of Contact with Clients</td>
<td>Social</td>
<td>Continual - over period of license</td>
</tr>
<tr>
<td>Methods of Contact with Clients</td>
<td>Technical</td>
<td>In person, phone, email, web</td>
</tr>
<tr>
<td>Application Location</td>
<td>Technical</td>
<td>Mixed (some applications are installed and some are hosted) – Limits in technology don’t allow for all applications to be hosted, Owners had some issues with data storage location</td>
</tr>
<tr>
<td>Number of Applications</td>
<td>Technical</td>
<td>Multiple – use applications that can be connected or disconnected as needed vs. one large application</td>
</tr>
<tr>
<td>Software Source</td>
<td>Technical</td>
<td>“Off the Shelf” vs. custom – Many quality off the shelf products exited that were proven, scalable, and applicable.</td>
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</tbody>
</table>

The founders of Staying Green came from diverse backgrounds and have experience in several industries. Some of the founders ran businesses with a model similar to that used by Staying Green though in other industries. For example, a similar business model was used in the heating and air conditioning industry and electrical supply industry. Much of the core of the Staying Green business model is drawn from the lessons learned from these other service industries.

The other group of founders came from the landscape industry. They were able to supply the industry specific context to the business model transported from other industries. This model has been modified over time as the knowledge from both sets of founders has been modified for the landscape industry. The combined knowledge of both
sets of founders is what made this company possible in its present condition and what made it an interesting case for a research study.

The information system designers are also integral to the current approach taken by Staying Green. One of the designers worked the business model and information system at a previous company. The other worked with software in the landscape industry for much of his career, thus both have strong technical backgrounds that allowed them to choose and implement systems rapidly.

The Staying Green business model previously discussed is an architectural choice point. This choice frames the operation of the company. For example, the licensing model allows owners to maintain control of their companies while implementing the Staying Green systems. This choice point maintains control of the operation by the owner but limits control of Staying Green. The owner and employees choose to implement the pieces of the Staying Green system they see fit.

The owner freedom, inherent in the licensing model, has some negative consequences. For example, Staying Green would like licensees to implement all pieces of their Business Operating System and to use the systems as designed. However, the licensees can choose both what pieces to implement and how to use each of the systems.

The alternative would have been the franchising business model. This model moves most of the control to the franchisor. The franchisee agrees to operate as designated by the franchisor. The franchisee must use all the systems as designed by the franchisor. This choice would have significant implications for the information system design and for its use in licensee organizations.
The next architectural choice point was the decision about which areas of business to cover in the license. Staying Green chose to cover sales, operations, human resources, and business management with their licensees. Staying Green believes that all these areas must be covered if a licensee is to move to Tier 3. The alternative is to cover other areas or fewer areas.

Consulting arrangements often cover only one area within a company. This allows the consultant to focus on specific areas of expertise for a limited period of time. Staying Green believes that all four areas must be covered in a continual process of learning to make the desired transformation.

The third choice point involves that amount of time spent with a client. Staying Green implements their system over years. This is based on the belief that licensees will improve slowly as they absorb and implement the information and systems in stages. The delivery of information over time is in contrast to the consulting arrangement that typically lasts for brief periods of time with little follow through.

Delivery of information over time is a key to understanding Staying Green’s transformation goals. Incorporated into their idea of transformation is the idea of translation that will be discussed in the design conceptions section.

Staying Green also chooses four methods to communicate with their licensees. The first method involves regularly scheduled face-to-face meetings held at Staying Greens headquarters or at the licensee site as necessary. General training sessions are held at Staying Green’s headquarters while ongoing meetings are held at the licensee site. The decision to travel to the client site is also a means to better understand the ongoing contextual issues each client faces.
Staying Green also communicates with clients by email, through web-based seminars, and through various web-based applications. This variety of methods allows for continual communication between in person meetings and takes advantage of those methods preferred by each client.

One of the pieces transported from the old business model was the information systems concept. A key difference is that the technologies have changed from when the systems were designed for the previous industries. The founders of Staying Green made some conceptual changes in the technology choices and updated technology choices based on the products and services available today.

Most of this information came from several interviews with Peter, the main system designer at Staying Green and Roy, the current CEO. Roy has been involved in many of the key choice points concerning the business model and information system and Roy has been the main architect for the information system.

We started by talking about the technical choices for the information systems as shown in the discussion below and shown in Figure 6.

(Peter, an information system designer at Staying Green) We started by selecting and identifying what the best business practices were, we thought needed to be brought to this cottage industry just as we identified similar ones for the other two industries, that mechanical and electrical service and maintenance. After identifying those, we then said we need an IT foundation upon which to support those, and we developed -- or we came up with the notion of let's have these things called foundation products, and each of the main disciplines we need to cover the sales and marketing side, (a hosted CRM system) was our choice. We need to cover HR and personnel evaluations, the ADA systems was our choice. We needed a trade product for doing CAD and landscape design, …and lastly we needed a common, tested and tried and true product for doing accounting that would be easy to use…
Application location is an important architectural choice point from the perspective of support and data location. Application location refers to applications that are either installed locally on the client systems or hosted by an application service provider.

Staying Green evaluated the hosting of all the applications of choice. Some, like the customer relationship management system worked well in a hosted setting, which is desirable because all installation and maintenance of the software is provided by the host. The host supplies the technical expertise for running and maintaining the systems and allows Staying Green to focus on other issues.

Hosting has several downsides. First, not all applications can be effectively hosted. For example, technology or licensing issues may not allow the application to run on a hosted server. Hosting an application also implies that the customer data resides on the hosted server. Some of the Staying Green clients wouldn’t allow their financial data to be stored on a server not directly under their control. Staying Green decided to implement a mixed solution where some of the applications are installed locally and some are hosted.

Another technical choice point involved the number of applications. Staying Green decided to use several pieces of software either tightly or loosely bundled for their solution. They chose applications that could be connected and disconnected over time as changes occurred in technology or in their business model. The alternative would be to use one large application that attempted to meet all the needs of their clients.

The source of software was the final technical. Staying Green chose to use “off the shelf” software rather than custom developed software. They explored the existing
software that could meet the needs of their clients and found products in each category that met their selection criteria, which they call proven, scalable and applicable as explained below.

(Peter, an information system designer at Staying Green) Proven meant to us that this is not a product where you have to worry about the product longevity or the company's longevity like (our financial software) for example, it's a strong company, … has millions of users, it certainly has been proven, if it was a no-name, then it wouldn't be proven… (Scalable means) it needs to grow and support their growing business or otherwise, the worst thing we could do is give them a superior business processes to grow them, their businesses, and pigeon hole them with our software… Applicable is just, you can have something that's proven and scalable but it's not the right tool for the right job… But (our financial software) is applicable because it produces the kind of information with the least amount of bells, whistles, overhead, distractions, et cetera. If it, you know, if it was an insurance agent program for a contractor, then that would be not applicable.

The listed choices were the major architectural design choices made by Staying Green. The choices have major implications to the success of their company, business model and information system.
7.0 Design Conceptions

Staying Green built a business operating system that has a profound understanding about the industry and its people. They’ve combined a proven business model with contextual information about the landscape industry. The result has been very impressive with the licensees involved in the study. Significant change has occurred in these companies and has resulted in better financial stability, improved working environments, and a better work-life balance. However, Staying Green has significant room for improvement as a company. For example, not all clients have continued in the Staying Green system and those that have show room for improvement as well.

The main research question for this study concerned the design conceptions behind the Staying Green information system. Through this chapter, I explore these design conceptions, constructing standard and alternative models as shown in table 14.

After significant analysis of the landscape industry, Staying Green licensees, and Staying Green, two design conceptions emerged as the most important in building the standard and alternative models, Staying Green’s view of their own work in contrast to their licensing model and their view of the information system. The standard and alternative views are explored for each of the design conceptions.

Table 14. Design Conceptions

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<th>Staying Green Standard Model Design Conceptions</th>
<th>STIN Alternative Model Design Conceptions</th>
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<tbody>
<tr>
<td>• View of a franchise</td>
<td>• Staying Green views of success and work inscribed into business model</td>
</tr>
<tr>
<td>• Model of a license</td>
<td>• Translated through information system</td>
</tr>
<tr>
<td>• Supported by an information system</td>
<td>• Information system is redefined and completely integrated</td>
</tr>
<tr>
<td>• Interactions are implicit</td>
<td>• Interactions are explicit</td>
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</tbody>
</table>
The standard model of Staying Green’s design conceptions is based on their current views including the view of a franchise with the model of a license supported by an information system where many of the interactions between Staying Green and their licensees are implicit, causing ambiguity and frustration. In contrast, the alternate model of design conceptions, based on the results of this research, describes different views including Staying Green’s current view of success and work, but inscribed directly into their business model and translated through their information system to their licensees, where the interactions between Staying Green and their licensees become explicit. In the alternative model the information system is redefined and completely integrated into the business model and the licensees.

7.1 Staying Green View of a Franchise, Model of a License

Standard model design conceptions are broken down into their component parts for examination, starting with the view of a franchise. Staying Green has the view of a franchise because they want to transform their clients’ views of work and success. This transformation is similar to that which occurs in a franchise operation. The franchisor essentially sells a branch to their franchisee; therefore, all aspects of the operation are controlled by the franchisor and implemented by the franchisee. In the franchise model a significant social change is required by the franchisee to implement the new business model of the franchisor. This required social change is inherent to the franchise model.

Staying Green has considered opening what they call a company store, defined as a landscape company owned and operated completely by Staying Green. This is the basic definition of a franchise. Staying Green would like to implement all their ideas in a company store to test these ideas in their entirety and measure the results. The advantage
of the company store is that Staying Green would have complete control over the operations of the business. However, this franchise view is not in alignment with their actual business model.

If Staying Green opened a company store they would bypass the difficulties of transformation through change based on a new view of work and success. Here, this view of work and cultural success is defined.

The Staying Green view of work and success is defined as financial stability, improved life style for all employees, higher quality product that is customer focused, and the creation of long-term financial value. This leads to a new view of work, which is based around the important needs of running a business rather than around transforming landscapes. This new view of work also impacts decisions concerning resource flows.

Resource flows in the licensees change from direct revenue producing services focus to a more balanced focused. Certainly, the direct revenue producing services are supplied with the necessary resources to complete the work, but other areas are resourced as well. Resources are now allocated based on information collected, analyzed, and shared using roles, processes and systems that help the entire organization meet its financial goals. By meeting financial goals, the organization has the opportunity to promote people to higher levels of authority and shift some of the resource to salaries.

Resources also shift based on the full years’ needs of the company. In the past, companies spent very little money in the winter, because they simply hoped to survive the cash flow crunch that comes from a lack of revenue over the winter. In the new model, cash flow becomes more stable and items like training and hiring can happen when landscape services are in low demand. Companies are then ready to hit the ground
running when the busy seasons occur rather than trying to play catch-up with hiring, training, and cash flow all year.

The last resource shift occurs as the decision-making shifts from almost entirely owner based to also include managers, which now have information and metrics for making their own decisions. With a shift in decision-making, the owner can now focus even more of their own time, a valuable resource, to monitoring the health of the business and making adjustments over time.

Transforming their clients to provide a better quality of life for the owner and employees is an admirable goal, but will it be the same company that people chose to enter? Will those currently in the company still wish to be a part of that company or will they chose another company that meets their views of quality of life? Currently, the Staying Green system must be implemented specifically as designed to meet the complete transformational goals of Staying Green. Finding owners and employees to meet these specific transformation goals will continue to be challenging. How many people employed in these landscape companies will stay if the company transforms, as Staying Green desires?

From the beginning of the research project, the researcher assumed that changes associated with computing would be one of the most difficult challenges facing the designers of Staying Green information systems. What wasn’t taken into account was the massive change the licensee would face by attempting to transform based on the overall services offered by Staying Green.

In actuality, the challenges of computerization were minimal compared to the challenges of social change. The largest social change and transformation comes through
a thousand little changes that happen when Staying Green’s clients face
reconceptualizing their organizations as businesses rather than hobbies. For example,
when the owners understand that their roles in the organization must change, if they are
to grow their business as Staying Green suggests, the social change is extreme. For
example, many owners want to grow their profits, stabilize their cash flow, and work
fewer hours but continue to physically manipulate landscapes. The physical manipulation
is the part they typically love.

In some cases, licensee owners want Staying Green to run the business and allow
them to continue working in the field. They hope the monthly fee paid to Staying Green
is enough for them to retain ownership and continue to do the work they enjoy, but
receive all the benefits of ownership. The social change needed to reconceptualize
themselves as business owners that spend their days working with business information
to make financial decisions and detailed personnel decisions are typically not desired.
Some of the clients that started into the Staying Green process did not stay as clients for
more than a few months to a few years. The cultural change was simply too much for
them to endure, despite wanting the financial and personal changes in their businesses
and their lives.

For those clients that decided to continue to make the needed cultural changes and
other associated changes, the results have been very impressive. Overall, profits have
increased with fewer working hours. Newly created roles have allowed some employees
to be promoted and to be challenged in rewarding ways. Areas of frustration have been
reduced for owners and employees as the promise of a growing and vibrant company,
where roles are defined and results are measured, is seen as positive.
In a licensing model, the licensee, licenses intellectual property from the licensor. Inherent to the licensing model is that the owner of the client company maintains complete control of the organization. Social change in the organization is influenced by the suggested view of success and work, but still in the control of the owner. The owners can choose to implement the ideas from the intellectual property as they see fit. In this case, a complete transformation is less likely as the owners and employees incorporate only the ideas that fit with their views of work and success.

One of the problems with the standard model is that the view of a franchise with the model of a license is inherently problematic. If this view of a franchise and model of a license is to work, then it must be made explicit to the owners and employees of Staying Green and the owners and employees of their licensees. Without a clear understanding of the implications of these two seemingly opposed views, interactions between Staying Green and their licensees will be inherently problematic. The issues of social change and control are extremely important for the future of Staying Green’s success.

Currently, the employees of Staying Green do not fully comprehend the inconsistencies of the view of a franchise with the model of a license. For example, they make deterministic statements about the changes in their licensees and get frustrated when their licensees do not behave as desired. They often see the need to change as obvious and miss the difficulties experienced by the licensees as shown below. Peter was asked why their licensee’s employees would be motivated to use the information system.

(Peter, an information system designer for Staying Green) Well, that's an excellent question because at the end of the day, you know, if they see what the bottom line is despite how they account for it, they might say, I only need to know that the company made $50,000 more than what it cost. That may be true but where were the problems with your profit, were they at the jobs, were they at the management of indirect overhead or were they
with the selling, general administrative expenses? And I genuinely think that the pressure put on by other licensees that are doing it right, peer pressure factor, and the constant pressure of the sales and -- or excuse me, the success coach element... and, you know, at the CEO level, ...looking at them saying they're expected to meet these expectations. The pressure to do it is probably what's -- maybe do that more than anything. And then ultimately what happens is they see the value and if they see the value and it gets to this threshold, they're going to run with it on their own. If they're not quite at that threshold, then we got to micromanage.

The challenges faced by Staying Green to transform their clients are large. They must have a complete view of their challenges and an appreciation of the implications of these challenges if they are to achieve successful transformation in their clients.

The alternate model of design conceptions for Staying Green attempts to eliminate the problems inherent to the standard model. The first goal of the alternate model is to make Staying Green’s views of work and success explicit. These views can be made explicit by understanding several concepts including inscription, translation, and transformation, each defined in the STIN strategies predecessor theory, ANT. For example, Akrich (1992) describes inscription by saying that,

Designers thus define actors with specific tastes, competencies, motives, aspirations, political prejudices, and the rest and they assume morality, technology, science, and economy will evolve in particular ways. A large part of the work of innovators is that of inscribing this vision of (or prediction about) the world in the technical content of the new object.

In the case of Staying Green, they are implicitly inscribing their views of work and success into their business model. While they understand the typical views of work and success in the landscape industry, they intend to replace those views with their own. The owners and employees of Staying Green must understand that they are attempting to completely replace their clients’ views with their own.
After Staying Green inscribes their views of success and work into their business model, they translate their views into their information system, where translation is defined as appropriating others’ interests to one’s own (Monteiro, 2000). Staying Green must understand that their views of work and success are incompatible with the typical views of work and success in the industry and that these different views will be inherently problematic, especially using the licensing model. Staying Green cannot force the changes to the clients and the clients will resist some or many of the proposed changes.

Staying Green’s desired transformation can occur only if the inscribed views of work and success are successfully translated through the information system. The interactions between Staying Green and their clients must be explicit from the beginning of the relationship. Both the owners and employees of Staying Green and the owners and employees of their clients must fully understand the implications of their relationship. The intention of Staying Green is to replace the client’s views of work and success. If Staying Green does not have a clear view of their work then they will be unable to make their intentions known to their clients and therefore change their client’s views of work and success. The result is that necessary social change is unlikely to occur.

7.2 Staying Green View of Information System

The second of the Staying Green standard design conceptions is the view of their information system. Staying Green sees their information system as carefully chosen technical components, processing information to be used for better decision-making. The information system plays a supporting role to what they call their Business Operating System and can be unplugged and changed out at any time. Inherent in this view of an
information system are certain assumptions about the definition of the information
system, the view of people, information and technology. The alternative model offers
another view of an information system.

The design conceptions for the information system are influenced by Staying
Green’s view of their own work. Since their own view is not explicit even to themselves,
the concepts of inscription and translation are missing from the business model and
especially from the information system. As a result, Staying Green sees its information
system as supporting and not integrated into the core operation of the business. With a
new view of their work, Staying Green can begin to consider a new view of their
information system.

Part of the current success of the Staying Green information system comes from
their concept of change over time. One of Staying Green’s primary systems designers
was asked how he correlates the business model of Staying Green into actual systems and
responded as follows.

(Peter, an information system designer at Staying Green) I found that the
only way to get people to absorb the stuff I'm working with them on is to
make it habit based and an iterative exercise. So take for instance how
you're going to document your actual financial performance and the
connections to be made between how the numbers come out of
QuickBooks and how they need to be mapped into our financials. I would
use graphical paraphernalia whenever possible, I would take spreadsheets
and mark them up with arrows and things like that, and comments. But at
the end of the day, the only way I found is that despite the fact I'll tell
them in training all the concepts, which drives me nuts too because I'll be
driving home these major concepts in continuing ed, say watch out for this
pitfall, it's right ahead, they still hit it. Only way to get them around it is
to actually work with the tool with them iteratively.

The idea of change over time seems reasonable considering the amount of change
required. If this concept can be combined with the concepts of inscription and translation
then a more complete change may occur. Another instance of the currently incomplete conceptualization follows.

(Peter, an information system designer at Staying Green) I mean they always entered it enough to have some idea of whether they made money. The question was the timeliness and the relevance of saying here's where your problems are, here's what you're doing wrong and our system ferrets out better where the problems are, where the areas for improvement are. So it really gets down to, and I know this is interesting because, you know, I never really thought of it in terms of you asking these questions but from my standpoint it really has to be a habit-forming exercise. That's the only thing that's going to make them do it.

The other item that might “make them do it” is a better understanding of what exactly they’re doing. This refers to the more explicit interactions suggested in the alternate model. Staying Green’s information system should include explicit details of what the client is doing and how that work fits into a larger picture of change.

The alternate view of the information system is an integrated system consisting of human and non-human actors filling roles related to informational responsibilities. This new view consists of a true information system rather than an information technology system where the components are not viewed as technology pieces playing a supporting role. In this new view, the information system and Business Operating System are combined as one piece.

Staying Green provides one service to one industry using one business model and delivered through one information system. To consider the information system as supporting or separate from the design of the company, services, or business model is incomplete. In actuality, the information system is just as integral to the operations as the business model, service, and industry. It was not developed out of context of any of the other pieces. Conceptualizing the design of the information system outside of the design
of any of the other components would lead to an ineffective system that does not serve Staying Green or its licensees.

Staying Green’s licensees inherently understand the idea that the information system is fully integrated into the entire Business Operating System and not separable. Instead, they see the information system, including the human actors, as an integral part of the entire system. The licensees do not see it as a distinct component that can be separated from the whole. They interact with the overall Staying Green service through the information system. To the licensees, there is no difference between the two.

To consider the information system as integral to the other pieces of the company, Staying Green must redefine the traditional understanding of an information system. In this research study, the information system includes much more than the hardware and software usually considered as tools used by people in a company. The information system includes both human and non-human actors interacting in a contextually rich, social environment of Staying Green and their clients. The human actors are not simply acting as employees of a company performing a function in a series of processes, rather they are social actors within the confines of a company but influenced and motivated by much more than the commonly perceived goals of that company.

Staying Green should expand their roles concept beyond the people and into the other pieces of the information system. Each human and non-human actor is responsible for interacting with other human and non-human actors with respect to information. Essentially, Staying Green is changing a company that previously understood their work as manipulating landscapes into a company that organizes their employees or actors and adds new actors all interacting with and through information.
The non-human actors include computer hardware and software, Internet connections, copy machines, scanners, printers, whiteboards, binders, networks, etc. The non-human actors fill roles just as the human actors fill roles. Each non-human actor should undergo the same stringent human resources criteria for being hired and filling a role.

7.3 Information, Technology, and People as Related to Design Conceptions

Social informatics theories tend to have different views of the relationships among information, technology, and people than do more traditional theories, like the resource-based view, currently held by Staying Green. Next, the different views of information, technology, and people are explored for their impacts on the design conceptions for Staying Green’s information system.

The current design conceptions for the Staying Green information system are consistent with commonly held views of a firm and computing; where the principles of business information systems are to collect, process, and analyze information for better decision-making purposes. Information technologies are tools used to support the information handling and sharing. People are considered from the viewpoint of technological competency, based on the background and comfort level of those in the landscape contracting industry, with information technology. Information is valued from a decision-making point of view.

Those designing information systems often poorly conceptualize people. In fact, people are usually considered based only on their titles or roles in an organization. They are also usually considered to have congruent goals as those espoused by the company
they work for and therefore it is assumed that they will act in a manner consistent with the company goals. If they act otherwise, it is often assumed that they are hiding something, not a team player, or otherwise acting outside the expected boundaries of the company’s interests. The designers of the Staying Green information system have this same view of people.

While the Staying Green information systems designers have understood the need for people to feel empowered in their jobs, they assume that empowerment comes simply from being more involved in the perceived success of the company. While being involved in the perceived success of the company can be very important to the people of the company, it can also overlook the personal definition of success held by the owners and employees of the company. For example, success may be measured not as the overall financial success of the company but in terms of a sense of accomplishment on a daily basis. While a company may become more financially successful using the Staying Green system, individual employees may not enjoy the new role they fill simply based on the technologies now employed as part of the role. Outside factors may influence their view of a technology and their relationship with that technology.

In the resource-based view held by Staying Green, technology is often viewed as a tool to complete work. In an interview with one of their system designers, he told me that the system is plays a supporting role to increase the speed of information processing. The system could be unplugged and replaced by pencil and paper and labor. This view represents the information processing abilities of computer systems and acts as a labor substitution.
The Staying Green system designers see information as something used in better decision-making. Certainly this view of information has its place in the design of their systems. Clearly, the landscape companies they serve have a need for increased information about the financial performance of their companies. This financial information is vital to the future of the company and the well being of its employees, but it has limitations that will be explored in an alternative view of information.

Design conceptions for an information system based on a social informatics view are quite different from those offered in a resource-based view. A social informatics view of an information system is one where the information system is integral to the operation of the firm and consists of human and non-human actors filling roles with information responsibilities. Information, technology, and people are explicitly reconceptualized as discussed below.

Rather than the simplified view of people taken by the Staying Green developers, a social informatics view suggests that people be reconceptualized as social actors. As defined in chapter one of this dissertation, a social actor is defined as an organizational entity whose interactions are simultaneously enabled and constrained by the socio-technical affiliations and environments of the firm, its members, and its industry. Social actors are not primarily users of ICTs. They have conflicting and ambiguous requirements about the activities they perform, and the socially legitimate ways in which to perform their work. Social actors exercise limited discretion in ICT choice and use since they are members of a collection of actors. ICTs play a mediating role representing their work and the work of others with whom they interact (Lamb & Kling, 2003).
For the purposes of this study, the social actors working at Staying Green’s licensees are suddenly asked to change their views of work and success to meet those of Staying Green. In addition to the new view of work, people are required to use new or different technologies than they’re often accustomed to, without choice of what technologies to use or how. They are also not typically asked for their goals; rather they are expected to meet the defined goals of the firm. In some cases, the people are asked to perform different roles, which can be inconsistent with their view of a landscape company and its services. While potentially difficult to implement, the social actor view provides the designer with a different conceptualization of people and their relationship with the information system.

At Staying Green’s licensees, employees that directly interact with the information system can be successful only if they interact with the information systems as conceptualized by the designers. Those that do not interact with the system as designed are seen as employees that aren’t capable of keeping up with the technological changes or as not being team members. The Staying Green designers may wish to develop a more complete view of a person with respect to their interactions with the information system. While some behaviors are necessary to complete the transition to a Staying Green powered company, the Staying Green designers may consider that their particular assumptions about the work may be at odds with some of the employees. Attempts must be made to understand competing views and design the systems to compensate as possible.

Instead of the tool view of technology, this researcher recommends a social constructivist view of technology. Sawyer and Tapia (2003) summarize the social
constructivist view as “the meaning, value, and ascribed outcomes of computer use are developed in relation to how they function in particular situations and not to the set of features that they are designed to support” (pg. 98). They continue by saying that “this functional perspective suggests that computers are part of a web of meaning that includes the current understanding of both the computer’s and people’s roles, the roles and norms of use, and the larger work context and incentive structures in which all of these are deployed” (pg. 98). This functional view is in contrast to the tool view which (Sawyer & Tapia, 2003) summarize by saying that “the computer is seen as an external force” and that the features are “easily understood (both in terms of use and outcomes)” (pg. 98).

The tool view is incompatible with the functional view and social informatics perspective. The tool view is also inappropriate for the design conceptions of Staying Green’s information system. The Staying Green designers have a basic level of understanding of the social constructivist view, but need to consider the different assumptions made by the tool view and the social constructivist view.

The tool view quickly comes into use when caught in the day-to-day details of designing and implementing an information system into an operational situation. It also comes into use for those who choose the different components of the information system because they’re able to deconstruct the system into individual components and services. This deconstruction is necessary for continual design development; however, at some point the designers must consider the system as a whole and its relationship with the clients. Since the clients aren’t able to deconstruct the information system or separate it from the service of Staying Green, they have a very different view of the system. The clients see the system as an integral part of their job and day. Where the system is not
consistent with their current views of their work, motivations, or goals, conflict may occur. As hard as the Staying Green system designers have worked to understand the context of the industry and its people, they must work harder to understand different views of technology and the role these views play on their design conceptions and ultimate implementation, especially with the use of a licensing model.

Social informatics and resource-based view also have a different view of information. For example, economic views, like the resource-based view, often conceptualize information as value neutral. Gougen (1997) developed the social, ethical theory of information.

In his theory he listed seven qualities of information including situated, local, emergent, contingent, embodied, vague, and open. He defined situated in the same way as social informatics saying that “information can only be fully understood in relation to the particular, concrete situation in which it actually occurs” (pg. 6). He defined local by saying “interpretations are constructed in some particular context, including a particular time, place, and group” (pg. 6). Both situated and local are important concepts for the Staying Green information system. For example, one of their clients may interpret the information entered and retrieved from the information system differently than another, not from a financial aspect but from a values aspect. An owner of one company may want the information shared in a completely transparent fashion while another may be at odds with certain financial details being exposed to all employees. An employee may not want the information they entered to be available to all due to a concern for the interpretation of the value of their job, real or imagined.
Another crucial quality of information is emergent, defined by Goguen by saying “information cannot be understood at the level of the individual, that is, at the cognitive level of individual psychology, because it arises through ongoing interaction among members” (pg. 6). This emergent concept is crucial to the Staying Green roles concept. Staying Green has placed people into roles for operational purposes. They can expand their roles concept by realizing the information related to each role. In the Staying Green system, people are placed in roles and those roles are responsible for collecting, processing, and analyzing certain information that is then related to information from other roles. It is the relation of information between roles, both human and non-human, that is powerful in the Staying Green system. Each employee is responsible for information whether it is directly entered into the information system or not. The emergent quality of each role’s information when pieced together is what forms the significant difference between those that are information rich and information poor. If Staying Green can expand upon the emergent quality of information inherent to their roles concept and also include the situated and local understanding of that information they can conceptualize a more complete information system.

Another important quality of information for their purposes is the concept of vague. Goguen defines this quality by saying “in practice, information is only elaborated to the degree that is useful to do so; the rest is left grounded in tacit knowledge” (pg. 6). What is vague and explicit is extremely important in the Staying Green system. The very detailed information Staying Green must translate for its clients is challenging based on the technical difficulties in understanding the necessary concepts related to the information. For example, translating general financial information to the specific needs
and uses of their clients is already difficult. Add the social change issues noted earlier and translating this information is all the more difficult.

For their clients, the financial information is not value neutral but has impacts well beyond the simple understanding of the inputs and outputs of the balance sheet. The information represents a change in the way they perceive their businesses and their roles in the business. The social change experienced by their clients certainly impacts the values of the information being received. For example, an owner may place a negative value on financial information that would normally be considered favorably, based on what that information represents in his or her role in the organization. If the owner must now leave the field and work in the office because of this information then the information is certainly not neutral.

Staying Green must consider the qualities of information related to their business model, service, and information system. Specifically, they must understand how the information is perceived based on very local and contextual values. This understanding of information is in direct contrast to an economic only view of information.

By viewing the information system as integral with the other components of the company, the social change observed during the study does not actually overshadow the design conceptions for the information system, rather it reinforces the need to consider these social changes as part of the design conceptualizations of the information system. The social change does not happen just inside or outside the information system, rather through all the components of the company, including the information system.
Figure 8. Staying Green Standard Model
The design conceptions represented by the standard and alternative models are represented in the STIN diagrams of figures 6 and 7. The differences in the STIN models are discussed below. It is important to note that STIN diagrams were not conceptualized as complete models. Kling (2003) says that only some of the relevant interactions may be noted in the STIN graphical representation. Items like social protocols, the character of legal contracts, and actors’ skills may not be represented.

There are six significant differences between the two STIN models. The first difference is the interactions between Staying Green and their clients. The standard model shows three interactions where some interactions are implicit, some are explicit and some concern social change. They are represented separately to show that Staying Green hasn’t fully conceptualized their own work, inscription, and translation. In the alternate model these interactions are represented together and are all explicit.

The second difference represents the clients as a company store rather than a separate entity. This is due to the incompatibility between the franchise view and licensing model. These incompatibilities can be addressed by making all interactions explicit.

The third difference is the representation of the information system. The standard model shows an information technology system supporting the Business Operating System. For the alternative model, the two systems are combined, both technical and business components.

The fourth difference concerns actors. In the standard diagram, only human actors are acknowledged. The alternate diagram represents human and non-human actors interacting with information through the information system.
The fifth difference concerns social actors. In the standard model, individual actors are not represented. Instead they are just seen as roles in the Business Operating System. In the alternate model, actors are represented to signify their individual views of work and success in relation to their roles within the company.

The last difference is represented as values associated with information. The standard model shows contextualized but value free information used for economic decision-making and the alternate shows interactions that contain values associated with information.
Figure 9. Staying Green Alternative STIN
8.0 Discussion

This chapter serves as a final discussion of the work in this dissertation. Specifically, it discusses the contributions of the work to industry and STIN and outlines the future of the research.

8.1 Contributions to Industry

This work is partly meant to aid the landscape contracting industry. The issues of business development knowledge, or lack thereof, are widely known within the industry. These issues are extremely important for Tiers 4 and 5 and even many of the Tier 3 companies have significant issues with business development. Findings from this research will be published in separate documents written specifically for the landscape contracting industry, because the writing style of a Ph.D. dissertation is meant for the academic community and not the practitioner community.

The research makes the following contributions. First, it raises awareness to the issues of business development in the landscape industry. The models of business development assistance are important for helping companies choose business development assistance. Second, it helps continue the general discussions of issues in the landscape industry and adds the industry perceptions to the discussion. Third, it adds new topics for discussion in the landscape industry, specifically involving the issue of views of work and success. Fourth, it hopes to strengthen the relationship between the practitioner community, professional organization community, and academic community. Fifth, the work should benefit Staying Green and their licensees by addressing issues of business models, differing views of work and success, information system design, and perceptions of information, technology, and people. If the work can impact any or all of these communities as discussed above, then it will be a success.
Beyond the landscape industry, this work can impact other small to medium business with similar characteristics. For companies that are in markets with little concentration of firms, with little professional management, and trying to make the transition from hobby to business, the contributions of this work may also apply to them. The Staying Green business model was adopted from other industries and these contributions can apply to those industries as well as others. For example, the views of work and success in the landscape industry may also apply to other service and contracting industries like home construction, electricians, plumbers, heating and air conditioning, and information technology consulting.

8.2 Contributions to STIN

The STIN strategy provided the core perspective with which this research was conducted. The prescriptive nature of STIN in comparison to other socio-technical theories helped with my own conceptual understanding of the work.

There were three significant differences, however, between the use of STIN in this study and how Kling originally thought about its potential use. First; Kling, McKim, and King (2003), say that STIN models help explain processes of technical change and their impacts on social, cultural, economic, political, and personal lives. The perspective in this statement is that of studying impacts associated with technical change. For this particular research study, the emphasis was not on technical change. The emphasis for this study was first about social change, then about different conceptualizations of information, and then about technical change. The social changes required for owners and employees of Tier 4 companies to transition from hobby to business far exceeded the social changes from the introduction of new ICTs.
A second difference between this study and other uses of STIN was the importance of information. STIN typically talks about relationships between people and technology. It is used in studies of information systems, but does not, at its core, discuss information. In this study, the values associated with the information collected, processed, and stored were crucial. Without considering the values associated with the new information collected and processed by the licensees, then information would have appeared to be for economic reasons only. While the economic value of the information is crucial, the human values attached to that information are also extremely important. Many owners of Tier 4 landscape companies do not wish to spend their time in the office. To understand and make decisions based on the new information collected by the Staying Green information systems, owners must currently spend more time in the office. The information represents a type of work the owners do not always wish to perform and therefore has potentially negative impacts on their workday. The values associated with information should not be taken for granted and should not be seen as necessarily positive.

A third difference of the use of STIN for this study was the macro-micro design for data collection. The use of the macro-micro design had two impacts on the study. First, I believed the main issue for the licensees would be with changes introduced through new ICTs. The findings from the macro potion of the study about views of work and success and the significant changes introduced by Staying Green related to new views of work and success. These important views and social issues introduced by trying to change these views in licensees would not have been discovered without the macro portion of the study. Second, only by gaining a deeper level of understanding of the
industry, issues with business development, and associated models for assistance with business development, could I truly understand the potential value of the Staying Green business model. The business model then, was the initial driving force behind the development of the associated information system. Once these concepts were understood, then, and only then, was it appropriate to address design conceptions for the information system. This focus on the macro level issues may have weakened the detail at the micro level of the study. In this case, the reduced level of detail at the micro level of the study was acceptable to the researcher because of the value of the contextual information gained at the micro level.

Despite these significant differences, STIN was still useful for this study, since STIN accounts for social change. Social change became the primary importance for the study rather than a result of technical change. Since the STIN strategy developed from other socio-technical theories, namely ANT, the important social aspects of the study were able to emerge under the STIN framework.

8.3 Contributions to Social Informatics

As stated earlier, social informatics is defined as the “interdisciplinary study of the design, uses, and consequences of ICTs that takes into account their interaction with institutional and cultural contexts” (Lamb et al., 2000). In this study, a social informatics perspective was taken, however, ICTs were not found to be the primary issue of concern. Instead the cultural contexts were found to be more important. With the broadening of the definition of the information system to include the Business Operating System, addressing the cultural contexts can be included in the design of the ICTs.
One goal of social informatics is to “make the unobvious, taken-for-granted, and the ignored explicit” (Robbin, 2005). In this research, Staying Green was found to have already addressed some of the goals of social informatics. For example, Staying Green addresses some of the cultural context associated with the landscape industry by introducing new information over time so their licensees can absorb the information. They also translate the general business development information into the specific contexts of their licensees. Despite the current efforts of Staying Green, many unobvious, taken-for-granted, and ignored issues were found. This critical element inherent in social informatics research was crucial to the perspective used by the researcher. If these elements hadn’t been addressed, the findings of the research would have missed significant issues related to the design conceptions of Staying Green.

8.4 Conclusion: Future of the Research

The research conducted for this dissertation could be continued in at least three ways. First, this study was done using macro/micro methods. The macro/micro methods spread the level of analysis from industry to Staying Green to Tier 4 Clients as shown in Figure 9.
Including the three groups in the research has advantages and disadvantages. The main advantage was to place the work of Staying Green into perspective of the entire industry. The main disadvantage was a diffusion of the results. If the research had focused on only Staying Green and their clients, then more detail could have been obtained about their specific relationship and in particular about the current implementation of their information system. Therefore, future research could choose a different level of analysis for the work. For example, someone could focus on the different methods available for business development assistance in the industry. An in-depth comparison of the methods should be quite useful to the industry.

A second direction for future research could be to address the issue of social change in Staying Green’s clients. It was assumed at the beginning of the research that cultural change would focus on the introduction of computer systems or additional computer systems into the client environment. As discussed, the computing element was
far secondary to the information system as a whole. Future research could include work specifically about cultural change.

A third area of future work could study Staying Green’s licensees in detail. A larger set of actors could be included and studied in more detail. As Meyer (2007) suggests, this research could be done as an ethnography rather than a case study. More time could be spent in the field with the clients. Ethnography would allow the researcher to expand the social network of those at the client sites. Because of the macro/micro methods the size of the social network of people at the client sites was small.

A different approach to the research could be to study the changes in Staying Green’s clients over time. A longitudinal study could provide detail not found in a single snapshot of time. Since Staying Green attempts change over time, a longitudinal study would be appropriate to study the transformation of the clients.
Appendix A. Semi-structured Research Questions

Macro Interview Areas and Questions

1. Demographics
   a. Person
      i. Gender
   b. Organization

2. Background
   a. Education
      i. College attended
      ii. Field of study
      iii. Highest degree completed
      iv. Year of graduation
   b. Related Work History
      i. Current position
      ii. Past positions
      iii. What brought you to the landscape industry

3. Development and history of the industry
   a. What industries contributed to the development of the landscape contracting industry?
   b. What were the major changes since the beginning of its development?
   c. What are the biggest challenges facing the industry?

4. What is the current state of the landscape contracting industry?
   a. Economically
      i. How has the industry performed from an economic basis over the last 5 years?
      ii. What do you expect for the next 5 years?
      iii. Will the growth in the industry return to the levels of a few years ago or stabilize?
      iv. With the growth and consolidation in the industry, will the smaller companies survive?
      v. Why do companies struggle to reach the $1 million mark?
      vi. How does someone make the shift in understanding that they need more business knowledge?
      vii. Does the lack of business knowledge hurt the industry?
      viii. Do the large number of small business in the industry help or hurt the industry?
      ix. Does fragmentation hurt the industry?
      x. Why have you grown your company to the size it is today?
      xi. What is your impression of the level of business knowledge in the industry?
      xii. Does it vary by company size?
      xiii. Why?
xiv. How would you rate the issue of business development in terms of all the other problems faced by the industry?
xv. Why has demand for landscape services increased?
b. Education
   i. What types of education should people in the industry obtain? (field workers, designers, sales people, foreman)
   ii. What methods can people in the landscape contracting industry to obtain general business education?
   iii. What are the benefits of these different methods?
   iv. What are the weaknesses of these different methods?
   v. How would you describe your level of general business education and how did you obtain it?
   vi. What are the opportunities of those entering the industry in terms of jobs vs. careers?
   vii. What can we do to foster a stronger relationship between the industry and education?
   viii. Why doesn’t the landscape industry fit with the traditional extension system and what does that mean in terms of funding?
   ix. What are the typical entry barriers for a business to join an industry association?
c. Culturally
   i. How has the culture (business, ethnic, social) changed in the industry over the last 10 years?
d. Technical
   i. Is your membership becoming more comfortable with information technology?
   ii. Are your members using more information technologies?
   iii. What is the level of information technology use across the industry?
   iv. What’s your impression of the use and quality of business software for the industry?
   v. Do the companies in the industry have the knowledge and infrastructure to use the business software?
   vi. How does technology use differ among the different size companies in the industry?
   vii. Are computers office equipment as compared to production equipment?
   viii. Are cell phones office equipment as compared to production equipment?
e. Other as defined by person interviewed
Appendix B. Micro Interview Areas and Questions (Clients)

1. Name: _______________________________

2. Alias: ______________________________

3. Date: _____/____/________

4. Location
   a. In Person
      i. Address

   b. Phone

5. Demographics
   a. Gender
      i. Male
      ii. Female

6. Background
   a. Education
      i. Highest Level of Education Completed

      ii. What field(s) of study

      iii. Year(s) of graduation

   b. Related Work History
      i. Current Company

      ______________________________________________________

      ii. Current Position Title

      ______________________________________________________

      iii. Past Related Positions
iv. What brought you to the landscape industry?

7. Organizational information
   a. People
      i. How many people work in your organization?
      ii. How many are involved with Staying Green and the supporting information system?
      iii. Who are they?
      iv. What are their jobs?
   
   b. How long has your organization been involved with Staying Green?
   
   c. What were the deciding factors to start working with Staying Green?
      i. Who was involved?
      ii. What sort of discussions took place?
      iii. Was there something from your background that helped you decide to work with Staying Green?
      iv. How do you plan to sell your business or retire?
   
   v. Describe the switch from your old systems to the new systems?
      1. How did people learn the new system?
      2. What sort of problems occurred?
      3. What conflicts occurred?
      4. Are you running duplicate systems?
      5. What were the immediate benefits?
      6. What are the long-term benefits?
      7. What is a livable industry?
      8. Do you think switching to this system was the best course of action?
   
   d. Are there people who started working here only after the switch to the new system?
   
   e. What roles have changed since switching to the new system?
   
   f. What cultural changes have occurred at the company since working with Staying Green?
g. Do you agree with the Staying Green philosophy?

h. Did you have to replace any employees as a result of the change to the new system?

i. What are the impacts on your customers as a result of these changes?

j. Who are the worst offenders of using the old systems and processes?

k. What other systems were considered before choosing this one?

8. Work Processes
   a. What is your role?

   b. Why do you want to work with Staying Green and the supporting system?

   c. What individuals or groups should or shouldn’t be excluded from the system?

   d. What potential issues exist that may enhance or jeopardize working with Staying Green and the supporting system?

   e. What were the hidden costs in working with Staying Green?

   f. What documentation did Staying Green provide for working with them and the supporting computer system?

   g. What role do you play in selecting choices for the system development or use?

   h. Where do you enter and exit the system and what inputs and outputs are associated?

9. Personal Experience with this system?
   a. Have you worked with other business systems in the past?

   b. Do you own a personal computer?

   c. Do you have Internet access at home?

   d. Do you have personal email?

   e. What is your level of expertise with respect to computer usage?

   f. What is the level of computer usage among your friends?
g. How has your knowledge of computers changed since using the Staying Green system?

h. What could be done to ease the transition into using the computer system?

i. Did you enjoy the transition?

j. Do you have any work-arounds for the system?

k. How should the system change?

l. What other systems do you use in conjunction with this system?

m. What technical changes did you have to make to use the system?

n. What frustrations do you have with the system?

o. What benefits have you received from using the system?

p. What has changed for you since using this system?

q. Can you separate the computer system from the rest of the Staying Green system?

r. Was the entire system ready for use when you started or has it been introduced over time?

s. What changes would you recommend?

t. Has the change been worth while?

10. Professional Communication

a. Affiliations
   i. What are your most important professional affiliations?

   ii. Why?

   iii. How are these related to your work in developing or using the system?

b. Networking
   i. Who else do you interact with in a related professional manner?

   ii. Do you have other professional interactions that influence your use of the system?
11. Is there anything important I haven’t asked?
Micro Questions for Staying Green Employees

1. Name: ________________________________

2. Alias: ______________________

3. Date: ___/___/_______

4. Location
   a. In Person
      i. Address
   b. Phone

5. Demographics
   a. Gender
      i. Male
      ii. Female

6. Background
   a. Education
      i. Highest Level of Education Completed
         ii. What field(s) of study
         iii. Year(s) of graduation
   b. Related Work History
      i. Current Company
         _________________________________
         ii. Current Position Title
         _________________________________
      iii. Past Related Positions
         iv. What brought you to the landscape industry?
7. Organizational Information
   a. What needs to occur to take your system to the next level?
   b. Compare the clients of Staying Green with those from the other companies with similar business models.
   c. What issues is Staying Green trying to solve?
   d. How do you interact with the Staying Green information system?

8. Social Information
   a. What prepared you for the social issues?
   b. Did your clients have any issues with the location of their data?
   c. Do you have a significant number of technical support calls?
   d. How do you know that your systems will be used?
   e. How do you build this for clients at different stages of development?
   f. What are the cultural issues inside the clients that impact use of the system?
   g. Have you faced resistance issues for those using the system and how have you handled those issues?
   h. Who’s excluded from using the system?
   i. What issues in the clients might jeopardize success in working with Staying Green?
   j. What type of people are good translators?
   k. Do you use business analysts?
   l. How has retention changed at the clients since working with Staying Green?
   m. What level of human resource knowledge do your client have when you first begin to work together?
   n. How do you disseminate human resource knowledge to your clients?

9. Technical Information
   a. What pieces of hardware and software make up the information system?
   b. How do you translate the Staying Green business model into information systems?
   c. Define proven, scalable, and applicable?
   d. How did you choose between installed applications and software as a service?
   e. How many different interfaces do the clients need to use in your system?
   f. What is the level of technical competency in your clients and how does it compare to your previous customers?
   g. Is the technical competency of your clients a barrier to success with your systems?
   h. How do you maintain your technical knowledge?

10. Professional Communication Information
    a. What professional organizations do you belong to?
    b. What are the other influences to your systems level thinking?
Appendix C. Lessons Learned

Lessons Learned

This section discusses the lessons learned while conducting the research of this dissertation. During the dissertation process, I realized that the main goal of the dissertation was not actually the findings of the work, but my education. I realized that I was supposed to be learning about the process of research in order to connect the different pieces of the Ph.D. process. Essentially, I connected the concepts and language of the classroom phase with the research process of the dissertation phase. Finally, I linked the lessons learned while conducting the research back to the specific details of this research project. Next, each of the lessons learned is discussed in detail.

Nonlinear Process

When I wrote the proposal for this research, I envisioned the different phases as happening in a linear process. I even pictured the research being linear inside the phases. For example, I planned to conduct all the macro interviews before starting the participant observation and micro interviews. However, due to scheduling issues with the interviewees, I conducted some of the interviews before and some after the start of the participant observation and micro interviews. Not only did this not turn out to be a problem, but the participant observation and micro interviews helped frame the questions for the remaining macro interviews.

The same observations were made during the other phases of the research process. For example, I assumed that analysis would happen after all the data was collected. However, analysis begins with the first interview. Each piece of information learned impacts the rest of the process. I had to question my work constantly to ensure I was
keeping to the original intension of the work while incorporating unexpected information.

While visiting one of Staying Green’s clients, I realized my definition of an information system was too narrow. My view of an information system from academic studies collided with my view from work as a practitioner. I hadn’t realized my views were incompatible until that site visit. I changed some of the interview questions, use of STIN, and analysis based on a new view of Staying Green’s information system that included human and non-human actors as well as computerized and non-computerized non-human actors. Essentially, I moved forward in the process, learned something unexpected that caused me to back up to a previous phase and rethink my work.

I believe the iterative nature of research to be extremely useful rather than a problem. Discovering previously unknown information is an exciting part of the research and following the new information down new paths of discovery enhances the work beyond that originally proposed.

**Inconsistent Use of Time**

Another lesson learned throughout the research process was an inconsistent use of time. At times the research process could take as many hours a week as I chose to work and at others I had a significant amount of time for other projects. Some of this inconsistent use of time was due to my lack of experience managing a research project. For example, the transcription of interviews should have started with the first interview. I waited until all interviews were complete to send the file to a professional transcriber. As a result, there was a delay in coding the interview data while I waited for the transcribed files. The transcriber sent files as they were completed, but I was able to code the data
faster than I received files. This delay slowed the analysis portion of the research and could have been prevented or at least mitigated with better project management.

Other issues with inconsistent use of time have to so with the research process itself. For example, waiting for potential interviewees to respond is an issue that is inherently inefficient. Some people responded faster than others. Some people contacted me after the first contact, which was sent by email. Others responded after the next contact, a phone call. Others responded after continued emails and or phone calls. I was fortunate that all my requests for interviews were eventually granted however it is a process that is inefficient. For this research, interviews with specific people were necessary so waiting for them to reply was necessary.

**Dynamic Process**

The biggest lesson learned included all parts of the research process and proved to be the most difficult. In the proposal phase of the work, I assumed that certain parts of the proposal would be held relatively constant during the research phase. In reality this assumption was completely false. For example, my understanding of STIN as a theory, macro-micro as a method, interviews and observation for data collection, and coding as an analysis method all changed throughout the process. The entire process was dynamic.

Some of the issues faced were again due to my limited experience as a researcher. For example, my understanding of methods has improved and may not change as much in the next research project. Other issues seem to be part of the research process itself. For example, I use STIN differently than used in other research projects. Using the same theory in different settings will certainly change how the theory is used. Section 7.3 details the use of STIN for this work.
The dynamic nature of this research caused the work to be iterative. As my understanding of each of the pieces of the research developed, I had to revisit portions of the proposal, interview questions, and foundational papers throughout the process. Also, the citations were incredibly useful to revisit throughout the process. I assumed the citations were mainly to help others understand my work but realized that they continued to help me understand my work. Essentially, I learned that the entire process is dynamic and as such never actually finished.

**When to Analyze and When to Write**

Because of the dynamic nature of the work and lack of experience, I began the writing process too soon. As such, a significant amount of rewriting occurred. I had to outline my own paper again and again to understand what was written. Some of this occurs as part of the writing process, but in my case it was extreme. I needed to have a more complete analysis before starting the writing process. The results of my analysis were changing as I wrote each draft of the document. For example, what I wrote in an earlier chapter was now changed in a later chapter as my understanding of the work evolved. Each time, I had to revisit chapters to remove inconsistencies with later chapters. Some of this work could have been avoided with a more complete analysis before the writing process occurred.
Appendix D. Methods and Findings Issues

While the methods and findings for this dissertation were useful, some issues arose during the study and analysis that were problematic. These issues are categorized and displayed in Table 15.

Table 15. Methods and Findings Issues

<table>
<thead>
<tr>
<th>Category</th>
<th>Issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
<td>Market will take care of itself</td>
</tr>
<tr>
<td>Industry</td>
<td>Labor is a small issue compared to what it used to be</td>
</tr>
<tr>
<td>Industry</td>
<td>Values question – should a business have to change from a hobby to a business</td>
</tr>
<tr>
<td>STIN</td>
<td>Results provide general guidance but with little detail</td>
</tr>
<tr>
<td>Methods</td>
<td>Didn’t talk to Tier 4 companies that weren’t Staying Green licensees</td>
</tr>
<tr>
<td>Methods</td>
<td>Wasn’t able to get many details about licensee that left the system</td>
</tr>
</tbody>
</table>

The findings for the industry had three main issues. First, one of the Top 100 executives interviewed believes that the market and supply and demand has taken care of business development issues in the industry. He believes that companies have developed and will continue to develop based on the needs of the market. Some of the companies will grow as a result of developing business knowledge and that further intervention is not necessary. His view is in contrast to the others interviewed who felt that the landscape industry needs more assistance with business development because the Tier 5 companies hurt the image and their other competitors.

The second industry issue concerns labor. One of the Top 100 executives interviewed believes that labor is not a big challenge for the industry. He believes that labor issues in the past were much more difficult than today. He related the challenges in his labor force before the entrance of the Latino labor force entered the landscape industry. He believes the labor force of today, including the Latino labor force, is
adequate to meet the needs of the landscape industry. His belief is in contrast to the others interviewed and with industry literature on the subject.

The third industry issue concerns values. Should landscape companies have to convert from hobbies to businesses? Many of the people in the industry may be happy with their companies as they exist today. The desire by some in the industry to reduce or eliminate smaller competitors does not necessarily mean the industry would be better off without the smaller competitors. This dissertation focuses on the positive aspects of increased business knowledge and cooperation among landscape companies, but does not address potentially negative issues associated with the elimination of smaller competitors.

One of the negative aspects of STIN in this study is the level of detail provided in general and specifically to Staying Green about information system development. The lack of specific details is related to at least two issues. First, since the study used a macro-micro approach, the emphasis was on industry issues related to the specifics of the Staying Green information system rather than the details of the system itself. As with other social informatics studies, the technologies involved are black boxed, rather than being specifically addressed. The second issue with STIN and specific details is the inability to predict. Even if the system developers at Staying Green read, understand, and try to implement the changes recommended in this study, there are no guarantees that these changes will improve their system or business in any way. The recommendations in this study are consistent with other STIN and social informatics studies but not predictive in any way. Studies from other disciplines offer predictions related to the design and use of ICTs but have been ineffective in their results. STIN and social informatics provides
general guidance that may be more useful than specific predictions but does not provide information that other researchers and practitioners may find directly helpful.

The methods used in this study have at least two flaws. First, no Tier 4 companies were interviewed or observed for this study that weren’t current or previous licensees of Staying Green. More could be learned about Tier 4 companies by including them in the study. Staying Green had already influenced those included and therefore the answers to the interview questions may be different than those that haven’t had access to the Staying Green system. Second, one of the licensees interviewed for this study had left the Staying Green system. The owner felt the value received from Staying Green wasn’t worth the licensing fees. Potentially valuable information could be gained from a more detailed study including owners and employees of former licensees of Staying Green. Access to the companies might prove challenging, however, the information learned could prove quite valuable to expanding the findings of this study.
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VITA – Michael Reinert

Education
The Pennsylvania State University, University Park, PA
Ph.D. Information Sciences and Technology (Expected 2009)

The Pennsylvania State University, University Park, PA
Bachelor of Science in Landscape Contracting, 1995

The United States Navy Nuclear Engineering School, Orlando, FL
Graduate, 1988

Publications


Teaching
Horticulture 120, Computer Applications for Landscape Contracting - Author and Instructor, Penn State University, Fall 2004, Fall 2005, Fall 2006 - received a 6.50 out of 7.00 for quality of course in student evaluations for Fall 2006

Appointments
Curriculum Committee: Landscape Contracting, Department of Horticulture, The Pennsylvania State University - responsibilities including: participating in an industry review of the major, curriculum development for the core courses in the program, media development for the program

Speaking Engagements

IT Partnership - Presented initial research findings concerning a workforce development project evaluating the education and skills necessary to succeed as an information technology professional


Awards
Received the Glenn Steyers award given annually to the Landscape Contracting senior who has shown the highest degree of motivation and excellence in their program