EMPLOYEE ENGAGEMENT MODEL FOR THE MULTI-FAMILY RENTAL HOUSING INDUSTRY

A Dissertation
Presented to
The Academic Faculty

By

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In Partial Fulfillment
Of the Requirements for the Degree
Doctor of Philosophy in Architecture

Georgia Institute of Technology

May, 2009

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EMPLOYEE ENGAGEMENT MODEL FOR THE MULTI-FAMILY RENTAL HOUSING INDUSTRY

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"Trust in the Lord with all your heart; and don't lean on your own understanding. In all things acknowledge Him, and He shall direct your way." - Proverbs 3:5-6

This work is dedicated to:

My parents, Dale and JoAnn Redeker, who instilled in me core values that have been fundamental to my success. My mother planted the seeds of success through her humor, tenacity and enthusiasm. My father, a man of principle, taught me the value "of doing what is right," persevering, and keeping your eyes on your goal.

Greg, who is my rock, my friend, my advocate and above all, my husband who has supported my projects and offered encouragement and humor every step of the way.

My precious daughter, Anna Scott, who is my pride and joy, my heart and my hope.

ACKNOWLEDGEMENTS

It is with heartfelt gratitude that I acknowledge the outstanding leadership of Dr. Roozbeh Kangari. Through his wisdom, expertise and mentorship, I have been the beneficiary of his extraordinary talent. His teachings of "systems and processes" will serve me well in my future endeavors. To members of my committee: Professor Kathy Roper, Dr. Linda Thomas-Mobley, Dr. Daniel Castro, and Dr. Bill Cummings, whose individual strengths offered tremendous insights into the development of my topic, but more importantly, added richness to my life through encouragement, practicality and purpose.

Special appreciation is extended to the Georgia Apartment Industry Education Foundation and its members, specifically Jerry Warshaw, who provided this opportunity for me to do my life's work and to promote our industry while spending time in the classroom. For it is in the classroom that I receive some of my greatest rewards – watching students grow!

This research would not have been possible without the industry support and partners from Kingsley and Associates, Post Properties, Lane Company, ECI, and others. The insights, experience, expertise, and camaraderie offered the fuel that ignited this endeavor and kept me focused. Above all, it is a testament to what our industry is all about: working together to bring knowledge to future generations.

The taste of success is much sweeter when it can be shared with friends and fellow colleagues. I am particularly grateful to Lisa Borello, who makes editing an art form; Richa Rastogi, Hamed Kashani, and Anchal Singhal for offering their analytical

talents. A special thank you is extended Lauren Mobley for assisting in the tedious tasks of referencing and research.

Yarrow Smith, the absolute greatest assistant and one of the most talented individuals I have ever had the pleasure of working with in more than 20 years of being in business! Because of her loyalty, skills, talent, and ambition, I have been able to pursue my passion. She makes me a better person and I'm extremely fortunate to have her in my life. Thank you is inadequate and should be multiplied a Quadrillion times!

My deepest appreciation is extended to my family, particularly Greg and Anna Scott, for always believing in me and sharing my victories and defeats. Their constant love and encouragement inspired me to stretch to the next level in learning. I most appreciate the inspiration Anna Scott offered when she gave me this advice:

"Run when you can, walk when you have to, crawl if you must, just never give up."

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SUMMARY

The multi-family apartment rental housing industry has faced numerous challenges in the past decade. Research indicates that employees are disengaged and this disengagement is affecting resident satisfaction and having a negative financial impact on this sector of the housing industry (Miller, 2005; CEL & Associates, 2008).

Despite documented support in other industries identifying the link between engaged employees and more impressive business outcomes, little research has concentrated on the special needs and challenges of the multi-family apartment rental housing industry. Further, there are limited tools available to assist owners and managers with the task of identifying the characteristic drivers affecting employee engagement.

The goal of this research is to assist multi-family apartment rental property owners and managers in their process of talent management by developing an employee engagement model that improves business outcomes. The objectives of this research are: 1) To identify and classify characteristic drivers of a multi-family rental property employees' engagement affect on resident satisfaction; and 2) To develop an Employee Engagement Model (EEM) that allows multi-family apartment rental property owners and managers to define the percentage of satisfied residents for a given average level of engagement score. This research utilizes statistical analysis, neural network techniques, and probabilistic modeling for developing the Employee Engagement Model.

The hypothesis of this research is that: *The relationship between an average percentage of satisfied residents satisfaction-score and average level of employee engagement-score is a Burr Distribution with a skewness to the left.* The results of this research are expected to assist human resources professionals, managers, and owners of the multi-family rental properties to retain employees and improve resident satisfaction.

A panel of experts from the multi-family rental housing industry identified key indicators of employee engagement. Using a survey approach, combined with a comprehensive literature review, a list of key drivers for employee engagement are identified and classified by frequency and similarity. Once significant drivers are selected, an Employee Engagement Model is developed to measure the percentage of multi-family apartment resident's satisfaction determined by the average level of the on-site property employees' engagement. The Employee Engagement Model (EEM) offers a tool for defining the relationship between employee engagement and resident satisfaction in the multi-family housing rental apartment industry. New knowledge is derived in correlations of certain aspects of employee engagement and the likelihood of resident satisfaction to extend their leases, thus improving business performance. It is expected that the Employee Engagement Model (EEM) will provide useful feedback to multi-family professionals in their process of talent management as it relates to improved business performance. It is also expected that further discussions toward improvements in measuring employee engagement and its impact on satisfaction will be prompted by this research.

CHAPTER 1

INTRODUCTION

1.1 Overview

Employee commitment is emerging as a critically important topic for human resource managers, particularly as Western society moves from focusing on materials, equipment and inventory to the "knowledge assets" of workers. Experts refer to this as the shift from the "Industrial Age" to the "Era of the Knowledge Worker." Companies are now competing on the basis of the skills and talents of their employees and are discovering that, by attracting and retaining the best and the brightest employees, the company can achieve higher than average market share and elevated profits (Smith, 2007).

In a recent survey of Chief Executive Officers in 2003, one-third of the CEOs identify the human resource activity of "engaging employees in the company's vision/values/goals" as one of the three factors most important to their company's success (Rudis, 2003). Another study (Hewitt Associates, 2004) finds that employee engagement levels are more than 20 percent higher at double-digit growth companies than at lower-growth companies. There is increasing evidence that confirms the importance of the relationship between the employee engagement and organizational outcomes. This evidence is demonstrated by the cost of disengaged U.S. workers, which is estimated at $300 billion annually (Bates, 2004), coupled with the cost of turnover to the United States economy, which is estimated at $5 trillion per year (Frank, Finnegan, & Taylor, 2004). Disengagement is not solely limited to the U.S.; similar studies have estimated the value of lost

productivity to exceed 260 billion Euros (Harter, Hayes & Schmidt, 2002). Despite increasing evidence demonstrating the financial costs to companies with disengaged employees, there exist few strategies, particularly in the multi-family housing industry, to both effectively measure and resolve these concerns. The goal of this dissertation is to develop an Employee Engagement Model (EEM) which multi-family housing owners and managers can use in their process of talent management.

1.2 Background

Many researchers believe that the measurable impact of employee engagement depends, in part, on how it is defined. Employee engagement can be defined as an employee putting forth extra discretionary effort, as well as the likelihood of the employee being loyal and remaining with the organization over the long haul (Clifton, 2002). Research shows that engaged employees perform better, put in extra effort to help get the job done, show a strong level of commitment to the organization, and are more motivated and optimistic about their work goals. Employers with engaged employees tend to experience lower turnover and have more impressive business outcomes (HR Solutions, 2006). Employee engagement is shaped by a number of distinct variables, such as the relationship that an employee has with his or her manager and colleagues, trust and organizational justice, work/life balance, rewards and recognition. The way in which these variables in turn affect customer satisfaction has had a significant impact on overall performance of companies.

The Society for Human Resource Management (SHRM) defines talent management as "…the implementation of integrated strategies or systems designed

to increase workplace productivity by developing, retaining and utilizing people with the required skills and aptitude to meet current and future business needs" (Society for Human Resource Management, 2007). The process of talent management has taken on a whole new meaning for organizations, particularly within the multi-family housing sector. This development process includes a strategic focus on five primary areas: attracting, selecting, engaging, developing, and retaining employees (Harter, et al., 2002).

There are approximately 18 million apartment units in the U.S. and experts expect an additional 2 million new apartments to be available by 2010 (National Multi-Housing Council, 2004). These renter-occupied households house 48.3 million residents, generating over $212 billion dollars in revenue. The majority of these apartments are located in buildings with 10 or more units and are managed by paid staff working directly for the owner (in-house management) or by a third-party management company (Kuperberg and Patellis, 2003).

Like other businesses, owners in the multi-family rental housing industry face significant challenges as they attempt to grow their profit margins. In the multi-family rental housing sector, this has become increasingly more difficult with the rise of development costs coupled with the complexities of owning and operating an apartment community. One of the primary goals of the owner is to maximize income, thereby enhancing the value of the asset.

The financial health of a rental real estate property is dependent on both internal and external factors. One of the most significant internal factors influencing the financial health of a rental property is Net Operating Income (NOI), which is

measured by the difference between total revenue collected and total operating expenses (Sheehan, Freeman, Culkin & Vassallo, 2005). NOI represents the gross cash available for debt service, capital expenditures and profits. This conceptual framework, illustrated in Figure 1.1, demonstrates the interrelationship that these factors have on the financial performance of a rental property. It also shows that the management procedures of a company can often be the source of many internal activities that drive performance within those operating categories. In particular, the figure illustrates how human resource strategies are developed from management procedures depending on the goals and objectives of the owner. Human resource strategies include recruitment, hiring, engaging, training, and retaining employees. In the multi-family rental housing industry, the cost of employee turnover has a double effect both on the income side of the business and expense side. The impact of an employee loss on others can reduce the efficiency and effectiveness of those employees, as well as impact existing customer relationships. Losing a valued employee is a hidden cost that would affect the bottom line dollars (CEL & Associates, 2008). Employee turnover, and the costs associated with talent management, is a growing concern among human resource executives. Managing human resource costs can present owners and managers with a tremendous challenge, especially as occupancies fluctuate and market conditions change (Kingsley & Associates, 2008). There are costs associated with each of these processes and these costs are reflected in the "salaries and personnel" box under the 'Operating Expenses' category in Figure 1.1.

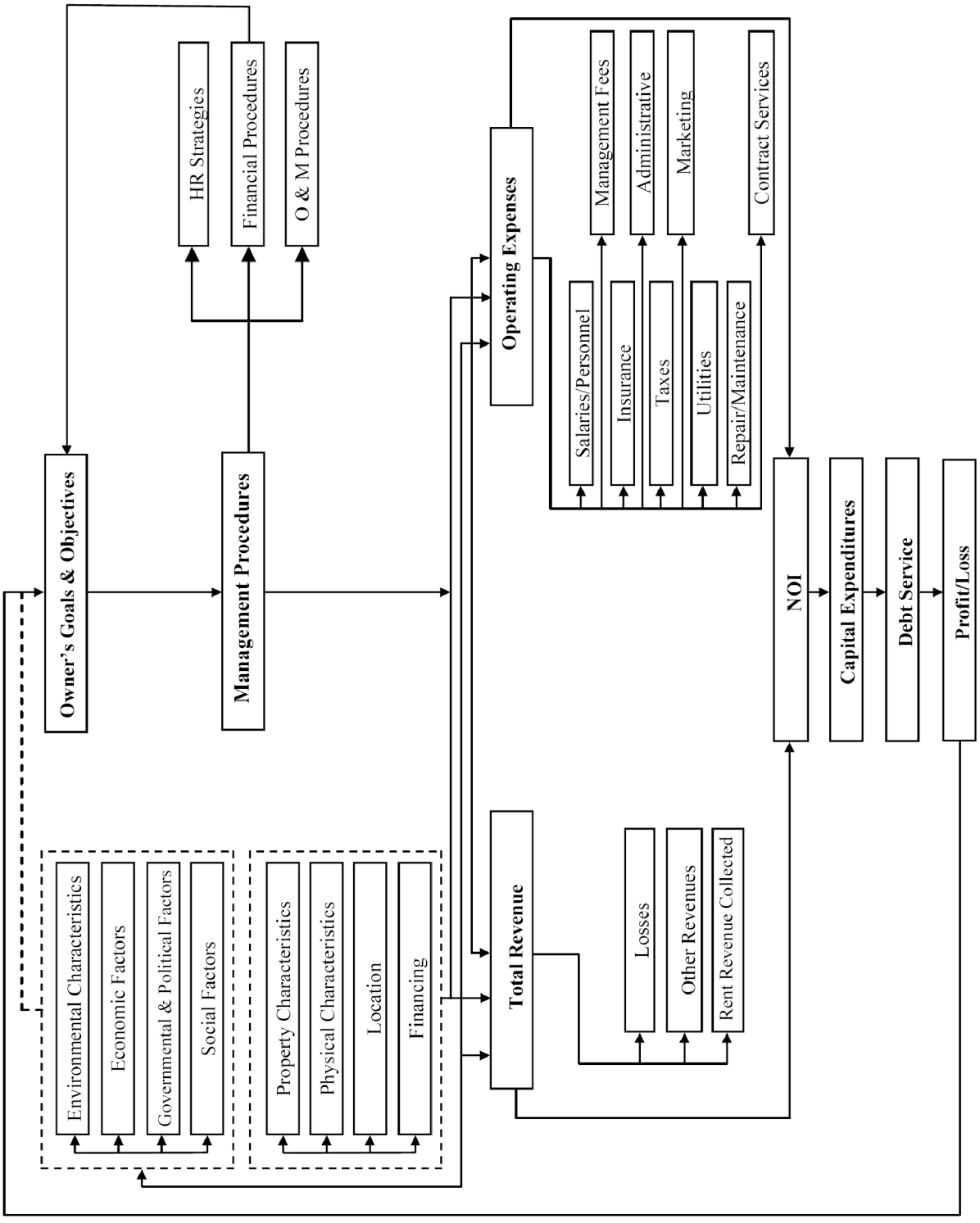

Figure 1.1: Factors that Influence Net Operating Income (NOI)

Operating expenses of an apartment community (rental property) typically fall into nine major categories: salary and personnel; insurance; taxes; utilities; management fees; administration; marketing; contract services; and maintenance. According to the National Apartment Association's 2005 Income and Expense Survey, total operating expenses represented 39.4 percent of Gross Potential Rent (GPR), as illustrated in Table 1.1. Gross Potential Rent is the sum of rent revenue collected and revenue losses, including those from vacancies, collections and concessions. The largest increase (10.6%) in operating expenses (among 3,807 properties) is in the category of salaries and personnel (Sheehan, et al., 2005).

Table 1.1: Operating Expenses by Category (Source: Sheehan, et al., 2005)

Operating Expenses	% of Total Operating Expenses	% of GPR
Salaries & Personnel	26.87%	10.60%
Insurance	5.45%	2.10%
Taxes	23.82%	9.40%
Utilities	9.62%	3.80%
Management Fee	7.96%	3.10%
Administrative	4.46%	1.80%
Marketing	4.66%	1.80%
Contract Services	8.35%	3.30%
Repair & Maintenance	8.81%	3.50%
Total Operating Expenses	**100.00%**	**39.40%**

According to the U.S. Department of Labor, employment in the apartment industry totaled 637,900 jobs in January 2006. Employment analysts predict a rise by at least 10,000 to 12,000 jobs annually, to reach nearly 740,000 jobs in 2010. The industry is currently experiencing high turnover among its current employees at a rate of 50%, compared to the average turnover in the retail sector of 27.1%; this

means that one-half of the staff employed in the multi-family rental housing industry leaves every year (NMHC, 2004). These trends, coupled with the increase in operating expenses related to salaries and personnel, force multi-family management professionals to take a closer look at talent management practices and its effect on customer satisfaction and overall organizational climate.

A number of researchers find that revenue-based measures of business unit performance, such as sales and profitability, are significantly correlated with employees' work-related perceptions (Gelade & Young, 2005). The evidence suggests that business units in which employees' collective perceptions are relatively favorable perform better.

Apartment owners gauge financial performance by a rental property's net operating income. Costs associated with salaries and personnel, such as recruiting, training and turnover, all play a major role in a property's performance. Most owners agree with the philosophy of hotel chain Marriott: "you can't make happy guests with unhappy employees" (Silvestro, 2002). However, owners and managers of multi-family units have failed to systematically identify those factors that contribute to employee engagement. If such an index was created and made available, owners and managers of apartment communities (rental property) might then better enhance resident's satisfaction and loyalty, which could, in turn, drive profit and growth. The result of an extensive review of literature in the multi-family housing industry guides this study to better understand the problem surrounding the relationship of multi-family rental property's employee engagement and business outcomes in this field. Business outcomes in this study

are a combination of both tangible and intangible variables. In this study, the variables affecting engagement will be identified and integrated into the model.

1.3 Problem Statement

Despite documented support in other industries identifying the link between engaged employees and more impressive business outcomes, little research has concentrated on the special needs and challenges of the multi-family apartment rental housing industry. Further, there are limited tools available to assist owners and managers with the task of identifying the key employee engagement drivers and the likelihood that resident satisfaction will occur. Other studies indicate that disengaged employees affect resident satisfaction; this disengagement, and the corresponding reduced level among residents living in multi-family communities is, in turn, having a negative financial impact on this sector of the housing industry (Miller, 2005; Kingsley, 2007).

1.4 Objective and Research Scope

The goal of this research is to assist multi-family apartment rental property owners and managers in their process of talent management by developing an Employee Engagement Model that improves business outcomes (e.g., profit, resident satisfaction, etc.).

The objectives of this research are: 1) To identify and classify characteristic drivers of a multi-family rental property employees' engagement effect on residents satisfaction; and 2) To develop an Employee Engagement Model (EEM) that allows multi-family apartment rental property owners and managers to define the

distribution of satisfied residents' satisfaction-score for a given average level of employee engagement-score. This research utilizes statistical analysis, neural network and probability modeling techniques for developing the Employee Engagement Model.

The hypothesis of this research is that: *the relationship between an average percentage of satisfied residents' satisfaction-score and average level of employee engagement-score is a Burr Distribution with a skewness to the left.* The scope of this research is limited to multi-family apartment rental properties (consisting of one-, two-, and three-bedroom floor plans) in the United States. Employees are defined as those who work directly with the residents on the apartment rental property site, and do not include those employees who work in the corporate headquarters of the real estate property rental company.

The results of this research are expected to assist human resources professionals, managers, and owners of the multi-family rental properties to retain employees and improve resident satisfaction.

1.5 Model Assumptions

This research specifically investigates drivers of multi-family rental employees' engagement; and assumes that rent increases, service requests made by the residents, management processes, and compensation factors stay constant in measuring the probability of resident satisfaction, resident's decision to renew his/her lease, and the likelihood that the resident will or will not refer someone to the community. It is also assumed that the average resident satisfaction-score has a

one-to-one relationship with an average employee engagement-score in a given property.

1.6 Methodology

The methodology for this dissertation consists of nine tasks, which are outlined in greater detail in Chapter 4; the decision criteria that are involved with each task are also outlined in this chapter. The methodological framework involves the use of both qualitative techniques, based on interpretive analysis of data gathered from expert knowledge, and quantitative methods, based on statistical analysis of collected survey data from a national multi-family housing company. These findings will identify those variables which contribute to resident satisfaction and will be used to develop a model to predict the likelihood resident satisfaction will occur.

1.7 Dissertation Outline

This research is divided into nine chapters. This chapter provides a background for the research, along with a problem statement and objective of the study. A comprehensive review of related literature is conducted and included in Chapter 2, along with the results of feedback gathered from a panel of experts to define variables that affect resident satisfaction. Chapter 3 discusses the research methodology that is used to guide this study. Chapter 4 introduces Statistical Analysis, the first of three approaches used to analyze the data, which is obtained from a consulting firm that serves the multi-family housing industry. The data set includes 1,516 employee responses and 23,795 residents over a three-year span, from 2005 to 2007. The frequencies for each variable are observed and organized

for the purposes of comparison. Chapters 5 reports the findings from the statistical analysis using Cumulative Logistic Regression, Simple Linear Regression, and Weighted Linear Regression. These analysis are used to identify the top 10 variables that are common to resident satisfaction, intent to renew, and the likelihood of the resident referring someone to his/her community. The chapter also discusses how the model is validated using a percentage of the data that is set aside for testing purposes. A final set of sensitivity analysis is also used to validate the Employee Engagement Model. Chapter 6 introduces Neural Network as a method for analyzing the data to make predictions based on complex relationships within the data. Chapter 7 describes Radar Diagramming and its application by graphically demonstrating the relationship of input variables (drivers of engagement) and finds patterns that link these drivers together. Chapter 8 describes the development of a Probability Model as a systematic way of explaining the percentage of satisfied residents satisfaction-score based on an average level of employee engagement-score. Finally, Chapter 9 concludes with a summary, discussion of the results, and recommendations for future research.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The purpose of this chapter is to provide a review of the literature that exists in the areas of employee engagement and resident satisfaction in the multi-family housing industry. This literature study is comprised of two sections. The first section focuses on employee engagement; the second part focuses on the link between resident satisfaction, employee engagement and profitability in the multi-family rental housing industry. The objective of this research is to examine the drivers affecting employee engagement and its impact on resident satisfaction, and to develop a model for employee engagement in the multi-housing industry. Once this Employee Engagement Model (EEM) is developed, it can be introduced to an industry that is highly dependent on human capital for its success. The model can be used by human resource professionals, managers and owners as a tool to develop and retain employees in this sector, with the intention of improving resident satisfaction and the company's financial performance.

2.2 Literature Search

This section provides an overview of the process by which the review of literature is conducted. The literature reviewed in this chapter is collected through a variety of methods. First, peer-reviewed journals are obtained through academic databases, such as LexisNexis, JSTOR and ProQuest Research. In addition, subject-related databases are reviewed that contain references and abstracts to scholarly articles and technical reports from the following disciplines: human resources, human psychology, management, real estate, and housing. Secondly, conference proceedings, trade journals and industry white

papers are also used from professional organizations in related fields. After a careful review, it became clear that there is limited research in the areas of resident satisfaction in the multi-family rental housing industry. The information used in this chapter is carefully reviewed for its source reliability and validity.

2.3 Defining Engagement

The literature on employee engagement builds on earlier research that focuses on issues of commitment, satisfaction and organizational behavior (Katz and Kahn, 1978). Kahn (1990) emphasizes that people use varying degrees of their selves in their work roles, whereby he further defines both engagement and disengagement. In Kahn's research, personal engagement is defined as "people employing and expressing themselves physically, cognitively, and emotionally during role performances"; he defines disengagement as when "people withdraw and defend themselves physically, cognitively, and emotionally during role performances" (p. 694). Hackman and Oldham (1980) began some of the original research on this subject, focusing on the degree of personal interaction between the employee and their job. These inter-relationships between the workgroup, the organization and employee demonstrate the complexity that surrounds this topic of employee engagement (Bennis, Schien, Berlew and Steel, 1964; Rogers, 1958; Alderfer, 1985; Hochschild, 1983).

Engagement is more recently described as a two-way interaction between the employee and the employer (Chartered Institute of Personnel and Development; Rafferty, Maben, West and Robinson, 2005). Therefore, the cited characteristics of an engaged workforce include having a focus on motivation, satisfaction, commitment, finding meaning at work, pride and advocacy of the organization (recommending the company's

products or services), and having a connection to the organization's overall mission and goals (Scottish Executive Social Research, 2007, Clifton, 2002). Schmidt (2004) defines engagement as bringing satisfaction and commitment together, and states that satisfaction addresses more of an emotional or attitudinal element, while commitment involves more motivational and physical elements.

Sharpley (as cited in Harrad 2006) points out that it is important to distinguish between motivation and engagement, as it is possible to be motivated in one's job without necessarily feeling an attachment to the organization. Sharpley's definition of engagement also states there must be a mutual feeling of support between the employee and the organization (as cited in Harrad 2006). Even though satisfaction and commitment are two key elements, individually they are not enough to guarantee engagement. There is a recurring theme that indicates that engagement involves workers "going the extra mile" and exerting discretionary effort over and above what is normally expected (SESR, 2007; Kochanski, Sorensen, & Ellis, 2006; and Clifton, 2002). These authors also endorse a two-dimensional definition of engagement that defines an engaged employee as one who both knows what to do and wants to do the work. It is their strong view that engagement should always be defined and assessed within the context of productivity, and that the two elements of engagement are necessary for driving productivity (Ellis and Sorensen, 2007). The strength of employees' bond with their organization can influence willingness to exert maximum effort for the company. In addition, the decision of key talent to stay or leave can play a greater or lesser part in influencing important business outcomes. For example, more favorable employee opinions may drive both more favorable customer opinion and higher sales; also, more

favorable employee opinions could be predictive of lower turnover. Attitudes about leadership, communication, and cooperation demonstrate how engagement influences customer opinions, sales and turnover rates (International Survey Research, 2007). Table 2.1 shows the factors that contribute to employee engagement. This extensive review of literature indicates that there are several common recurring themes identifying factors that contribute to employee engagement. The factors are ranked from the highest to the lowest frequency and the top 15 factor frequencies (about 60 occurrences) are: teamwork; clear expectations; feedback; performance evaluations; quality work; professional development and training; work/life balance; sense of purpose; friends at work; opportunity to grow; proper equipment; job fit; open communication; recognition and praise; and job fit. The frequencies of these top 15 factors are illustrated below in Figure 2.1. For a complete listing, see Appendix A.

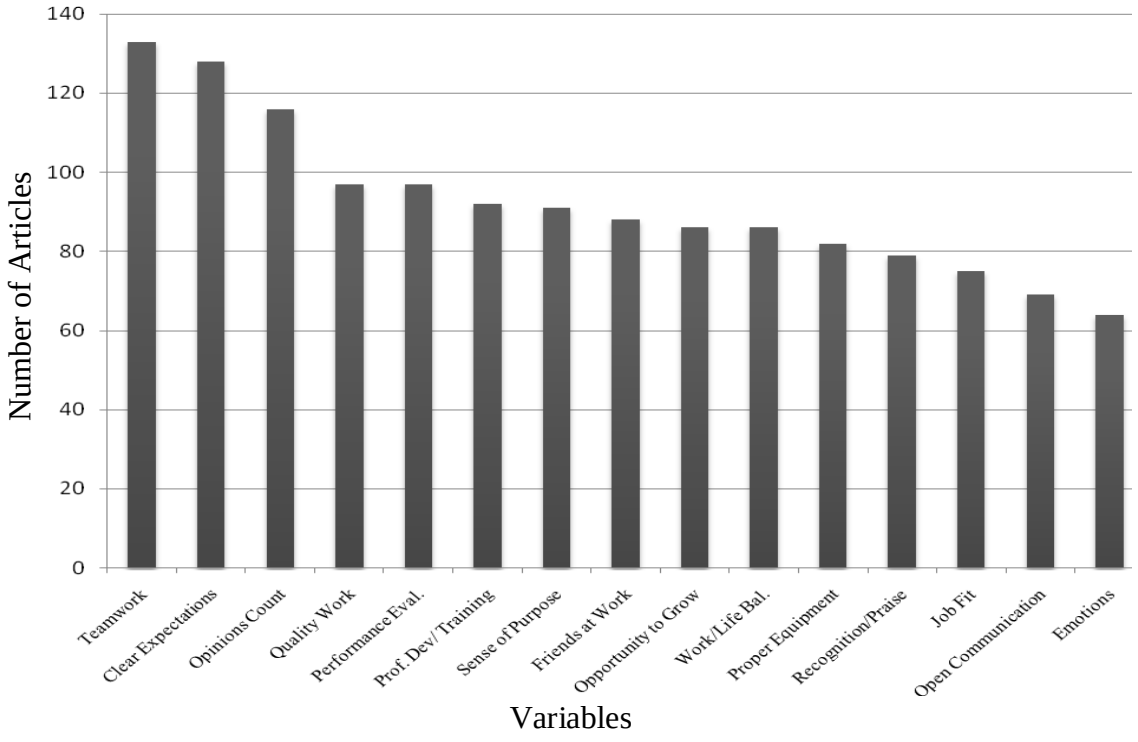

Figure 2.1: Frequency of Top 15 Employee Engagement Variables

Table 2.1: Factors That Contribute to Engagement

			Employee Engagement Variables																																		
			Clear Expectations	Proper Equipment	"Opportunity to do my best"	Recognition/Praise	Concern/Caring Environment	Professional Development/Training	Feedback "opinions count"	Sense of Purpose "Worthwhile"	Quality Work	Friends at Work	Performance Evaluation	Opportunity to Grow	Trust	Values	Emotions/Emotional	Compensation/Pay/Benefits/Health/Medical	Employee Incentives	Culture	Job Fit	New Hire Development/Employee	Sense of Security	Intrinsic Motivation	Employee/Employer Collaboration	Supervisor/Leader	Working Conditions	Community Involvement	Teamwork	Work / Life Balance	Support for Diversity	Strategic Management	Commitment to Employees	Systems	Open Communication	Longevity / Tenure	Workplace Design
Tab#	Source	Methodology	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
1	Abma (2007)	Employee Survey				1											1				1							1									
2	Bacal (2004)	Journal Article													1										1								1				
3	Banks (2206)	Case Study-Firestar	1					1										1	1		1					1			1	1	1						
4	Barling & Frone (2003)	Book-Psychology of Workplace Safety											1																					1			
5	Baruch (1999)	Study/Comparative Analysis							1								1									1				1							
6	Bassi (2007)	Likert Survey-HBR												1							1					1				1				1			
7	Berry (2006)	Case Study-Intercontinental Hotel											1											1		1							1				
8	Beslin & Reddin (2006)														1																						
9	Bliese & Castro (2000)	Study Sample			1						1							1				1							1				1				
10	Bobinski (2004)	Opinion Article	1												1																				1		
11	Bowers (2001)	Likert																		1																	
12	Brim (2006)	Opinion Article																			1													1			
13	Brim (2002)	Q12 Survey	1	1	1	1	1	1	1	1	1	1	1	1														1								1	
14	Buckingham (2001)	Opinion Survey Research Q12	1	1	1	1	1	1	1	1	1	1	1	1							1														1		
15	Byrnes (2006)	Case Study-Nucor Steel							1									1		1						1											
16	Campbell (2006)	Case Study-Can West Media Works				1			1								1									1				1							
17	Cartwright & Holmes (2006)									1																											
18	Cawley, Keeping & Levy (1998)	Meta Analysis	1																																		
19	Choi, Huh & Kang (2003)	Algorithm	1																																		
20	Clay (2007)	Journal Article												1																							
21	Clifton, D. (2003)	Opinion Article						1													1																
22	Clifton, D. & Harter	Q12 Survey	1	1	1	1	1	1	1	1	1	1	1	1																	1						
23	Clifton, J. (2006)	Opinion Article																	1																		
24	Coffman (2002)	Gallup Journal-Q12 Survey	1	1	1	1	1	1	1	1	1	1	1	1			1				1					1										1	
25	Coffman (2002)	Interview																													1						
1-410	Total Frequency * (see Appendix for comprehensive list)		128	82	51	79	44	92	116	91	97	88	97	86	57	41	64	58	45	60	75	32	50	33	44	59	52	35	133	86	32	41	50	27	69	37	5

2.3.1 Levels of Engagement

Employee engagement has three related components: a cognitive, an emotional, and a behavioral aspect (Guest and Conway, 2004). The cognitive aspect of employee engagement concerns employees' beliefs about the organization, its leaders, and working conditions. The emotional aspect concerns how employees feel about each of those three factors and whether they have positive or negative attitudes toward the organization and its leaders. The behavioral aspect of employee engagement is the value-added component for the organization and consists of the discretionary effort engaged employees bring to their work in the form of extra time, brainpower and energy devoted to the task of the firm.

Coffman and Buckingham (1999) find that employee responses to the Q-12 survey tend to fall into three distinct categories: engaged, not engaged, and actively disengaged. Engaged employees are builders. They want to know the desired expectations for their role so they can meet and exceed them. They're naturally curious about their company and their place in it. They perform at consistently high levels. They want to use their talents and strengths at work every day. They work with passion, and they have a visceral connection to their company. These engaged employees are not only driving innovation within organizations, they are also driving customer satisfaction. A meta-analysis of engagement and financial performance includes 1,979 business units in 10 different companies in financial services, professional services, retail, and sales industries. It reveals that local business units that score above the database median on employee engagement and customer engagement metrics are, on average, 3.4 times more effective financially than units that rank in the bottom half on both measures. They are

also about twice as effective financially as units that are high performers on one but not both of these critical vital signs (Fleming and Asplund, 2007.)

Employees who are "not engaged" are not necessarily negative or positive about their company. They take a wait-and-see attitude toward their job, their employer, and their coworkers. They hang back from becoming engaged, and they don't commit themselves. The "actively disengaged" employees are not just unhappy at work; they are busy acting out their unhappiness. Every day, actively disengaged workers undermine what their engaged coworkers accomplish. The most recent research by Wagner & Harter (2006) suggests that 29% of the U.S. workforce is engaged, 55% is not engaged, and 16% is actively disengaged.

2.4 Factors Affecting Engagement

The Institute for Employment Studies (IES) (1999) finds that the strongest driver of engagement is a sense of feeling valued and involved. The components of which relate to several aspects already identified as relevant to engagement and include: involvement in decision-making; the extent to which employees feel able to voice their ideas, and to which managers listen to these views and value employees' contribution; the opportunities employees have to develop their jobs; and the extent to which the organization is concerned for employees' health and well-being.

Wagner and Harter (2006) expand on the research by Harter, et al. (2002) to explain the relationship between the employee and the employer, further defining 12 elements of employee engagement. Wagner and Harter's (2006) research with The Gallup Organization using the Q12 survey and statistical modeling proves that a more engaged employee is a more productive employee. The 12 elements that emerge from their

research are shown in Table 2.2 (Buckingham and Coffman, 1999); these elements coincide with those most frequently occurring in the review of literature. The elements are identified from 10 million responses that are measured in 41 languages and 114 countries in industries as varied as electrical utilities, retail stores, restaurants, hotels, hospitals, paper mills, government agencies, banks, newspapers, and others.

Table 2.2: The 12 Key Elements that Contribute to Engagement (Buckingham & Coffman, 1999)

No.	Key Elements
1.	Clear Expectations
2.	Proper Equipment
3.	Opportunity to Do Best Work
4.	Recognition/ Praise
5.	Someone Cares
6.	Someone Encourages Development
7.	Opinions Count
8.	Mission/ Purpose of Organization is Important
9.	Quality Work
10.	Best Friend at Work
11.	Progress/ Feedback is Provided
12.	Opportunity to Learn & Grow

2.4.1 Additional Factors Which Build Engagement

A more in-depth analysis of several key factors which contribute to engagement, as identified by the review of literature, are discussed in the following sections. These factors include: relationships with managers and colleagues; organizational justice and trust; promotion; work-life balance; job satisfaction; and pay and reward.

2.4.1.1 Relationships with managers and colleagues

The quality of the relationship between managers and their employees relates to the development of engagement. Several studies have found significant positive relationships between the two variables, that is, employees who have good relationships with their immediate managers have greater commitment (Green, Machin & Wilkenson, 1996; Nystrom, 1990; Setton, et al. 1996). Similarly, a recent study by the Chartered Institute of Personnel and Development (2001) concludes that a good relationship between managers and employees is one of the most important factors affecting motivation at work. Emotional attachment to colleagues is another important aspect, and is maintained through frequent, rewarding contact with peers (Baumeister and Leary, 1995). These relationships promote feelings of belonging that can bind employees to the organization.

2.4.1.2 Organizational justice and trust

Research indicates that employees evaluate their experiences at work in terms of whether they are fair and reflect a concern on the part of the organization for the well-being of the employees (Meyer, 1997). McFarlin and Sweeney (1992) suggest that employees' commitment to the organization might be shaped, in part, by their perception of how fairly they are treated by the organization. It is suggested in the literature that, by treating employees fairly, organizations wanting to foster greater engagement from their employees must first provide evidence of their commitment to employees.

Organizational justice also has links with the concept of trust. According to Kramer (1999), trust in an organization can promote the acceptance of organizational initiatives. When there is trust, employees are willing to suspend judgment and defer to

the authority of others. O'Malley (2000) identifies four areas in which employees' sense of trust in the employer can be increased. These include: growth; work-life balance; individual accommodation; and health and safety.

2.4.1.3 Promotion

Policies and practices concerning promotion can also affect engagement. For example, Schwarzwald, Krochlowsky & Shalit (1992) find that engagement is higher among employees who have been promoted. Commitment is also related to employees' perceptions that the organization has a preference of recruiting from their internal labor market; such a policy may be perceived as an example of the organization's commitment to the employee. Among those who are considered for promotion, the outcome of the decision is likely to have an effect on commitment. But, for some, the perception of fairness in the decision-making process may be even more important.

2.4.1.4 Work-life balance

A key issue emphasized by recent research (Johnson, 2004) is the degree to which employees perceive they are able to achieve the right balance between home and work. Organizations are beginning to recognize this, and are making more concerted efforts to introduce a host of programs intended to ease employees' burdens. These include initiatives such as: flexible work arrangements; child care; time-off policies; elder care; health care; information and counseling; and convenience services. A major study by The Families Work Institute (1998) finds that such employer support is related to increased employee engagement.

2.4.1.5 Job satisfaction

A positive relationship between job satisfaction and engagement, using a variety of satisfaction and commitment measures, has been consistently reported in the literature (Balfour and Wechsler, 1996; Cook and Wall, 1980; Green et al, 1996). From meta analysis (*e.g.* Iaffaldano and Muchinsky, 1985), it is clear that employees who enjoy their jobs will work harder and stay longer with their employers than employees who do not. A satisfying job typically has three properties. First, it has intrinsically enjoyable features; Mathieu and Zajac (1990) find that the strongest correlation with commitment is job characteristics, particularly job scope (enrichment). Second, a satisfying job provides an opportunity for growth and development. And third, it makes employees feel effective in their roles (that they can positively influence organizational outcomes).

2.4.1.6 Pay and reward

As mentioned previously, employees may remain with an organization because there are constraints against leaving and incentives for staying. It is, thus, important for organizations to structure the economics of the relationship in a way that will not obstruct engagement. Empirical tests of administration of benefits have implications for employee engagement. For example, Grover and Crooker (1995) use data collected in a national survey of over 1,500 U.S. workers to examine the relationship between availability of family-responsive benefits and affective organizational commitment. They find a positive correlation between the availability of such benefits and commitment, even for those who do not benefit directly. They argue that organizations that offer such benefits are perceived by employees as showing greater care and concern, and as being fair in their dealings with employees. Similarly, Cohen and Gattiker (1994) examine the link

between organizational commitment and rewards, and find that engagement is more strongly related to pay satisfaction than to actual income.

2.4.2 Role of Management in Promoting Engagement

Findings by Benson, Young and Lawler (2006), Richards (2004), and Axelrod (2002) indicate that top-performing managers have an approach to management that focuses on developing the strengths of the individuals they manage. In a sense, high-performing managers have been ahead of their time in doing what is psychologically most efficient: they affect engagement and productivity by understanding and positioning individual differences in their employees. Researchers (Harter, et al., 2002) find that employees' perceptions of their organizational leaders and the future of the organization is significantly more positive if the employees feel "the leadership of the organization focuses on the strengths of each person." Developing sustainable positive momentum in an organization is, in part, a function of developing systems that increase the opportunity for talent identification and strengths development for each individual.

Businesses that adopt a strength-based approach to individual development see the greatest gains in employee engagement, and, hence, productivity. In his study of health care organizations, Black (2001) concludes that, by using talent and strength identification methods, employee engagement increases. Gelade and Ivery (2003) examine the relationship between human resource management (HRM), work climate and organizational performance in the branch network of a retail bank. It extends previous research conducted by Huselid (1995) that find HRM practices, such as employee recruitment and selection procedures, compensation and performance management systems, employee involvement, and employee training, have a significant

impact on employee turnover and productivity, and on short- and long-term corporate financial performance. Similarly, Huselid, Jackson & Schuler (1997) show that HRM effectiveness is associated with increased financial performance, as indexed by productivity, cash flow and market value.

2.5 Engagement and Business Performance

A number of researchers find that revenue-based measures of business unit performance, such as sales and profitability, are significantly correlated with employees' work-related perceptions (Gelade and Young, 2005). The evidence suggests that business units in which employees' collective perceptions are relatively favorable perform better. Further investigation of these studies leads to identification of a set of variables related to employee engagement and business outcomes, which are used to develop the employee engagement model in this research.

There are several studies that measure employee perceptions and business unit performance, one of which is a meta-analysis of 7,939 work units in 39 companies (Harter, et al., 2002). These authors find significant correlations between business unit productivity and profitability and a composite of items they call 'employee engagement'. Overall, these results suggest that positive employee work experiences, as reflected by elevated business unit scores on a variety of attitudinal and climate measures, are associated with enhanced financial performance.

One plausible account of the link between employees' work experiences and financial performance holds that, in the service sector, customer satisfaction is a critical intervening variable. Management theorists call this view of organizational performance the service profit chain (Heskett, Sasser & Schlesinger, 1997). The service profit chain

asserts that satisfied and motivated employees produce satisfied customers; satisfied customers, in turn, tend to purchase more, increasing the revenue and profits of the organization. Authors Fleming, Coffman & Harter (2005) suggest that fully engaged customers deliver a 23% premium over the average customer in terms of profitability, revenue, and relationship growth. IES research, in the UK retail sector, shows conclusively that employee commitment has a direct impact on sales (Barber, Hayday & Bevan, 1999). As well as the direct link, commitment influences sales through improved customer loyalty and improved employee attendance. Broadly, as employee commitment increased, sales went up; in addition, employee absence decreased, customer satisfaction increased and customer spending intention increased, causing sales to go up even more. The literature shows a considerable amount of evidence that suggests HR practices are linked to organizational performance. The engagement and involvement of the workforce appears to be an essential part of the success of implementing such practices often mediated by the capability of the managerial workforce. The Institute for Employment Studies (2005) refers to this as a Chain of Impact, illustrated in Figure 2.2, whereby a number of inputs affect human capability. This, in turn, affects the activity of the people, their productivity, and the quality of what they do. The input factors that develop employee's abilities or their commitment, through to the outcomes of capability or the final results be they profit, or shareholder value or improved goods or services. Such a chain is established within the environmental context. The capability of the workforce is expressed through activities of people and they effort they make, the new products or services they crease or the quality of what they do. The activity will have an impact on the amount of work which takes place which can be measured in terms of productivity of

the workplace, and the satisfaction of the customers. Productivity and customer satisfaction are likely to give rise to final outcomes of profit or shareholder value (IES, 2005).

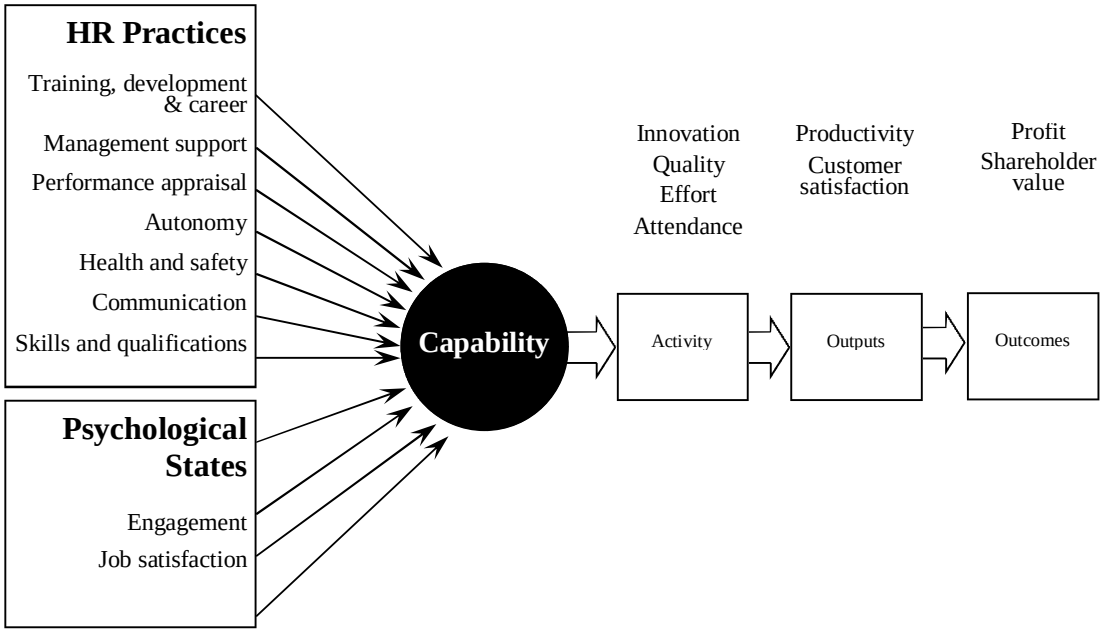

Figure 2.2: The Chain of Impact (IES, 2005)

The performance benefits accrued from increased employee commitment are widely demonstrated in the literature, as demonstrated in Table 2.3.

Table 2.3: Performance Benefits Demonstrated in Literature

Performance Benefit	Literature Reference
Increased job satisfaction	Vandenberg and Lance, 1992
Increased job performance	Mathieu and Zajac, 1990
Increased total return to shareholders	Walker Information Inc., 2000
Increased sales	Barber, et al., 1999
Decreased employee turnover	Cohen, 1991
Decreased intention to leave	Balfour and Wechsler, 1996
Decreased intention to search for alternative employers	Cohen, 1993
Decreased absenteeism	Cohen, 1993; Barber, et al., 1999

2.5.1 Cost of Disengagement

Coffman and Buckingham (1999) find that the longer an employee stays with a company, the less engaged he or she becomes. The decrease in lost profit, sales and lower customer satisfaction can be detrimental to a company's overall performance. They estimate that those "actively disengaged" employees – the least productive – cost the American economy up to $350 billion per year in lost productivity. Disengagement across all industries is proven to significantly increase absenteeism, turnover, work-place accidents, customer dissatisfaction, and "shrinkage" in inventory. Business units with a surplus of disengaged employees report 31 percent more turnover than those with a critical mass of engaged associates (Harter, Schmidt, Killham & Asplud, 2006).

2.6 Human Resources Practices and Engagement

A number of researchers (Huselid, 1995; Pfeffer, 1998; Pil and MacDuffie, 1996) have studied the link between Human Resource Management systems and employee productivity and firm performance. Pfeffer (1998) describes seven practices of successful organizations: employment security; selective hiring; self-managed teams and decentralization of authority; comparatively high compensation; extensive training; minimal status distinctions; and extensive sharing of financial and performance information. In their study of car manufacturers, Pil and MacDuffie (1996) suggest five key practices that promote employees' enhanced performance: online work teams; employee involvement practices; problem-solving groups; job rotation; suggestion programs; and decentralization of quality efforts.

Ashton and Sung (2002) sift all of these various lists down to four dimensions: 1) employee involvement and autonomy in decision-making (the use of self-managed work teams and multi-tasking that provide the employee with the opportunity of developing teamwork and decision-making skills); 2) support of employee performance (appraisal systems, mentoring, coaching); 3) rewards for performance (individual and group-based performance pay); and 4) sharing of information and knowledge (communication of information to all employees).

A recent study published by the Charted Institute of Personnel and Development (CIPD) (Purcell, et. al, 2003) examines the ways in which HR practices may impact performance. The authors seek to move the debate from whether HR practices do have an impact to understanding *how* they have an impact. The researchers assert that for people to perform above minimal requirements they must: have the ability, i.e. the requisite knowledge and skills; be motivated to work well; and be given the opportunity to deploy their skills and contribute. HR practices serve to turn these three elements into action, and managers have a key role in implementing policy and practice.

2.6.1 High Involvement Work Practices

Recent work by Sung and Ashton (2005) finds a significant positive association between the level of High Performance Work Practices (HPWP) adoption and a range of organizational outcomes. The authors find that various outcomes are differentially associated with three distinct 'bundles' of practices: 1) high employee involvement practices; 2) human resource management practices; and 3) reward and commitment practices. Konrad (2006) further suggests that high-involvement work practices can develop the positive beliefs and attitudes associated with employee engagement, and that

these practices can generate the kinds of discretionary behaviors that lead to enhanced performance. In summary, employees who can conceive, design, and implement workplace and process changes are engaged employees.

Organizational effectiveness scholar Edward Lawler (2006) and his colleagues identify four interlocking principles for building a high-involvement work system that help to ensure that the system will be effective and that the various practices will work together to have a positive impact on employee engagement. These principles can be summed up as providing employees with power, information, knowledge, and rewards. Research on high-involvement work practices in the service industry sector reveals that high involvement practices are positively associated with employee morale, employee retention and financial performance of the firm (Benson, et al., 2006). Participation generates engagement on all three levels by affecting beliefs, attitudes and behaviors. Participation also generates more positive attitudes toward the change to high involvement. When people participate in the design of the new system, they become personally invested in making the system succeed. High involvement is a rigorous, long-term process, but the result can be a uniquely structured organization with highly engaged employees and a strategic advantage of competitors (Lawler, 2006).

Guest (2000) identifies 18 key practices associated with high performance or high commitment HRM. They include: realistic job previews; use of psychometric tests for selection; well-developed induction training; provision of extensive training for experienced employees; regular appraisals; regular multi-source feedback on performance; individual performance-related pay; profit-related bonuses; flexible job descriptions; multi-tasking; presence of work-improvement teams; presence of problem-

solving groups; information provided on the business plan; information provided on the firm's performance targets; no compulsory redundancies; avoidance of voluntary redundancies; commitment to single status; and harmonized holiday entitlement. The Guest list provides a comprehensive range of indicators, but is not intended to act as a guide for employers; therefore, not all the indicators would be easy to collect or measure. The indicators are not clustered into explicit bundles of practices and are not underpinned by a conceptual/explanatory model.

In a major review of HR practices in British aerospace companies, Thompson (2000) identifies a close link between high performance working and financial performance. The research identifies more than 30 practices, which fall into three distinct clusters. The first involves high involvement practices that aim to create opportunities for engagement (*e.g.,* semi-autonomous teams, problem-solving teams, continuous-improvement teams, responsibility for own work quality, job rotation within and/or between teams, team briefings, staff suggestion schemes, attitude surveys). The second includes human resource practices to build skill levels, motivation and ability (*e.g.,* formal recruitment interviews, performance or competency tests, psychometric tests, share ownership schemes, personal development plans, training, competence-based pay, team rewards, incentive pay). Lastly, Thompson identifies employee relations practices that help build trust, loyalty, and identity with the organization (*e.g.,* single status, formal grievance procedures, formal salary reviews, social gatherings). Since the Thompson model explores practices emerging from a specific sector, the broad clusters of processes overlap between similar concepts, like motivation, engagement and loyalty, and may not apply as easily to other sectors.

Based on research conducted in the U.S., Jeffrey Pfeffer (1998) identifies seven practices of successful organizations. These include: employment security (to eliminate fear of lay-offs); selective hiring (emphasizing a good fit with company culture); self-managed teams and decentralization of authority empowering employees; comparatively high compensation; extensive training; minimal status distinctions (to build a sense of 'we'); and extensive sharing of financial and performance information (to build trust).

2.6.2 Human Capital Management

Elias and Scarborough (2004) draw four conclusions on human capital. First, human capital should be viewed as a bridging concept between strategy and HR practices. Second, it is a precarious asset, and the potential mobility of employees could and can undermine an organization's ability to deliver. Third, it is a paradoxical asset in that the qualities that individuals bring to the workplace, such as flexibility and commitment, create competitive value which is difficult to measure. Lastly, human capital management is context-dependent. Many experts (Huselid, et al., 1997; Beatty, Huselid & Schneier, 2003) use a variety of measurement systems that reflect the indisputable role human resources plays as a driver of value creation. They demonstrate a type of HR architecture (the function, the system, and employee behaviors) that reinforces the importance of employee engagement as a strategic asset (Becker, Huselid & Ulrich, 2001). In a competitive environment where people issues are front-and-center, the demand for innovative approaches that link talent strategies to business has never been more pressing. By designing metrics and conducting analysis, such as the ones described in the following section, researchers can deliver further insights into how organizations can best combine these delivery models to maximize value.

2.6.2.1 Human capital index

The Human Capital Index is a methodology developed by Watson Wyatt Worldwide (2002) to calculate the correlation of human capital to shareholder value. They develop a set of measures to quantify which HR practices and policies have the greatest correlation with shareholder value and use these results to create a single human capital index (HCI) score. The index uses a proprietary questionnaire, which measures responses on a one to five scale against four critical practices: clear rewards and accountability, flexible workplace, recruitment practices, and communication strategy. The Watson Wyatt approach does not cover skills and development, and, like many approaches, does not have an underpinning conceptual framework.

2.6.2.2 The organizational performance model

In the early 1990s, Mercer HR Consulting developed methods to measure the business impact of human capital practices in organizations with a research group of economists and work psychologists. According to the model, a firm's human capital strategy consists of six interconnected factors: people; work processes; managerial structure; knowledge transfer; decision-making; and rewards. The ways in which these factors relate to each other provide insight into how companies can develop an integrated model that is targeted specifically to their industry. Organizations can measure their performance against the model using two statistical tools marketed by Mercer. The model covers work processes and management, but does not attend to how individuals access the organization or deal directly with motivational issues (Mercer HR, 1991).

2.6.2.3 Balanced scorecard

Kaplan and Norton (1996, 2004) created the balanced scorecard that has had considerable influence on HR practice. The scorecard suggests that companies should measure their performance against a range of measures, which fully captures four constituencies of interest: 1) Financial; 2) Internal Business Processes; 3) Learning and Growth; and 4) Customers.

More recent work by Kaplan and Norton (2004) develops the 'strategy map', which provides a cascade of processes to which firms should attend. This map begins with long-term financial goals; it suggests organizations need to determine the value proposition which will deliver the revenue growth specified, identify the processes most critical to creating and delivering that value proposition, and, finally, determine the human, information and organizational capital the processes require. This final layer builds on the learning and growth perspective embedded in the balanced scorecard and identifies three categories of intangible assets essential for implementing any strategy. The first is human capital, defined as the skills, talent, and knowledge that a company's employees possess. The second is information capital, or the company's databases, systems, networks and technology infrastructure. Lastly is organization capital, defined as the culture, leadership, alignment of people to strategic goals, and employees' ability to share knowledge.

The advantage of the balanced scorecard approach is that it is underpinned by a conceptual approach to determining value. However, it is primarily a process model rather than an attempt to explain human capability in organizations. It also does not deal

with access issues or job design factors within application, nor does it suggest the measures which organizations may use.

2.6.2.4 HR scorecard

Building on Kaplan and Norton's balanced business scorecard, Becker and Huselid (2001) have created an HR Scorecard, illustrated in Figure 2.3 below, which focuses on human resources systems rather than people management. At the center of the model is the strategic choice of the organization. This uses Tearcy and Wiersema's (1997) scheme in which firms pursue value propositions of a low-cost provider (operational excellence), innovator (produce or service leadership), or customization/unique solutions (customer intimacy).

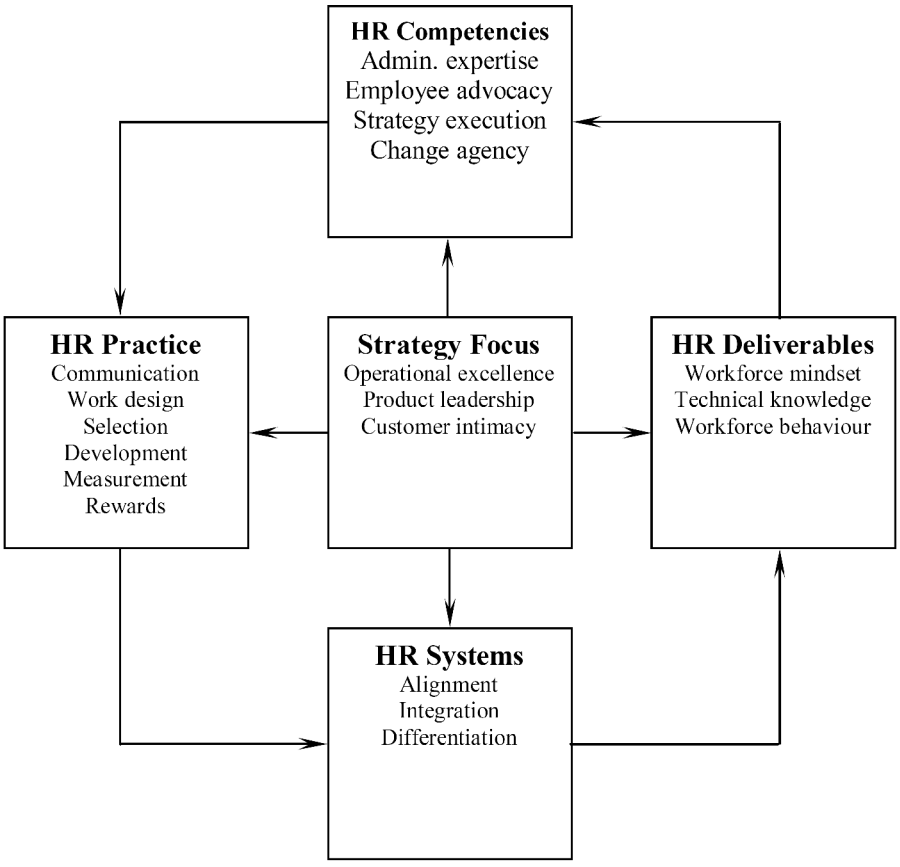

Figure 2.3: Linking HR Scorecard to Business Scorecard (Beatty, et al., 2003)

2.7 Modeling Engagement

Research from The Institute for Employment Studies (2005) studies engagement in both the public and private sector and makes use of two significant findings: 1) the key role of feeling valued and involved is a driver of engagement; and 2) the most important aspects (strongest correlations) found to foster this perception are being valued and involved. Statistical regression (IES, 2003) shows that feeling valued and involved accounts for more than 34 percent of the variation in engagement scores. Five variables – co-operation, job satisfaction, equal opportunities and fair treatment, ethnicity (white/minority ethnic), and communication – account for an additional 13 percent of the variation. As shown in Figure 2.4, the model developed by IES indicates that a focus on increasing individual's perceptions of their involvement, with added value to the organization, will dramatically increase employee engagement levels.

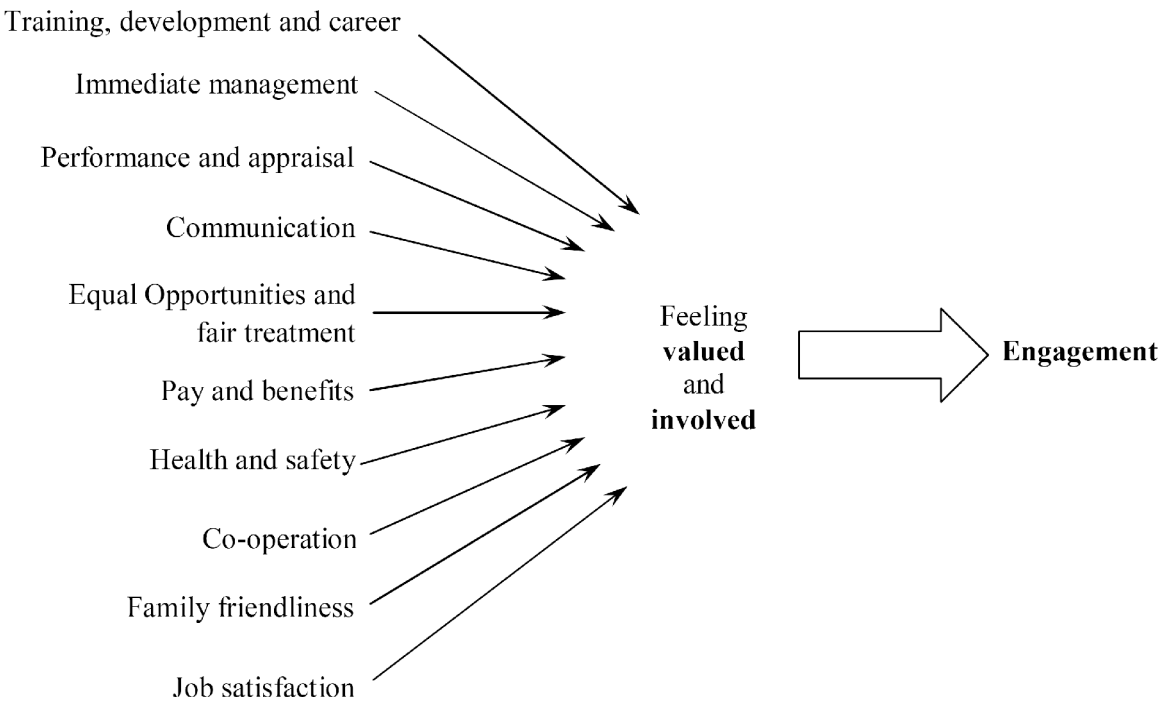

Figure 2.4: Drivers of Employee Engagement (IES, 2003)

In comparing the Institute for Employment Studies (IES) model with the HR Scorecard described in the previous section, the key similarities are in the horizontal line: HR practice; strategic focus; and HR deliverables. The IES model integrates practice and deliverables into each quadrant of the model and places strategy firmly within the application quadrant. The IES model does not explicitly cover HR competence, but does look at management; alignment is not considered a separate issue but emerges from the interaction across and within the model.

Since feeling valued and involved is considered a critical element of performance, it is important to understand what factors are related to this construct. Management plays a key role, not only as a direct link, but also indirectly, in that the line manager is instrumental in such aspects as delivering performance appraisals, smoothing the path to training, communicating, and demonstrating equality of opportunity. Almost all the correlations are positive in the IES study (2005); however, the two negative correlations are age and length of service, meaning that the sense of feeling valued and involved diminishes as both age and length of service increase.

The literature reveals there is considerable evidence that skills and development produce individual and organizational outcomes. But what Konrad (2006) reiterates is that broader HR practices and enhanced employee commitment give rise to improved organizational performance. It is clear that there are a number of other factors which help employers make the link between HR investment and organizational performance.

2.7.1 A Model of Capability

Whereas training and skill development are focused on the growth and stock of human capital, the capability of the workforce is also dependent on the way in which such capital is utilized in practice. This utilization is dependent in part on the motivation and engagement of employees, their attitudes to their organization, their manager, their colleagues, customers, and their job, which will all affect their performance. As we have seen from the literature, motivation is a crucial element of performance (Benson, Young & Lawler, 2006).

Benson, et al. (2006) construct a value chain from antecedents of capability – the input factors that develop employees' abilities or their commitment through to the outcomes of capability – to the final results, be they profit or shareholder value, or improved goods or services. Such a chain is inevitably set within the environmental context, which includes all the other factors that can affect organizational performance, such as the level of competition, the environmental infrastructure, and the regulatory environment. The capability of the workforce is expressed through the activities of people: the effort they make; the new products or services they create; or the quality of what they do. That activity will impact on the amount of work which takes place, the productivity of the workplace, and the satisfaction of consumers and customers of the organization. Productivity and customer satisfaction are likely to give rise to final outcomes of profit or shareholder value.

2.7.2. The 4-A Model

Tamkin, et al. (2000) use a model of four quadrants, illustrated in Figure 2.5, commonly referred to as the '4A Model' to explore the relationship between skills,

motivation and HR practices. The 4A Model explores people management in the organization, rather than the HR function and its policies and practices. The 4A Model points out the importance of the environment as a construct from which to consider engagement.

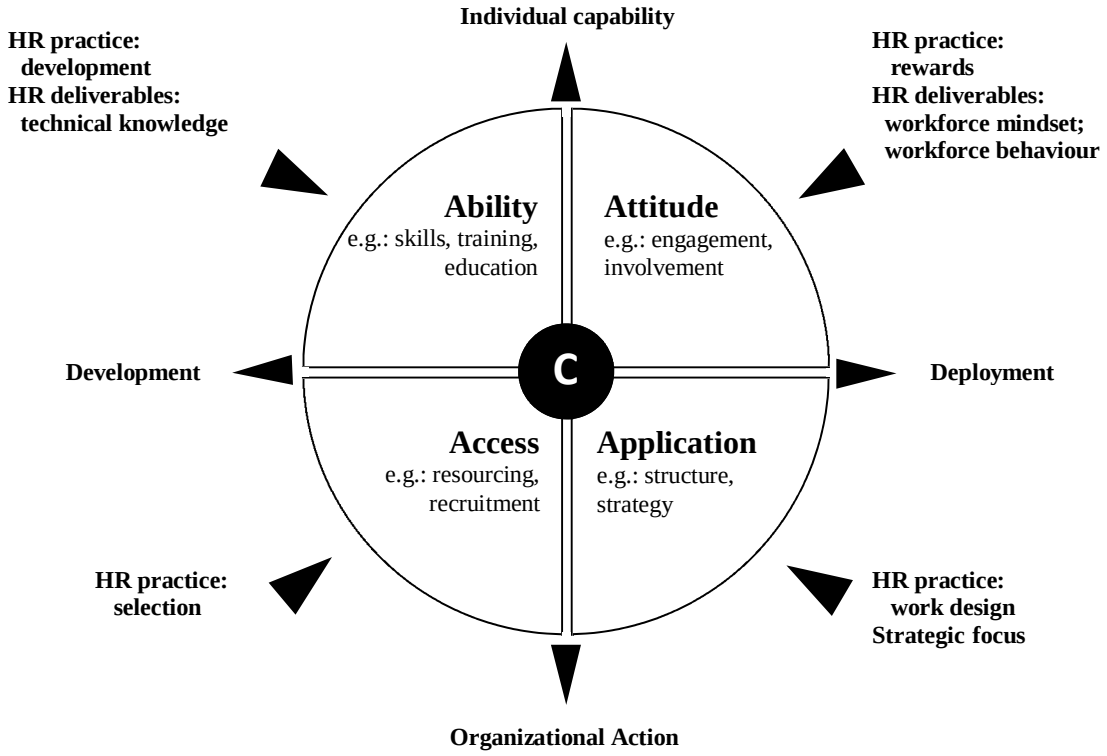

Figure 2.5: The 4A Model of Capability (IES, 2005)

2.8 Multi-family Housing Industry

According to the most recent American Community Survey by the National Multi-Housing Council (2004), there are approximately 18 million apartment units in the United States. Experts expect an additional 2 million new apartments to be available by 2010 (NMHC, 2004). The majority of the apartments are located in buildings with 10 or

more units and are managed by paid staff working directly for the owner (in-house management) or by a third-party management company (Kuperberg & Patellis, 2003).

The purpose of the following sections is to provide an overview of the multi-family housing industry and to explain the relationship between the residents (customers) and the employees (associates) who provide services to this customer base. A discussion of the factors contributing to industry profits, as well as the role of employee engagement, is provided. The words apartment and apartment home are used interchangeably when referring to a multi-family rental housing unit.

2.9 Factors Affecting Profit in the Multi-family Housing Industry

One of the primary goals of the owner is to maximize income, thereby enhancing the value of the asset. The financial health of a given property is dependent on both internal and external factors. One of the most significant internal factors influencing the financial health of a property is Net Operating Income (NOI), which is measured by the difference between total revenue collected and total operating expenses. NOI represents the gross cash available for debt service, capital expenditures and profits (Sheehan, et al., 2005). Income is derived from the rent that the residents pay on a monthly basis.

2.9.1 Resident Satisfaction and Profitability

Resident retention is critical to maintaining profitability in the multi-family rental housing industry and it is highly dependent on the interaction of the staff to reduce resident turnover. Reducing resident turnover and keeping residents in their apartments year after year (which is estimated to range from $2,000 to $3,000 per unit) affects Net Operating Income (NOI) more dramatically than new rentals. Thus, industry leaders are

beginning to understand the importance of improving the relationship between on-site staff and residents (NMHC, 2007).

The prompt and professional treatment by the staff, particularly when it comes to service requests, is proven to dramatically affect resident's satisfaction and the likelihood of that resident renewing their lease (Miller and Pulket, 2005). This interaction is not limited to service technicians only: it includes the entire staff. On a typical apartment community with 250 apartment homes, there is generally a team of on-site staff consisting of an apartment manager, a bookkeeper, at least two leasing consultants, a maintenance supervisor, a maintenance technician, and possibly a groundskeeper or housekeeper (National Apartment Association Education Institute, 2007). The responsibilities of each team member generally fall into two categories: management and maintenance. Collectively these team members are responsible for the financial performance of the apartment community by enhancing the value of the real estate asset, ensuring resident satisfaction through responding to service requests in a timely manner, and to maintaining positive resident relations.

While many residents move out due to rent increases, job transfers or other unforeseen reasons, 66 percent of residential turnover is related to controllable reasons, with staff performance and responsiveness leading the list (Miller and Pulket, 2005). In a survey conducted by SatisFacts (2003), 62% of residents state that issues, such as courtesy, dependability and responsiveness of office and maintenance staff, as reasons they were "unsure or would not renew" (Miller, 2005). The survey further concludes that customer service training is needed to further improve resident satisfaction, thereby dramatically improving the bottom line performance through resident retention. Another

study conducted by Kingsley and Associates (2008) finds community management to be the reason residents are "unlikely to renew." Other studies also reveal a strong correlation between customer service and the overall financial results of the communities. Properties scoring higher in resident satisfaction typically perform better overall (Mullen, 2007; Batdorf, 2008).

While many studies in other industries, particularly in the long-term health care industry (Rondeau and Wager, 2005; Sikorska-Simmons, 2006), focus on resident satisfaction, there are limited studies in the multi-family housing industry. However, one primary study, conducted by Paris and Kangari (2005), focuses on resident satisfaction in the affordable housing sector of the multi-family housing industry. This study identifies issues, such as communication with residents, responsiveness to service requests and staff relations, as factors that impact resident satisfaction, further demonstrating the impact of positive resident relations on the "income side" of the business.

2.9.2 Employee Satisfaction and Profitability

A number of researchers find that revenue-based measures of business unit performance, such as sales and profitability, are significantly correlated with employees' work-related perceptions (Gelade and Young, 2005). The evidence suggests that business units in which employees' collective perceptions are relatively favorable perform better. To date, the largest study of employee perceptions and business unit performance is a meta-analysis of 7,939 work units in 39 companies (Harter, et al., 2002). These authors find small, but significant, correlations between business unit productivity and profitability and a composite of items they call employee engagement. Overall, these results suggest that positive employee work experiences, as reflected by elevated business

unit scores on a variety of attitudinal and climate measures, are associated with enhanced financial performance.

One plausible account of the link between employees' work experiences and financial performance holds that, in the service sector, customer satisfaction is a critical intervening variable. Management theorists call this view of organizational performance the *service profit chain* (Heskett, et al., 1997), as discussed previously in this chapter. The service profit chain, as illustrated in Figure 2.6, asserts that satisfied and motivated employees produce satisfied customers; satisfied customers, in turn, tend to purchase more, increasing the revenue and profits of the organization.

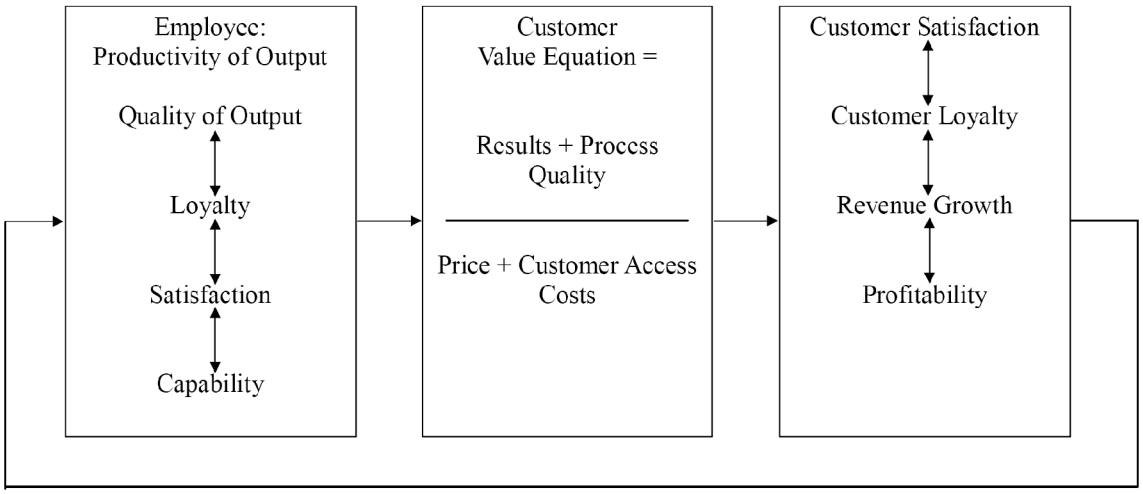

Figure 2.6: Elements of the Service Profit Chain (Heskett, et al., 1997)

Within this framework, the service profit chain may be described as a causal relationship: climate influences employee commitment, and employee commitment influences both customer satisfaction and sales (Heskett, et al., 1997).

2.9.3 Personnel-related Expenses

In addition to the impact they have on resident retention, employees within the multi-family housing industry represent the "expense side" of the business which is reflected in the operating expenses of a property. Operating expenses typically fall into nine major categories: salary and personnel; insurance; taxes; utilities; management fees; administration; marketing; contract services; and maintenance. According to the National Apartment Association's 2005 Income and Expense Survey, total operating expenses represent 39.4 percent of Gross Potential Rent (GPR). GPR is the sum of rent revenue collected and revenue losses, including those from vacancies, collections and concessions.

The largest increase (10.6%) in operating expenses (among 3,807 properties) is in the category of salaries and personnel, as shown in Table 2.4. Expenses associated with salaries and personnel include base salary, commissions or bonuses, worker's compensation insurance, state and federal withholding taxes. The true cost of employee turnover can range from 30 to 300 percent of that employee's annual cash compensation (CEL & Associates, 2008). At the lower end of that scale, if a firm loses 10 people a month who each earn $20,000 per year, that firm is spending $720,000 per year due to employee turnover which drastically affects personnel expenses. According to the National Apartment Association, employment in the apartment industry totaled 700,000 jobs in January 2006. Employment trends predict a rise by at least 10,000 to 12,000 jobs annually between 2006 and 2010 (NAAEI, 2007). This increase, coupled with the increase in operating expenses related to salaries and personnel, forces multi-family

management professionals to take a closer look at employee engagement, customer satisfaction and overall organizational climate.

Table 2.4: Operating Expenses in the Multi-family Housing Industry (Sheehan, et al., 2005)

Operating Expenses	% of Total Operating Expenses	% of GPR
Salaries & Personnel	26.87%	10.60%
Insurance	5.45%	2.10%
Taxes	23.82%	9.40%
Utilities	9.62%	3.80%
Management Fee	7.96%	3.10%
Administrative	4.46%	1.80%
Marketing	4.66%	1.80%
Contract Services	8.35%	3.30%
Repair & Maintenance	8.81%	3.50%
Total Operating Expenses	**100.00%**	**39.40%**

2.10 Employee Engagement in the Multi-family Housing Industry

Kingsley & Associates (2008) concludes that engaged employees make a financial impact on the bottom line by driving increased customer retention, in addition to recommending their company to both prospective residents and employees. Understanding the concept and value of employee engagement can pay dividends to organizations looking to optimize their operations. Lower employment costs and increased resident retention through improved customer service are two of the quantifiable benefits of a highly engaged workforce.

An employee satisfaction survey conducted by SatisFacts (2005) finds six factors, similar to those found by Harter, et al., (2002), to be important in linking employee engagement to performance. Those five include: a quality work environment; feeling of being involved in decision-making; a clear job description; empowerment to solve

problems; and proper training and the right tools and equipment to do the job (Miller, 2005). In a study by Kingsley & Associates (2008), employee engagement moves beyond "satisfaction" to include a composite of various employee perceptions that collectively indicate high performance, commitment and loyalty. In the multi-family industry, the large percentage of employees in customer intensive jobs, coupled with the high turnover associated with these roles, makes understanding commitment and loyalty a critical issue.

2.10.1 Engagement and Turnover

One of the most frequently cited costs within the human resources industry is the cost of turnover. According to the National Multi-Housing Council's 2007 compensation survey, the average turnover is 51% among leasing consultants who earned a median salary of $28,000; the median salary for a community manager is $46,700 with an average turnover rate of 21.5% (NMHC, 2007). Using the widely accepted figure of five month's compensation for the cost of turnover of a community-level employee, this organization faces turnover costs of nearly $1 million for these two positions alone. Kingsley's study further states that 91 percent of employees identified as having high levels of engagement expect to be with their current company in 12 months. This is compared to only 53% of employees with low levels of engagement (Kingsley & Associates, 2008). The clear implication is those organizations that can identify current levels of engagement can then take steps to increase employee engagement and can positively impact the company's bottom line through reduced turnover.

2.11 Summary

This chapter provides an overview of literature in the areas of employee engagement and the link between resident satisfaction, employee engagement and profitability in the multi-family housing industry. Studies reveal there is a strong correlation between employee engagement levels and resident satisfaction (Kelley, 2007; Rondeau and Wagar, 2005; Sikorska-Simmons, 2006). Thus, this link creates mounting pressure for multi-family housing owners and managers to develop talent management strategies that increase engagement. This chapter summarizes factors, such as teamwork, clear expectations, supervisor support, quality work, professional development, proper equipment, recognition, and praise, which contribute to employee engagement. The literature review also states that, while there are several models that define engagement, there are few if any designed specifically for the multi-family housing industry. Therefore, these findings lead to the need to develop a model which owners and managers can utilize in their efforts to increase both engagement and resident satisfaction. The steps taken to begin developing this model are outlined next in Chapter 3, Research Methodology.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Purpose

The purpose of this dissertation is to create an employee engagement model based on the findings from data collected from both residents and employees within the multi-family rental housing industry. Once this Employee Engagement Model (EEM) is developed, it can then be introduced to an industry that is highly dependent on human capital for its success.

This chapter first describes the research framework used in this study, which incorporates both qualitative and quantitative aspects. Each of the steps undertaken in this investigation is then described in more detail. Then, there is a brief discussion of the three primary methodologies that are used to conduct this research. The three methodologies that are discussed include: Statistical Analysis, Neural Network, and Probability Modeling. These approaches will be used to identify those variables which affect resident satisfaction in the multi-family housing industry. The intent is to develop a model that can be used by both scholars and practitioners to predict the probability of residents being satisfied given a particular engagement score.

3.2 Research Chronology

The literature review indicates that employees are generally disengaged and this disengagement results in lower satisfaction among residents in the multi-family housing industry (Miller and Pulket, 2005). The purpose of this research is to develop an employee engagement model to identify those variables that increase resident

satisfaction. The scope of this study is limited to multi-family rental properties (consisting on one-, two- and three-bedroom floor plans) in the United States and to those employees who work on-site at the apartment community. The framework for this study is illustrated in Figure 3.1 and consists of nine tasks. These nine tasks involve critical decision points (as illustrated at points A through G).

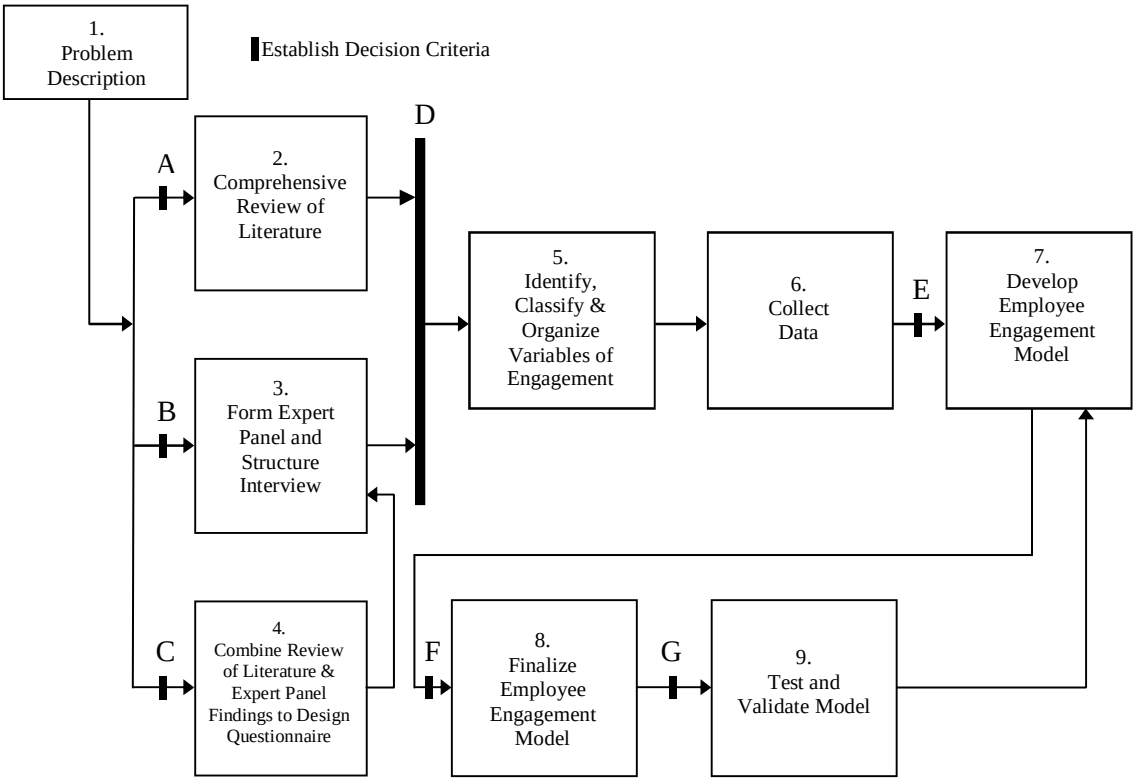

Figure 3.1: Research Methodology Framework

After identifying the problem of disengagement and its effect on resident satisfaction, as discussed in Chapter 1, the next step involves conducting a comprehensive review of literature from peer-reviewed journals and industry publications in the related fields of human resource management, psychology, management, real estate, and housing. This information is then organized around common themes. In the course of the research, more than 400 articles from these various fields are analyzed and

variables affecting employee engagement and resident satisfaction are noted, along with the type of methodology or scientific study used in the research. The frequency of each variable is tabulated, which results in the identification of major themes and/or concepts driving employee engagement, resident satisfaction, or other business outcomes. These major themes and tabulated variables are discussed in Chapter 2.

As noted in Figure 3.1, after the literature review is conducted, an expert panel is formed. Then, a questionnaire is developed and a Delphi study is performed. Findings from the expert panel and the review of literature are then combined to identify those variables of employee engagement that affect resident satisfaction; survey data from a sample of residents and employees in the multi-family housing industry is then collected and analyzed. The following sections describe the remaining steps of this research framework in more detail.

3.3 Expert Panel

After having identified common themes, the findings are discussed with industry professionals to gain further insight and feedback, as shown in Step 3 of the framework in Figure 3.1. After several initial information-gathering discussions with both human resource professionals and executives from the multi-family housing industry, an expert panel is formed using the Delphi Method (Okoli and Pawlowski, 2004) to obtain feedback regarding employee engagement and its affect on resident satisfaction. These 10 experts are selected from a larger group of experts in the multi-family industry who are currently measuring employee engagement, customer satisfaction and performance. These experts have prior experience in using models that measure employee engagement and are developing management processes around employee perceptions. This

homogeneous group share similar characteristics, such as the type of properties they manage and their general operating procedures (Okoli and Pawlowski, 2004). The experts are asked open-ended questions regarding employee engagement and factors (variables) affecting resident satisfaction. (For a sample letter and survey, see Appendix B.)

3.3.1 Delphi Study

Using the information gained from these interviews, a questionnaire is then distributed to the panel of 10 experts asking them to rate their level of importance in relationship to resident satisfaction, which is represented in Step 4 of the methodological framework in Figure 3.1. At least four iterations of the Delphi study are conducted (Chan, et al., 2001). The Delphi Method is a scientific and structured method of forecasting by conducting a survey, where the questions are asked from a group of expert panel members individually and separately. A number of iterations are carried out to obtain an unbiased and reliable opinion of the expert panel. It is based on the principle that forecasts from a structured group of experts are more accurate than those from unstructured groups or individuals (Rowe and Wright, 2001).

The Delphi technique is originally used to target possible factors (variables) of engagement as they relate to resident satisfaction, as well as the importance of the factors of employee engagement and its affect on resident satisfaction. Part of the success of this method lies in its use of experts in the multi-family housing field. By utilizing the knowledge of experts, combining it and redistributing it, the study opens up doors and forces new thought processes to emerge. It also allows for study participants to see how closely they responded to the rest of the field of experts and to justify their train of thought (McKillip, 1987). The 10 experts who participated in the Delphi study identify

relevant factors (variables), and rate their importance and its affect on resident satisfaction; data gathered in this step is then utilized in the next stage of the research framework.

3.4 Identification of Variables

The findings from the expert panel and the review of literature are then combined to identify those variables (factors) of employee engagement that affect resident satisfaction, as represented in Step 5 of the framework shown in Figure 3.1. The list of variables are then classified and organized for the purposes of comparison (Fellows and Liu, 2003). These variables are then classified by frequency and similarity. Once classified, the variables are referenced with the data collected from both residents and employees of a multi-family housing company, and are then analyzed to search for patterns and relationships. The data is used to confirm themes and categories identified from the review of literature and the findings from the expert panel.

3.5 Data Collection & Analysis

The data used in this research is obtained from a research firm specializing in the multi-family housing industry. The data is collected from a survey of 1,516 employees (referred to as “associates”) and 23,795 residents over a three-year period, from 2005 to 2007. This data is collected and then analyzed for themes pertaining to engagement and resident satisfaction, as shown of Step 6 of the methodological framework in Figure 3.1. The responses from the associates are matched with responses from the residents on the same property. Those associates that work in the corporate office are eliminated from the analysis so that only the responses from associates that work directly with the residents on site are analyzed. This results in 872 responses being matched to the resident data.

This also results in 152 communities being analyzed using responses from both the residents and the associates. A detailed description of the data regarding age, gender, length of employment, and years of residency is discussed in Chapter 5.

3.5.1 Associate Survey

The associate survey is disseminated to employees via electronic mail with a secure passcode to protect privacy and to avoid duplication. The survey of associates asks for information on human resource policies and practices, as well as on firm characteristics. Respondents are asked to rate their overall satisfaction using a five-point Likert Scale (from "strongly agree" to "strongly disagree") and to identify those aspects of their job that have the greatest impact on their level of employee engagement. The employees are also asked to provide feedback on various departments within the company and the level of support that each provided the associate. A complete list of associate (employee) survey questions is included in Appendix C.

3.5.2 Resident Survey

The resident satisfaction survey is distributed to each resident. The questions ask the residents to rate their overall level of satisfaction using a five-point Likert Scale (from "very satisfied" to "very dissatisfied"); other questions concerned the factors related to their likelihood to renew their lease, as well as their level of satisfaction in regard to the management staff (office and maintenance) and to the average length of response time to non-emergency calls. The respondents returned the survey by mail. A complete list of resident survey questions is included in Appendix D.

3.6 Methodologies Utilized

The three methodologies that are used to analyze the data include: Statistical Analysis, Neural Network, and a Probability Model. Multiple Regression is used as part of the Statistical Analysis, as well as the use of Multiple Factor Analysis. The inter-correlation coefficients are analyzed to determine those variables that possibly drive engagement (Fellows and Liu, 2003; Naoum, 2007; Thurstone, 1934). Radar Diagramming offers a visual display of the factors in comparison with one another and is helpful in illustrating the relationship of the factors which influence engagement. Variables measuring employee engagement and resident satisfaction are then identified. These methods are discussed in greater detail in the following chapters.

3.7 Summary

Employee engagement is a relatively new term which has been previously described in the literature as employee commitment, satisfaction and involvement. However, the number of existing studies is very limited, in terms of those which measure engagement as a single variable. In addition, there is even less empirical data on the relationship between employment engagement and resident satisfaction. This chapter presents an overview of the methodological framework used to develop a model to identify those variables which contribute to resident satisfaction. This study involves the use of both qualitative techniques, based on interpretive analysis of data gathered from expert knowledge, and quantitative methods, based on statistical analysis of collected survey data from a national multi-family housing company.

By relying on these three methodologies, Statistical Analysis, Neural Network, and Probability Modeling, this study aims to reveal those employee engagement drivers

that affect resident satisfaction. These results are then graphically analyzed using Radar Diagramming for further analysis. The steps outlined in this chapter guide this process and provide a framework by which this research identifies primary factors of employee engagement that affect resident satisfaction. As additional findings are available from the methodologies described in the following chapters, a preliminary model is developed quantifying the defined objectives of this research. Chapters 4 and 5 discuss the use of Statistical Analysis and the development of the model that is used to measure the relative degree of employee engagement and its affect on resident satisfaction. Chapter 6 adds additional information and identifies drivers of engagement that affect resident satisfaction by using a Neural Network to analyze the relationship of multiple variables working in concert to affect resident satisfaction. Chapter 7 demonstrates the use of Radar Diagramming as a way of illustrating the interrelationship of the variables. Chapter 8 describes the use of a Probability Model to predict the percentage of resident satisfaction for a particular level of employee engagement. Chapter 9 summarizes the findings, draws conclusions and makes recommendations for future research.

CHAPTER 4

STATISTICAL ANALYSIS

4.1 Purpose

The previous chapter outlines the conceptual framework of this research and discusses the process by which the investigation is conducted. It also discusses both qualitative and quantitative techniques that are used to form the foundation of this study. Methodologies, such as Statistical Analysis, Neural Network and Radar Diagramming, are primarily used to analyze survey data from the multi-family housing industry. The results of this study are used to create a model for the multi-family housing industry to use in identifying those variables that impact resident satisfaction.

This chapter describes a methodological approach using Statistical Analysis. The purpose is to statistically determine the factors influencing employee engagement and to find the link between employee engagement and resident satisfaction. First, a description of the dataset is provided. Then, statistical techniques are discussed, including Simple Linear Regression and Multiple Linear Regression. The chapter also references other studies that use a similar approach to identify attributes which affect satisfaction among residents in the multi-family housing industry. The process for analyzing factors of engagement and satisfaction are also addressed.

4.2 Data Source and Description

The data is obtained from Kingsley and Associates, an international consulting firm that specializes in multi-family real estate. Kingsley and Associates have been collecting data on employee engagement, resident satisfaction and retention since 1985.

The data used in this research is derived from a sample of 1,516 employees and 23,795 residents of a publicly traded real estate investment trust (REIT) with operations in major real estate markets throughout the United States, such as Georgia, Texas, Denver, Florida, North Carolina, Maryland, Virginia, and New York. The data is collected over a three-year span (2005-2007). A description of the two surveys administered by Kingsley and Associates, the associate (employee) survey and resident survey, are described in the following sections.

4.2.1 Associate Survey

The employees of this company are referred to as "associates" and the associate survey is administered annually in September. The questions asked on the survey are shown in Appendix E. The confidential survey asks associates their opinions about the following: their overall satisfaction; future plans for employment; engagement factors; company mission; vision and values; work and team environment; employee support services; immediate supervisor and senior management; advancement and training; compensation and benefits; and communication. The responses are rated using a 5-point Likert Scale (from "strongly disagree" to "strongly agree"), as well as general questions that allow for open-ended responses. For the associates survey, there are a total of 58 questions and 77 variables. Forty-six percent of the associates are male, 52% percent are female, and 2% do not answer the question. Eighty percent of the associates range in age from 25 to 54. The length of employment is almost evenly divided between new employees, who worked at the company less than two years (37%), and employees working for the company between five and 10 years (31%). These percentages are

illustrated below in Figures 4.1, 4.2 and 4.3. For a detailed breakdown of associate demographics, refer to the table in Appendix E.

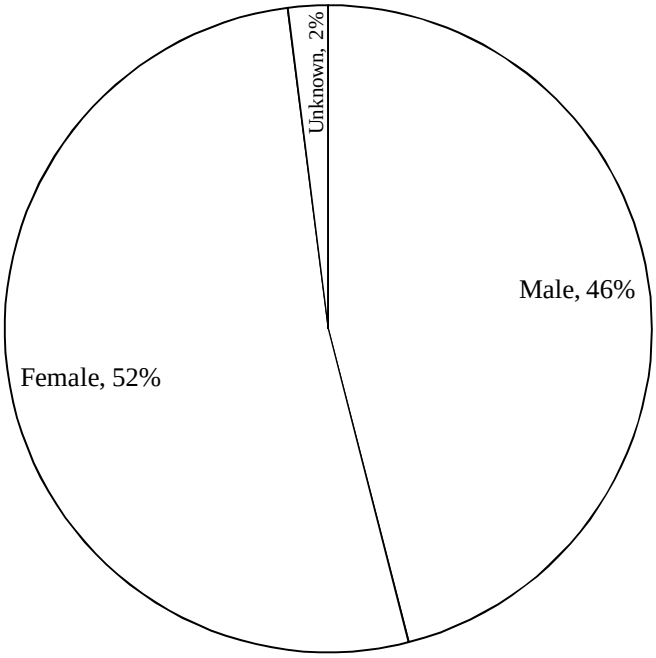

Figure 4.1: Associate Gender Breakdown (Kingsley & Associates, 2007)

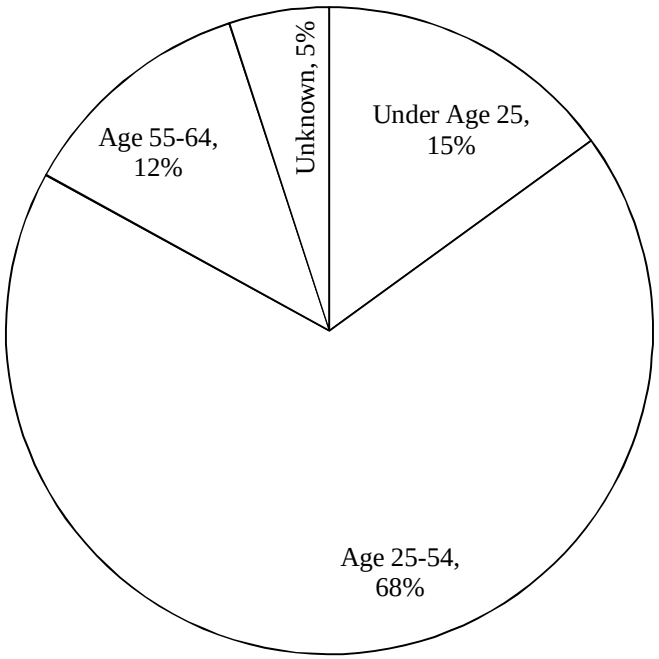

Figure 4.2: Age Range of Associates (Kingsley & Associates, 2007)

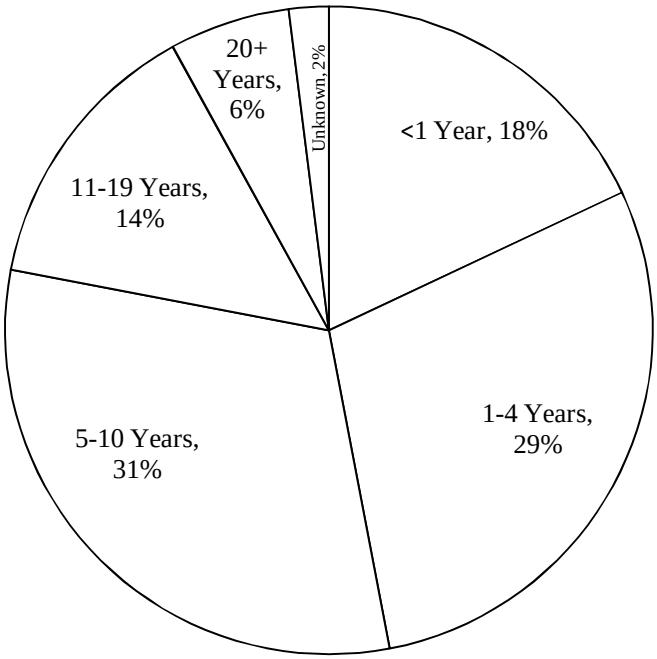

Figure 4.3: Length of Associate Employment in Years (Kingsley & Associates, 2007)

4.2.2 Resident Survey

The resident satisfaction survey is conducted in June of every year. Each resident who completes their survey is automatically entered into a drawing for $500 to encourage full participation by all residents. The residents are asked to rate their overall satisfaction on a 5-point Likert Scale (from "very satisfied" to "very dissatisfied"), as well to identify factors that most influence their decision to choose their community over others they had considered. They are also asked to rate the management staff in several areas, such as communication, accessibility, responsiveness, professionalism, rent collection procedures, and their overall leasing experience. The second portion of the resident satisfaction survey asks about their renewal intentions and if they will recommend their community to others. The residents' survey includes 59 questions and 105 variables. A complete list of the questions asked on the resident survey is shown in Appendix D. The gender composition of the residents is 46% male, 52% female, and 2% not responding.

The majority (63%) of the residents are 34 years old or younger. Eighty-six percent of the residents have lived on their property for less than three years. These percentages are illustrated below in Figures 4.4, 4.5 and 4.6. For a complete breakdown of the resident demographics, refer to the table in the Appendix H.

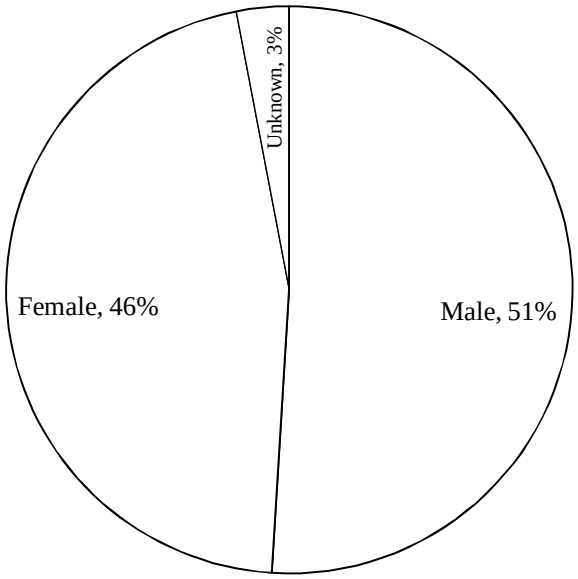

Figure 4.4: Resident Gender Breakdown (Kingsley & Associates, 2007)

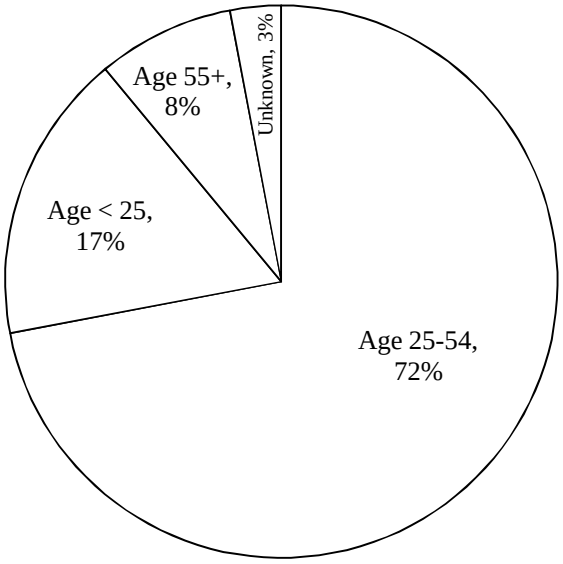

Figure 4.5: Age Range of Residents (Kingsley & Associates, 2007)

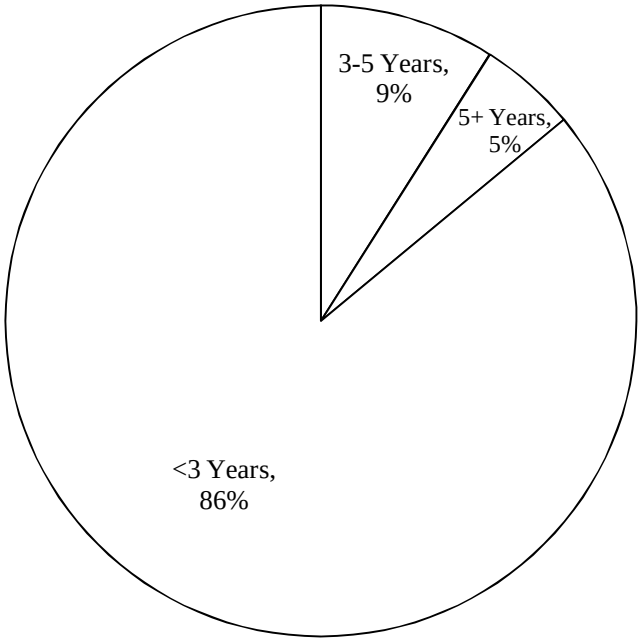

Figure 4.6: Years of Residency (Kingsley & Associates, 2007)

The data from both the associates and the residents is analyzed using Statistical Analysis, described in the following sections. The data is also analyzed using Neural Network and Radar Diagramming, which are described in the following chapters. These approaches are used to identify those input variables (also referred to as engagement drivers or factors) which affect the output variables (also referred to as resident satisfaction). It is important to note that two additional output variables are also considered in the analysis. These are "intent to renew" and "likelihood to refer others to the community." The reason that these two additional variables are used is that a resident's true intent to renew demonstrates his or her authentic satisfaction and his or her recommendation to refer others is another indication of overall satisfaction, despite the resident's current situation, such as a job transfer, employment status or change in economic status (Kingsley & Associates, 2007; Miller, 2005; Kuperberg and Patellis, 2003).

4.3 Statistical Analysis

Descriptive statistics is commonly used to summarize and describe the collection of data gathered from a survey. Common statistical analysis is used on the raw data to obtain the frequency distribution of each of the factor (variables) influencing employee engagement. The frequency distribution of the factors can then be compared to extract data, in terms of trends and patterns being followed.

Analysis is conducted to find the relation between different variables (factors) and how they affect employee engagement. The findings from this method can identify those factors of engagement that most significantly affect resident satisfaction. These factors are then used to create an employee engagement model for use by human resource professionals and owners/managers in the multi-family housing industry.

The concept of a relation between two variables can be seen as a functional relation and a statistical relation. Functional relation between two variables is expressed by a mathematical formula. If X denotes the independent variable (engagement variables) and Y the dependent variable (resident satisfaction variables), a functional relation is of the form (Equation 4.1):

$$Y = f(X) \tag{4.1}$$

Given a particular value of X, the function f indicates the corresponding value of Y. The statistical relation between two variables, unlike a functional relation, is not a perfect one. In general, the observations for a statistical relation do not fall directly on the curve of relationship.

Regression analysis was first developed by Sir Francis Galton in the latter part of the 19^{th} century. The term “regression” describes the statistical relations between

variables. A regression model is a formal means of expressing the two essential ingredients of a statistical relation: 1) A tendency of the response variable Y to vary with the explanatory variable X in a systematic fashion; and 2) A scattering of points around the curve of a statistical relationship (Kutner, et al., 2005). Two forms of statistical analysis are performed, simple linear regression and multiple linear regression, which are described in further detail in the following sections.

4.3.1 Strategy for Building a Regression Model

In order to develop a regression model and analyze the results, the first step is to define the steps used to create a regression model, as illustrated in Figure 4.7. The strategy involves three or sometimes up to four phases: 1) Data collection and preparation; 2) Reduction of explanatory or predictor variables; 3) Model refinement and selection; and 4) Model validation. These studies, based on responses, are intended to test (i.e. to confirm or not to confirm) hypotheses derived from previous studies or from "hunches" (Kutner, et al., 2005, p. 343). For these studies, data are collected for explanatory variables that previous studies have shown to affect the response variable, as well as for the new variable or variables involved in the hypothesis. In this research, variables identified in previous research are used as the explanatory variables, such as team, organizational culture, immediate supervisor, and work environment. In this research, the response variables are: Y_1 – Resident Satisfaction; Y_2 – Intent to Renew; and Y_3- Likelihood of Referring Someone to the Community. After a lengthy list of potentially useful explanatory variables is compiled, some of these variables are quickly screened out. An explanatory variable may not be fundamental to the problem, or may be subject to large measurement errors, and or may effectively duplicate another explanatory

variable in the list. Once the data are collected, edit checks are performed and plots are prepared to identify data errors, as well as extreme outliers. Difficulties with data errors are especially prevalent in large data sets and should be corrected or resolved before the model building begins (Kutner, et al., 2005). Once the data are properly edited, the formal modeling process can begin. A variety of diagnostics is employed to identify: 1) the functional forms in which the explanatory variables should enter the regression model; and 2) important interactions that should be included in the model. Scatter plots are useful for determining relationships and their strengths. Selected explanatory variables can be fitted in regression functions to explore relationships, possible strong interactions and the need for transformations. Kutner, et al. (2005) state:

> Whenever possible, one should rely on the investigator's prior knowledge and expertise to suggest appropriate transformations and interactions to investigate. This is particularly important when the number of potentially useful explanatory variables is large. This can results in the variables being highly intercorrelated. It is recommended that this large number be reduced for several reasons, mainly because regression models with a limited number of explanatory variables are easier to work with and understand and primarily the presence of many highly intercorrelated explanatory variables may substantially increase the sampling variation of the regression coefficients, and detract from the model's descriptive abilities, increase the problem of roundoff errors and not improve, or even worse the model's predictive ability. An actual worsening of the model's predictive ability can occur when explanatory variables are kept in the regression model that are not related to the response variable, given the other explanatory variables in the model. In this instance, the variances of the fitted values tend to become larger with the inclusion of the useless additional explanatory variables (p. 347).

Therefore, it is important to identify "subsets" of potentially explanatory variables to be included in the final regression model, and determine the appropriate functional and interaction relations for these variables. Even for a given purpose, it is often found that several subsets are about equally "good" according to a given criterion, and the choice among these "good" subsets needs to be made on the basis of additional considerations

(Kutner, et al., 2005). Even though computerized approaches can be very helpful in identifying appropriate subsets for detailed, final consideration, the process of developing a useful regression model must be pragmatic and needs to utilize large doses of subjective judgment.

4.3.2 Refinement and Validation of the Model

Diagnostic checks are useful in identifying influential outlying observations, in addition to a variety of residual plots, and analysis can be used to identify any lack of fit or outliers. Another method is to use other variables identified as the next "best" set to validate the model, as well as to use data that has been set aside for the purposes of validation. These methods can be used to help determine the final regression model and to determine how well the model will perform in practice. Peck, Olsen, and Devore (2001) recommend that the investigator explores and identifies other candidate models for consideration depending on the number of explanatory variables that are being considered. It is then that the investigator makes assessments of validity concerning the other models to select a final regression model. Model validity refers to the stability and reasonableness of the regression coefficients, the plausibility and usability of the regression functions. Validation is a useful and necessary part of the model-building process.

The general objective of regression analysis is to establish a useful relationship between a dependent variable Y and one or more independent (i.e., predictor or explanatory) variables (Peck, et al., 2001). While many investigators have used a simple linear regression model $Y = a + \beta X + e$ to relate Y to a single predictor variable X, there is not a strong enough relationship between Y and any single predictor variable X. But,

by knowing the values of several independent variables, this may considerably reduce uncertainty concerning the associated Y value. Therefore, it is important to build a multiple regression model that includes more than one predictor variable.

To begin to develop a regression model, data is collected and checked for quality as to the accuracy of the coding. Data collection for confirmatory observational studies involves obtaining observations on the response variable, the control variables and the primary explanatory variables (Peck, et al., 2001). General diagnostics are run regarding mean and standard deviation. The data is then checked for any inconsistencies and to also identify the relationship between or more two independent variables. Graphs of these mean value functions and scatter plot are particularly beneficial when considering essential and non-essential variables. At this time, only the quantitative (numerical) predictor variables are considered for inclusion in the model. These variables are plotted and the curvature and interaction is examined more fully for consideration.

Based on this initial exploratory analysis, one or more preliminary regression models are developed. These regression models are then examined for their appropriateness for the data at hand and are revised based on the suitability of a particular regression model, such as the inferences about the regression coefficient, like p-value, confidence interval etc. (Kutner, et al., 2005). The strategy for building the regression model is illustrated in Figure 4.7.

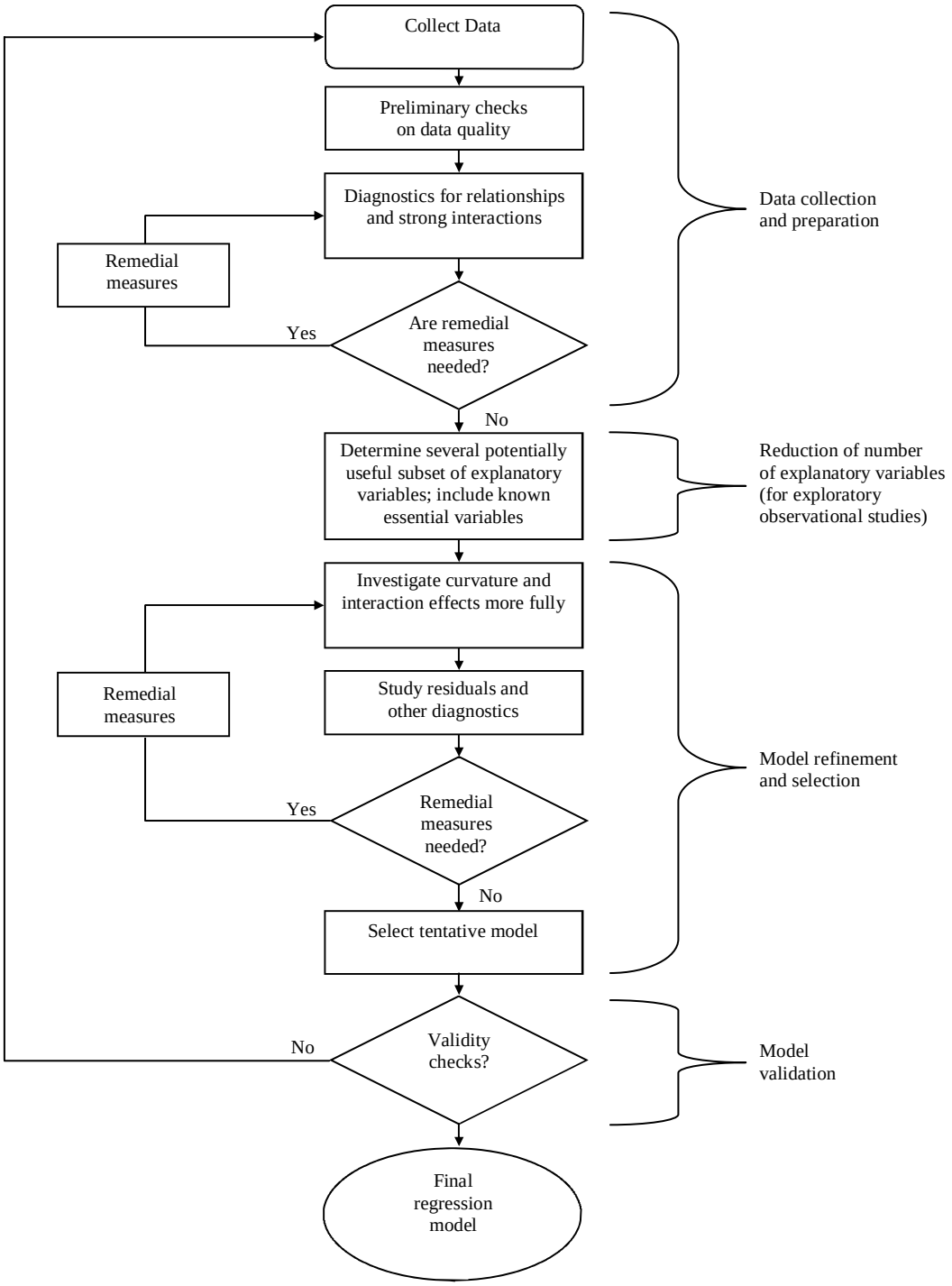

Figure 4.7: Strategy for Building a Regression Model (Kutner, et al., 2005).

4.3.3 Simple Linear Regression

In basic regression model, there is only one predictor variable and the regression function is linear (Equation 4.2):

$$Y_i = \beta_0 + \beta_1 x_i + \varepsilon_i \quad (4.2)$$

In this equation, Y_i is the response variable, e.g., residents' satisfaction; X_i is the explanatory variables (e.g., questions in employee survey representing engagement variables); ε_i is the error term, which follows normal distribution with mean equal to 0 and unknown variance σ^2; and $i = 1, \dots, n$, are indices of observations.

This regression model is said to be simple, linear in the parameters, and linear in the predictor variable. It is "simple" in that there is only one predictor variable. It is considered "linear in the parameters" because no parameter appears as exponent or is multiplied or divided by another parameter. Lastly, it is denoted as "linear in the explanatory variable" because this variable appears only in the first power. Hence, this is a first order model. The parameters β_0, β_1 are called regression coefficients. β_1 is the slope of the regression line. It indicates the change in the mean of the distribution of Y per unit increase in X. The parameter β_0 is the Y intercept of the regression line. When the scope of the model includes X=0, it gives the mean of the distribution of Y at X=0. When the scope of the model does not cover X=0, it does not have any particular meaning as a separate term in the regression model.

4.3.4 Multiple Linear Regression

Multiple regression analysis is one of the most widely used of all statistical methods. The general model is given by (Equation 4.3):

$$Y_i = \beta_0 + \beta_1 x_{i,1} + \beta_2 x_{i,2} + \cdots + \beta_{p-1} x_{i,p-1} + \varepsilon_i \quad (4.3)$$

where p-1 is the number of explanatory variables. In Multiple Regression, more than one variable (factor) is used to predict the criterion. Nonlinear regression is a form of regression analysis in which observational data are modeled by a function which is a nonlinear combination of the model parameters and depends on one or more independent variables (Pedhazur, 1982; Wright, 1921; Wright, 1934; Wright, 1960 a; and Wright, 1960 b).

4.4 Model Selection

One of the procedures for model selection is to use the number of explanatory variables in the model identified as a "best" estimate of the number of explanatory variables needed in the regression model. Then, the investigator explores and identifies other candidate models. Two methods of model selection, namely Forward Selection and Backward Selection, are described below.

4.4.1 Forward Selection (FORWARD)

The forward-selection technique begins with no variables in the model. For each of the independent variables, the FORWARD method calculates F statistics that reflect the variable's contribution to the model if it is included. During the forward step regression, F statistic is the Statistical inference regarding two population standard deviations. The test statistic follows Fisher's F-distribution (Sullivan, 2004). The p-values for these F statistics are compared to the SLENTRY= value that is specified in the MODEL statement (or to 0.50 if the SLENTRY= option is omitted). If no F statistic has a significance level greater than the SLENTRY= value, the FORWARD selection stops.

Otherwise, the FORWARD method adds the variable that has the largest F statistic to the model. The FORWARD method then calculates F statistics again for the variables still remaining outside the model, and the evaluation process is repeated. Thus, variables are added one by one to the model until no remaining variable produces a significant F statistic. Once a variable is in the model, it stays (O'Rouke, Hatcher & Stepanski, 2005).

4.4.2 Backward Elimination (BACKWARD)

The backward elimination technique begins by calculating F statistics for a model, including all of the independent variables. Then, the variables are deleted from the model one by one until all the variables remaining in the model produce F statistics significant at the SLSTAY= level specified in the MODEL statement (or at the 0.10 level if the SLSTAY= option is omitted). At each step, the variable showing the smallest contribution to the model is deleted (O'Rouke, et al., 2005).

4.5 Analysis of Engagement and Satisfaction

Similar studies use statistical analysis to identify categories and to arrange information into various dimensions to investigate and analyze their importance to satisfaction level (Chen, et al., 2006; Arthur, 1992; Arthur, 1994; Huselid, 1995). Consistent with Becker and Huselid's (1998) recommendations pertaining to research on high performance work systems, a group of 12 items are identified as a composite measure to be essential for creating high performance work systems. Authors also argue that implementing management practices, such as additional staff and incentives to residents, will tend to enhance resident satisfaction (Kingsley, 2008). While some studies support this relationship (Miller and Pulket, 2005; Miller, 2005), others have not

(Huselid, 1995; Koch and McGrath, 1996). While some authors (Guther, Spell & Nyamori, 2002) include compensation as part of the factors that influence engagement, the majority of studies, such as Gallup, recognize pay as a distinct and separate characteristic (Harter, et al., 2002, Huselid, et al., 1997). These authors have identified 12 factors separate from compensation and benefits to that drive engagement (Harter, et al., 2002). Although Gallup treats the topic of wages and compensation separately, these researchers feel that it works only in combination with all the non-financial drivers of employee engagement. In fact, they argue that money without meaning is not enough compensation, and is, therefore, a separate and distinct variable that money itself does not buy engagement; it appears that an employee's perception that the company is aggressively looking out for his financial interest leads to productive reciprocation (Wagner and Harter, 2006). This study provides one of the most comprehensive approaches across a broad section of industries.

In this research, data is collected from both employees and residents in the multi-family housing industry. Results from this analysis indicate the level of association between employee engagement and resident satisfaction. Specific factors of employee engagement are statistically determined to describe this relationship. These factors are organized into clusters to classify broad categories, in order to analyze the inter-relationship of the variables and to determine the level of significance for each cluster. This indicates that broad categories are particularly important to firms using a strategy associated with greater levels of change, uncertainty and employee discretion.

With respect to the relationship between employee engagement and resident satisfaction, Statistical Analysis provides insight into the degree to which these factors

affect resident satisfaction (Gaul, Opitz & Schader, 2000), Researchers caution investigators to use consideration when interpreting these results given the limitations inherent to using psychological or attitudinal data that has been collected from a single respondent at the same time. It is difficult to determine whether observed covariance among the variables is attributable to valid relationships or common method variance. A second concern is bias introduced by the non-respondents, i.e. the residents which did not respond to the survey may differ significantly from those which did complete the survey. Again, while this threat cannot be dismissed, the time trend extrapolation lessens this concern since the data has been gathered annually over a three-year time span.

4.6 Summary

This chapter provides an overview of statistical analysis, describes the way in which a regression model is developed, including simple linear regression and multiple linear regression, as well as provides a description of the data set from the multi-family housing industry which will be analyzed. This chapter also summarizes previous studies of engagement which use statistical analysis. This chapter indicates that, by using both simple linear regression and weighted simple linear regression together, an Employee Engagement Model can be developed and hypothesis can be tested. This dual approach offers additional insights over and above what other researchers have done in this area and will expand the body of knowledge that currently exists in linking employee actions to resident satisfaction. Due to the complexity of analyzing employee engagement as a single determinant of resident satisfaction, it is important to identify those variables that are linked to resident satisfaction. Within the highly competitive environment of the multi-family housing sector and growing corporate pressure to perform at higher levels,

these factors aid in developing a model that will not only expand this body of scholarly knowledge, but will also be useful for practitioners who are developing strategies to increase resident satisfaction. These findings specifically benefit multi-family owners and managers as they develop a more-engaged workforce. The next chapter reveals findings from the Statistical Analysis and forms a model that allows multi-family apartment rental property owners and managers to measure the percentage of satisfied residents for a particular average level of employee engagement.

CHAPTER 5

DATA ANALYSIS FOR STATISTICAL MODEL DEVELOPMENT

5.1 Purpose

The previous chapter provides a description of the data and outlines the methodology using regression analysis as a part of the Statistical Analysis. The steps that guide the model development are also discussed. The purpose of this chapter is to report the findings of the data analysis and offer interpretations that are used to create an Employee Engagement Model for the multi-family rental housing industry.

5.2 Data Set

The data used in this research is described in more detail in the previous chapter; in summary, the data is obtained from a research firm specializing in the multi-family housing industry. The data is from a survey of 1,516 employees (referred to as "associates") and 23,795 residents over a three-year period, from 2005 to 2007. The survey of associates collects information on human resource policies and practices, firm characteristics, and overall levels of satisfaction. Residents are asked questions concerning their overall level of satisfaction (Output variable classified as Y_1), their intention to renew their lease (Output variable classified as Y_2), and their likelihood of referring someone to their community (Output variable classified as Y_3). Among all the questions in the employee survey, 54 questions (i.e. 54 different Xs) are considered to be potential explanatory variables for Y_1, Y_2 and Y_3. Both the response variables and the explanatory variables are on a 1 to 5 Likert Scale, where "5" is 'most satisfied' or 'strongly agree.' There are six sets of data, with three on the resident survey and three on

the employee survey for 2005, 2006, and 2007. Over the three years, there are 23,795 resident respondents and 1,516 employee respondents (also referred to as associates). One limiting factor in using the data set, as described above, is that residents and employees must be matched to the same living community in the same year. Only 872 of the 1,516 responses (57.5%) can be matched to resident communities; the remaining data represents employees from the corporate office or from communities that the company sold or was in the process of building during the years 2005 to 2007. The average score is taken over all residents in a particular community in a particular year, assuming that at least one employee of that community responded to the associate questionnaire in that year. This results in 152 communities being analyzed using both responses from employees (associates) and residents.

5.3 Statistical Analysis

Several types of Statistical Analysis are used to explore an association between employee engagement and resident satisfaction, including Cumulative Logistic Regression, which is used to determine the statistically significant drivers of employee engagement. Simple Linear Regression and Weighted Simple Linear Regression are then carried out to determine those drivers of employee engagement that most significantly affect resident satisfaction. The dataset is analyzed using SAS statistical software system for running Cumulative Logistic Regression and Multiple Regression. SAS software provides guided data analysis for meeting analytical and data presentation needs of engineers and scientists. The software includes specific capabilities for engineers and scientists. Commonly required capabilities for analysis of variance, analysis of

covariance, and regression analysis are closely linked with graphical tools that produce scatter plots, histograms, and contour plots.

5.3.1 Cumulative Logistic Regression

The resident data and the employee data are examined separately. When analyzing the resident data, the five levels of residents' overall satisfaction are treated as discrete and ordered categories, and model $p_1, p_2, p_3, p_4$and p_5, where $p_i$is the probability that a resident's overall satisfaction (Q1) scored i (i=1, 2, 3, 4, and 5). Cumulative logistic regression model is used to predict 4 odds, $\{O_1, O_2, O_3, O_4\}$, where $O_i$is the odds of falling into category i or lower versus falling into category i+1 or higher. For example (Equation 5.1):

$$O_{\mathrm{i}} = \frac{p_1 + \cdots + p_i}{p_{i+1} + \ldots p_5} \tag{5.1}$$

i=1, 2, 3, and 4. These 4 odds can be converted into p_1, p_2, p_3, p_4 and p_5. In particular, the cumulative logistic regression is expressed as (Equation 5.2)

$$\begin{cases} \ln\left(\frac{p_1}{1-p_1}\right) = \ln\left(\frac{p_1}{p_2+p_3+p_4+p_5}\right) = \alpha_1 + \beta_1 X_1 + \cdots + \beta_k X_k \\ \ln\left(\frac{p_1+p_2}{1-p_1-p_2}\right) = \ln\left(\frac{p_1+p_2}{p_3+p_4+p_5}\right) = \alpha_2 + \beta_1 X_1 + \cdots + \beta_k X_k \\ \ln\left(\frac{p_1+p_2+p_3}{1-p_1-p_2-p_3}\right) = \ln\left(\frac{p_1+p_2+p_3}{p_4+p_5}\right) = \alpha_3 + \beta_1 X_1 + \cdots + \beta_k X_k \\ \ln\left(\frac{p_1+p_2+p_3+p_4}{1-p_1-p_2-p_3-p_4}\right) = \ln\left(\frac{p_1+p_2+p_3+p_4}{p_5}\right) = \alpha_4 + \beta_1 X_1 + \cdots + \beta_k X_k \end{cases} \tag{5.2}$$

where $\{X_1, X_2, \ldots, X_k\}$are variables (i.e., questions) in the resident survey that are chosen to explain the overall satisfaction which is the first question in the survey. To choose

$\{X_1, X_2, \ldots, X_k\}$, forward and backward variable selection methods are used. A model is then obtained for each year, from 2005 to 2007. All variables selected are significant at level 1 (DF) Degree of Freedom, referring to the number of parameters which may be independently varied. It is evidenced that some variables are selected in all three years, but others appear just once or twice. Finally, data from all three years are combined together and the same analysis is run based on the pooled data. The final results are shown in Table 5.1 below:

Table 5.1: Cumulative Logistic Regression for Residents

Parameter	DF	Estimate	Standard Error	Wald Chi-Sq	Pr > ChiSq
Intercept 1	1	7.9698	0.3141	643.8318	<.0001
Intercept 2	1	10.1795	0.3056	1109.5040	<.0001
Intercept 3	1	12.2979	0.3181	1494.9646	<.0001
Intercept 4	1	16.9884	0.3649	2167.0129	<.0001
Q6	1	-0.3994	0.0533	56.2270	<.0001
Q7	1	-0.1561	0.0550	8.0544	0.0045
Q9	1	-0.4958	0.0469	111.7438	<.0001
Q10	1	-0.1119	0.0439	6.4894	0.0109
Q11	1	-0.2308	0.0540	18.2416	<.0001
Q12	1	0.1525	0.0373	16.7224	<.0001
Q16	1	-0.3001	0.0421	50.8157	<.0001
Q20	1	-0.2274	0.0449	25.6875	<.0001
Q25	1	-0.0602	0.0283	4.5167	0.0336
Q26	1	-0.0952	0.0416	5.2431	0.0220
Q27	1	-0.0845	0.0330	6.5482	0.0105
Q29	1	-0.4542	0.0466	95.0785	<.0001
Q30	1	-0.4637	0.0466	99.0094	<.0001
Q33	1	-0.1840	0.0585	9.8895	0.0017
Q35	1	-0.1861	0.0581	10.2627	0.0014
Q37	1	0.1033	0.0520	3.9559	0.0467
Q38	1	-0.2478	0.0488	25.7511	<.0001
Q40	1	-0.0820	0.0319	6.5868	0.0103
Q47	1	-0.1815	0.0282	41.5174	<.0001
Q5001	1	-0.3225	0.0675	22.8378	<.0001
Q5005	1	-0.1838	0.0740	6.1743	0.0130
Q5006	1	-0.2170	0.0947	5.2469	0.0220
Q5008	1	-0.5844	0.0692	71.2636	<.0001
Q5009	1	0.1541	0.0761	4.1041	0.0428
Q5107	1	-0.2134	0.0896	5.6716	0.0172

Note: Model for 3 years. # of observations: 23,795 # of observations in use: 6,244

This iteration reveals that most Xs have negative estimated coefficients. If an explanatory variable, say X_1, has a negative coefficient, then a resident's overall satisfaction will tend to be high if this resident gives a high score for question X_1; in other words, X_1 is positively associated with overall satisfaction. For example, in the model based on the pooled data, Q6 of the resident survey (i.e., communication) has an estimated coefficient of -0.3994 with p-value <0.0001. This indicates that Q6 is significantly related to a resident's overall satisfaction (Q1). Given that other variables in the model are held constant, if Q6 increases by one point, then $\ln(O_1), \ln(O_2), \ln(O_3)$ and $\ln(O_4)$ for Q1 are predicted to decrease by 0.3994 unit; that is (Equation 5.3),

$$\frac{p_2 + \cdots + p_5}{p_1}, \quad \frac{p_3 + \cdots + p_5}{p_1 + p_2}, \quad \frac{p_4 + p_5}{p_1 + \cdots + p_3}, \quad and \ \frac{p_5}{p_1 + \cdots + p_4} \quad (5.3)$$

are predicted to multiply by exp(0.3994)=1.49, meaning that Y_1 will become more likely to score high.

The same kind of analysis is also performed on the employee data. The cumulative logistic regression model is used to find a set of questions in the employee survey that can best explain an employee's overall satisfaction with his job. For example, an employee may value his or her relationship with team members and this cooperating directly affects the employee's overall satisfaction. This analysis helps identify those variables that affect satisfaction, as well as offers insights into how these variables relate to each other. Relevant results are also reported in the Excel file "Results-Logistic Regression", as shown in Table 5.2.

Table 5.2: Cumulative Logistic Regression for Employees – Model for 3 Years

2005			2006			2007		
Q7, Q14, Q23, Q28, Q29, Q30, Q32 and Q58 removed.			Q7, Q28 and Q58 removed.			No variables removed.		
Observations: 1,516 total, 1,262 in use.			Observations: 1,516 total, 872 in use.			Observations: 1,516 total, 398 in use.		
Parameter	Estimate	Pr > ChiSq	Parameter	Estimate	Pr > ChiSq	Parameter	Estimate	Pr > ChiSq
Intercept 1	6.9339	<.0001	Intercept 1	8.0809	<.0001	Intercept 1	6.5307	<.0001
Intercept 2	9.4958	<.0001	Intercept 2	10.2726	<.0001	Intercept 2	8.4940	<.0001
Intercept 3	11.6931	<.0001	Intercept 3	12.6380	<.0001	Intercept 3	11.2170	<.0001
Intercept 4	16.0718	<.0001	Intercept 4	17.1349	<.0001	Intercept 4	15.8954	<.0001
Q6	-0.3836	0.0001	Q6	-0.3454	0.0063	Q6	-0.7834	<.0001
Q10	-0.8110	<.0001	Q10	-0.5557	0.0004	Q10	-0.4771	0.0604
Q11	-0.1765	0.0655	Q12	-0.3080	0.0058	Q12	-0.3543	0.0546
Q15	-0.1423	0.0590	Q14	-0.2613	0.0190	Q13	0.4794	0.0324
Q16	-0.2563	0.0041	Q16	-0.2154	0.0599	Q14	-0.3788	0.0216
Q21	-0.5772	<.0001	Q21	-0.5428	<.0001	Q19	-0.1255	0.4970
Q22	-0.2162	0.0185	Q22	-0.2520	0.0350	Q21	-0.4145	0.0567
Q26	-0.1960	0.0153	Q26	-0.1865	0.0761	Q31	0.2380	0.0024
Q27	0.1743	0.0401	Q31	0.1614	0.0087	Q32	-0.3288	0.0429
Q31	0.0950	0.0742	Q32	-0.2368	0.0461	Q41	-0.4569	0.0012
Q38	0.2179	0.0436	Q38	0.2362	0.0652	Q44	-0.3606	0.0150
Q40	-0.2510	0.0122	Q41	-0.2820	0.0090	Q52	-0.3439	0.0714
Q45	-0.2297	0.0031	Q44	-0.3366	0.0005	Q55	-0.5742	<.0001
Q50	-0.2171	0.0036	Q52	-0.2786	0.0140	Q57	0.2876	0.0945
Q52	-0.1750	0.0585	Q55	-0.5075	<.0001			
Q55	-0.5165	<.0001						

5.3.2 Linear Regression on Matched Data

To further test the hypothesis, the residents' responses to Y_1, Y_2 and Y_3 are re-matched with employees' answers to engagement questions (i.e., Xs) by property. Since there are many residents and a few employees living or working at one property for a particular property and a particular year, the averages of Y_1, Y_2 and Y_3 are matched to all the residents of the property with the averages of Xs over all the employees. Thus, in the matched data, there is one record per combination of property and year. The total number of records of the matched data over three years is 152. It should be noted that the average

number of resident responses per property year is fairly large, about 145. However, the average number of employees matched to a property-year is much smaller, around five.

By taking averages, Y_1, Y_2 and Y_3 no longer have five discrete levels. Instead, the mean Y_1, Y_2 and Y_3 of each property can take any value between 1 and 5. Therefore, linear regression models are appropriate for analyzing the X and Y variables here. There are p=54 potential Xs, and the sample size is n=152. Thus, the sample size is not large enough relative to the number of explanatory variables to perform simple model selection procedures (which work well only when n >> p). Simple linear regression models are run in each of which only one X is used. A simple linear model has the form (Equation 5.4):

$$Y_i = \beta_0 + \beta_1 x_i + \varepsilon_i \qquad (5.4)$$

where Y_i is the response variable (i.e. residents' satisfaction), X_i is the explanatory variables (e.g. questions in employee survey), ε_i is the error term, which follows a normal distribution with mean 0 and an unknown standard deviation σ, where $i = 1, \dots, n$, are indices of observations.

This examination is done to find out how much variability in the response variables can be explained by each individual X_i; this is measured by R-square. A variable with a higher R-square explains the response more than a variable with a lower R-square does. For each of Y_1, Y_2, and Y_3, a ranking of Xs by their p-value and R-square in the simple linear regression model has been conducted. Note that for simple linear regression models considered here, a lower p-value always corresponds to a higher R-square. Also, note that some Xs (questions) have to be removed from the ranking list, as they do not appear in all three years and, thus, simple linear models with those Xs are based on much fewer than 152 observations.

These tables also report the estimates of regression coefficients, p-values (if they are smaller than 0.35; variables with larger p-values are highly insignificant), R-squares and correlation coefficients. Correlation coefficients measure the strength and the direction of a linear relationship between an explanatory variable (Sullivan, 2004). X and the response variable Y (one of Y_1, Y_2 and Y_3, in this case), and has a value between -1 and +1. If X and Y have a strong positive linear correlation (i.e., Y increases as X increases), their correlation coefficient is close to 1. If X and Y have a strong negative linear correlation (i.e., Y decreases as X increases), their correlation coefficient is close to -1. If there is no linear correlation or a weak linear correlation, the correlation coefficient is close to 0. A value of ± 1 occurs only when the data points all lie exactly on a straight line, i.e., X can be used to obtain an exact prediction of Y. For a simple linear regression (weighted or un-weighted) model, the R-square is equal to the square of the correlation coefficient between Y and X. Thus, in analyzing the results, the rankings from top to the bottom show the absolute values of the correlation coefficient (i.e., the strength of the correlation) decrease as the R-squares decrease. For example, the correlation coefficient between Q31 and Y_1 is 0.2516, which indicates that Q40 has a positive linear correlation with Y_1; this correlation is relatively strong, when compared with the correlations between Y_1 and other variables.

The statistical results indicate that Q40, which is "Immediate Supervisor - I am treated with fairness by my immediate supervisor", is most highly correlated with Resident satisfaction. Particularly, this factor for Y_1, which is overall resident satisfaction, is correlated with a measure of 0.24, which implies that as the factor Q40 increases, overall resident satisfaction (Y_1) also increases and the strength of linear

dependence between the two variables is 0.24. Similarly, Y_2- Intent to Renew increases with Q40; however, the strength of linear dependence between Y_2 and Q40 is 0.19 and the strength of linear dependence between Y_3 and Q40 is 0.17. The results show that Q40 is the most highly correlated among all the other variables for each of Y_1, Y_2 and Y_3. Similarly, these findings reveal that the next top variable is Q38 which is "Immediate Supervisor - My immediate supervisor trusts me". This variable has a strength of linear dependence with Y_1 as 0.20, with Y2 as 0.12, and with Y_3 as 0.13. Hence, it can be seen that among Y_1, Y_2 and Y_3, it is the overall resident satisfaction (Y_1) that is most strongly correlated with the top 10 variables. Tables 5.3, 5.4 and 5.5 show the correlation coefficient ranging from 0.25 to 0.12 for Resident Satisfaction (Y_1). The correlation coefficient for Y_2 - Intent to Renew ranges from 0.21 to 0.07 and Y_3 – Referral to Others ranges from 0.21 to 0.07. Though a correlation coefficient is considered high if it is greater than 0.5, however, it depends on the context of study as to what value of the correlation coefficient is high enough. In this study, as indicated in research by Cohen (1988), a correlation coefficient above 0.2 may be considered high because of several complicated factors.

The ranking list of explanatory variables for each of Y_1, Y_2 and Y_3 is shown in the Tables 5.3, 5.4 and 5.5.

Table 5.3: Simple Linear Regression Y_1

Variable	Description	Estimate	R-Square	P-value	Correlation Coefficient
Q40	Immediate Supervisor - I am treated with fairness by my immediate supervisor.	0.0832	0.0582	0.0029	0.2412
Q38	Immediate Supervisor - My immediate supervisor trusts me.	0.0776	0.0437	0.0102	0.2090
Q8	I would recommend this community to someone seeking an apartment home.	0.1094	0.0344	0.0231	0.1855
Q24	Team - I feel like an integral part of the team.	0.0620	0.0271	0.0442	0.1646
Q39	Immediate Supervisor - I trust my immediate supervisor.	0.0526	0.0262	0.0480	0.1619
Q36	Immediate Supervisor - I understand what my immediate supervisor expects of me.	0.0700	0.0236	0.0605	0.1536
Q5	I am aware of the company's vision, mission, and core values.	0.0782	0.0174	0.1075	0.1075
Q26	Team - There is adequate communication within my department.	0.0435	0.0172	0.1097	0.1097
Q42	My immediate supervisor communicates clearly.	0.0425	0.0170	0.1121	0.1304
Q43	My immediate supervisor recognizes my extra efforts.	0.0395	0.0170	0.1117	0.1117
Q50	Hiring and promotion decisions are impartial.	0.0373	0.0164	0.1178	0.1178
Q54	My immediate supervisor assists me in identifying my training or personal development needs.	0.0382	0.0162	0.1211	0.1211
Q37	Immediate Supervisor - My immediate supervisor encourages innovation.	0.0423	0.0156	0.1279	0.1279
Q41	My immediate supervisor is approachable and easy to talk to.	0.0388	0.0130	0.1645	0.1140

It is evident that the relationship with the supervisor and the team are fairly correlated. Communication at all levels of the organization should not be understated.

Table 5.4: Simple Linear Regression Y_2

Variable	Description	Estimate	R-Square	P-value	Correlation Coefficient
Q40	Immediate Supervisor - I am treated with fairness by my immediate supervisor.	0.0856	0.0367	0.0189	0.1916
Q36	Immediate Supervisor - I understand what my immediate supervisor expects of me.	0.0880	0.0222	0.0686	0.1490
Q38	Immediate Supervisor - My immediate supervisor trusts me.	0.0618	0.0165	0.1175	0.1285
Q8	I would recommend this community to someone seeking an apartment home.	0.0877	0.0132	0.1622	0.1149
Q42	My immediate supervisor communicates clearly.	0.0481	0.0130	0.1654	0.1140
Q18	Work Environment - The work I do makes a difference to my company.	0.0640	0.0129	0.1670	0.1136
Q24	Team - I feel like an integral part of the team.	0.0534	0.0120	0.1828	0.1095
Q54	My immediate supervisor assists me in identifying my training or personal development needs.	0.0416	0.0114	0.1935	0.1068
Q39	Immediate Supervisor - I trust my immediate supervisor.	0.0430	0.0104	0.2137	0.1020
Q47	Senior Management - Senior management regularly communicates the direction and plans of the company.	0.0415	0.0082	0.2715	0.0906
Q35	Legal/Property Insurance	0.0354	0.0079	0.2808	0.0889
Q43	My immediate supervisor recognizes my extra efforts.	0.0302	0.0059	0.3493	0.0768
Q50	Hiring and promotion decisions are impartial.	0.0288	0.0058	0.3534	0.0762
Q10	I am proud to work for my company.	0.0450	0.0055	0.3689	0.0742
Q26	There is adequate communication in my department.	0.0308	0.0051	0.3838	0.0721

The relationship between the immediate supervisor and a resident's intention to renew is fairly correlated, which indicates the importance of communication and suggests opportunities for staff development.

Table 5.5: Simple Linear Regression Y_3

Variable	Description	Estimate	R-Square	P-value	Correlation Coefficient
Q40	Immediate Supervisor - I am treated with fairness by my immediate supervisor.	0.0671	0.0290	0.0372	0.1703
Q8	I would recommend this community to someone seeking an apartment home.	0.1091	0.0262	0.0478	0.1619
Q38	Immediate Supervisor - My immediate supervisor trusts me.	0.0583	0.0189	0.0933	0.1375
Q24	Team - I feel like an integral part of the team.	0.0584	0.0185	0.0974	0.1360
Q36	Immediate Supervisor - I understand what my immediate supervisor expects of me.	0.0656	0.0159	0.1239	0.1261
Q51	My performance reviews are helpful to me in improving my performance.	0.0518	0.0153	0.1313	0.1237
Q42	My immediate supervisor communicates clearly.	0.0240	0.0042	0.1654	0.0648
Q39	Immediate supervisor – I trust my immediate supervisor.	0.0415	0.0125	0.1730	0.1118
Q26	Team - There is adequate communication within my department.	0.0405	0.0114	0.1932	0.1068
Q33	IT – Information Technology	0.0376	0.0101	0.2217	0.1005
Q35	Legal/Property Insurance	0.0321	0.0083	0.2676	0.0911
Q47	Senior Management - Senior management regularly communicates the direction and plans of the company.	0.0337	0.0069	0.3114	0.0831
Q12	My company attracts and retains outstanding personnel.	0.0304	0.0066	0.3247	0.0812
Q54	My immediate supervisor assists me in identifying my training or personal development needs.	0.0269	0.0061	0.3407	0.0781
Q43	My immediate supervisor recognizes my extra efforts.	0.0249	0.0052	0.4330	0.0721

In each ranking list, the top-rated explanatory variables are *most related* to the response variable. The following scatter plots, Figures 5.1, 5.2, 5.3, 5.4, and 5.5, illustrate the relationship between the input variables to Y_1- Resident Satisfaction. The clusters show a moderately strong level of satisfaction based on the way the employees are treated

by their immediate supervisor (Q40), trust between the employee and the supervisor (Q38 and Q39), recommendation of the community to another individual (Q8), and feeling like an integral part of the team (Q24). For other scatter plots related to Y_1, Y_2 and Y_3, see Appendix F.

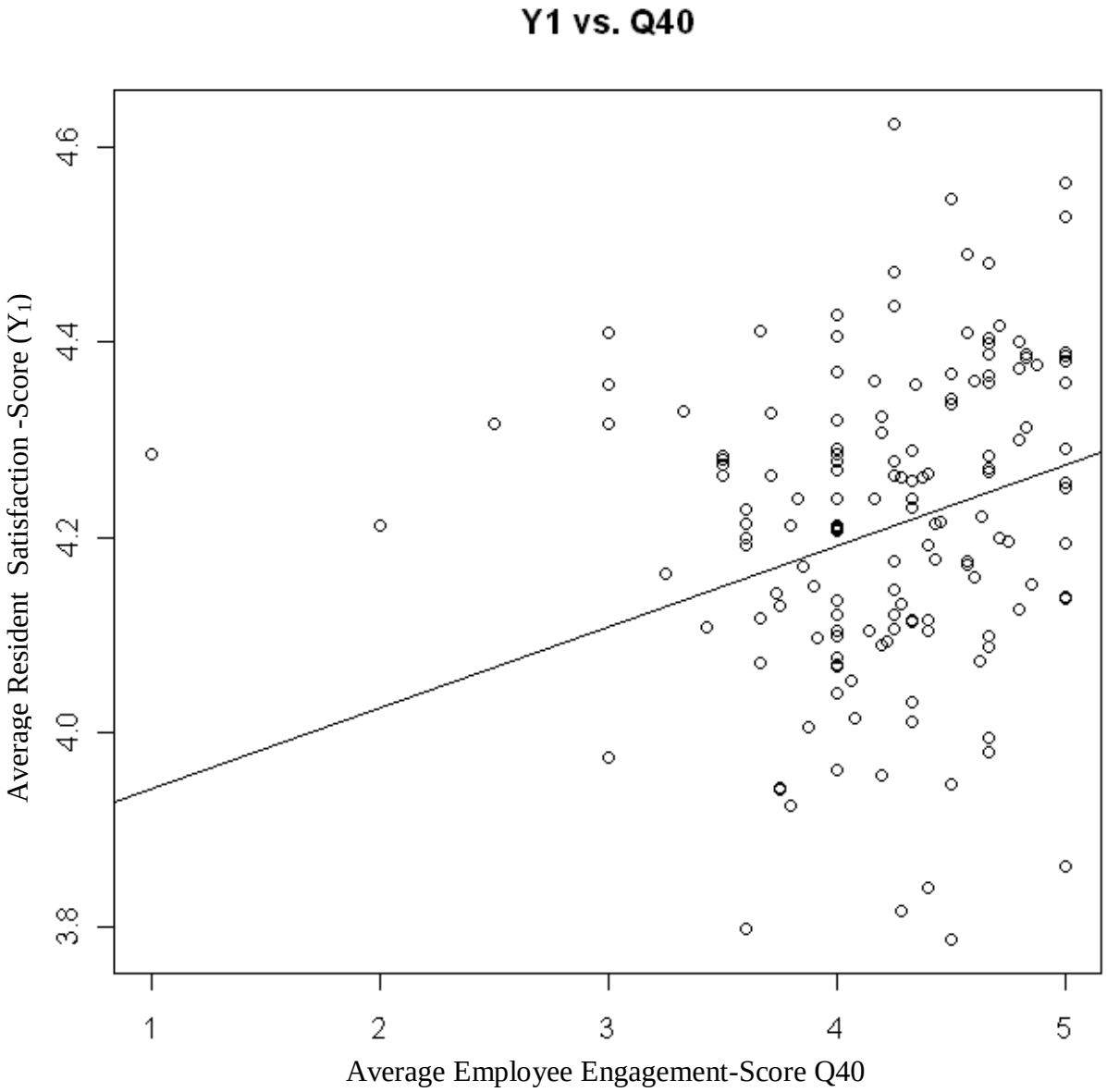

Figure 5.1: Average Resident Satisfaction-Score (Y1) Versus Average Employee Engagement-Score (Q40- I am Treated with Fairness by My Immediate Supervisor.)

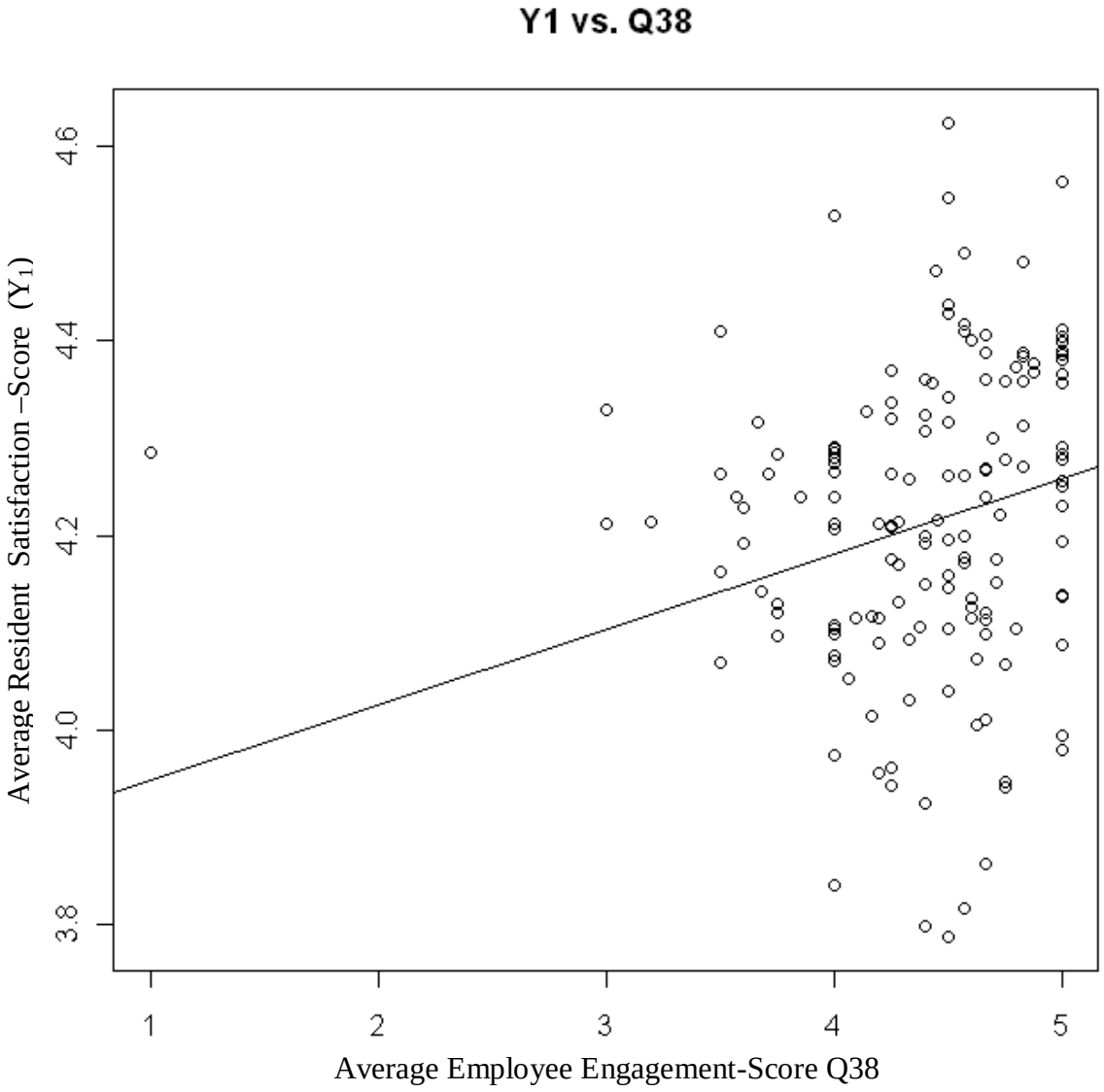

Figure 5.2: Average Resident Satisfaction-Score (Y_1)
Versus Average Employee Engagement-Score
(Q38 - My Immediate Supervisor Trusts Me.)

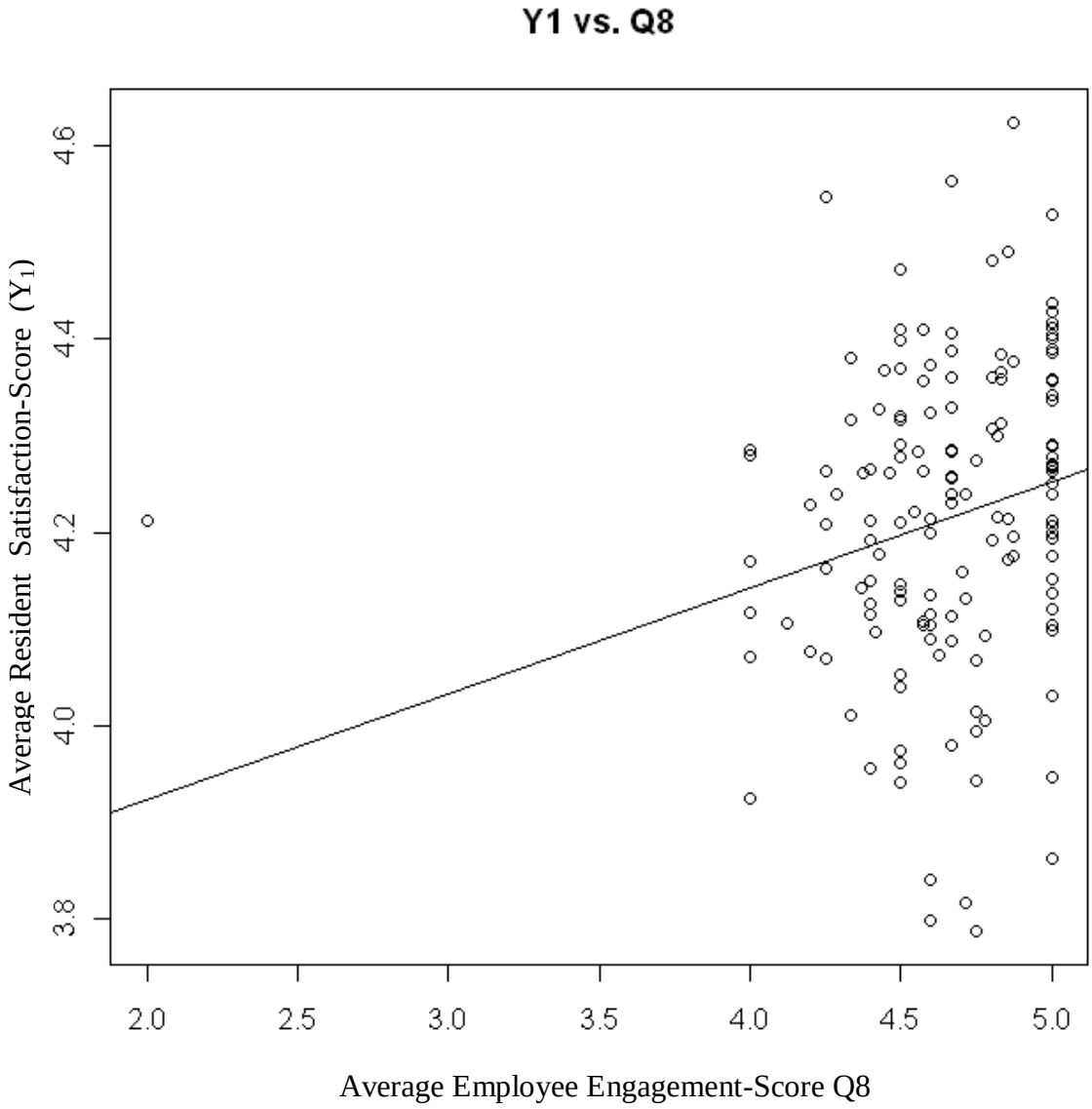

Figure 5.3: Average Resident Satisfaction-Score (Y_1) Versus Average Employee Engagement-Score (Q8 - I Would Recommend this Community to Someone Seeking an Apartment Home.)

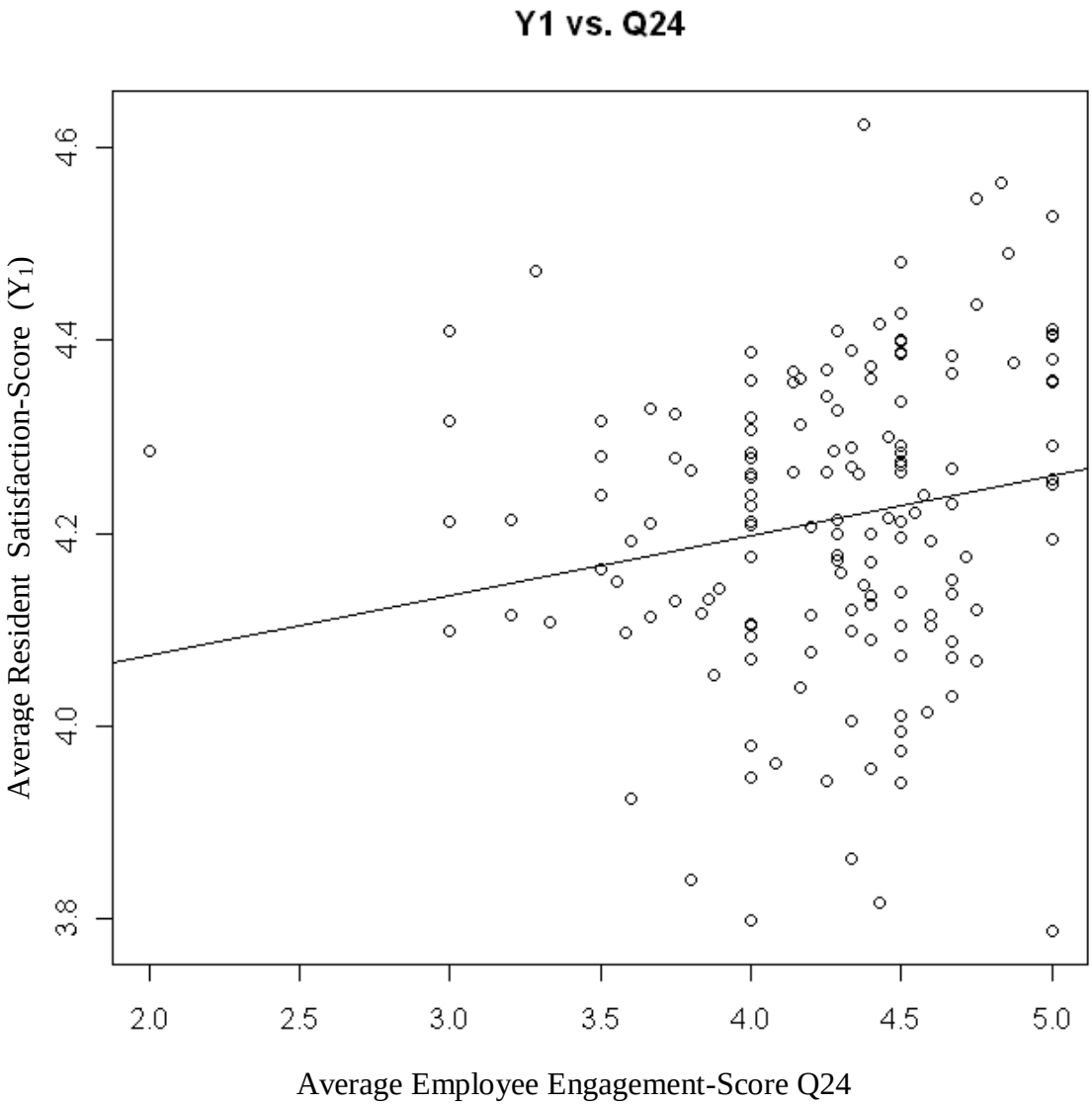

Figure 5.4: Average Resident Satisfaction-Score (Y_1) Versus Average Employee Engagement-Score (Q24 - I Feel Like I am an Integral Part of the Team.)

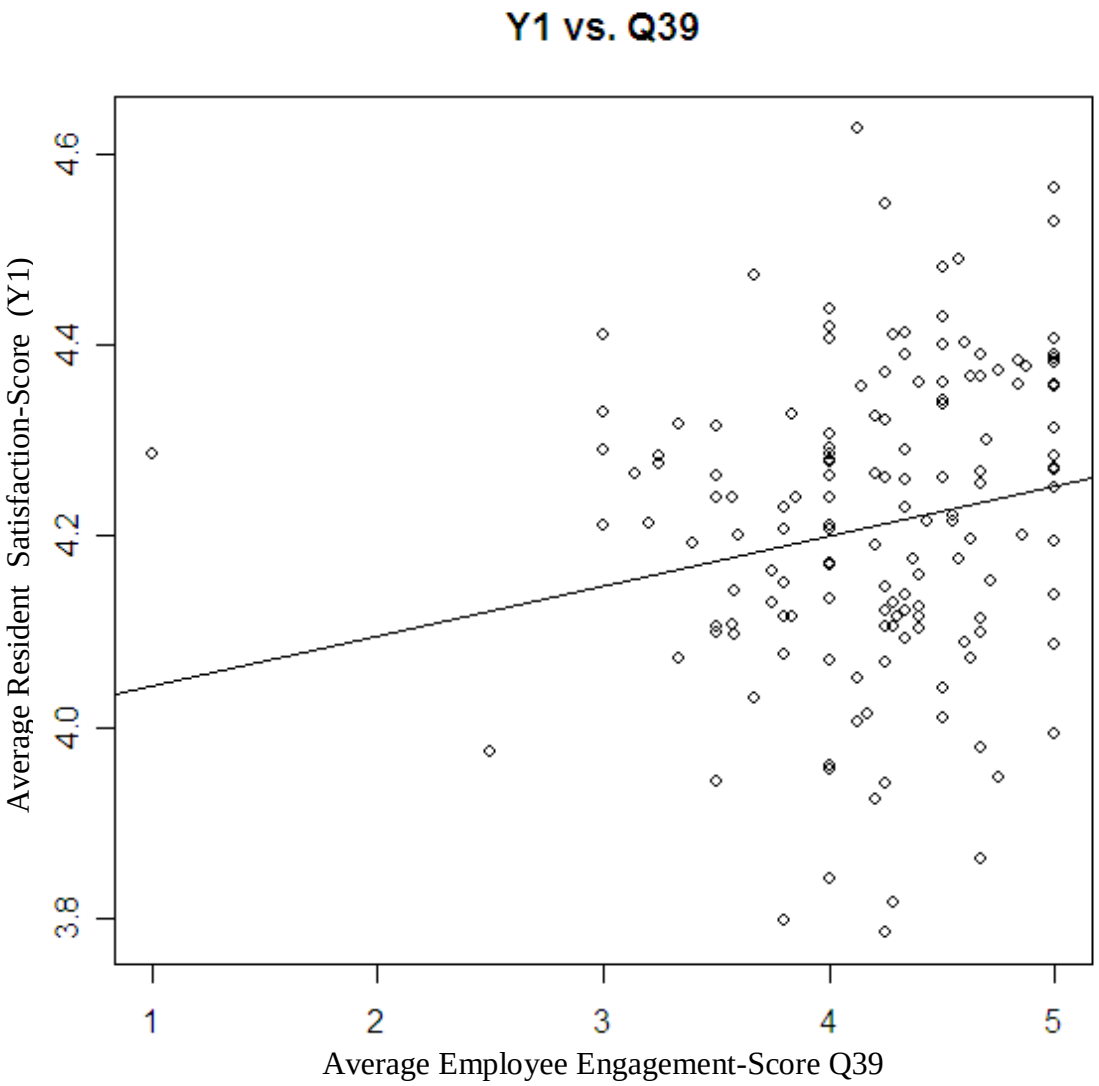

Figure 5.5: Average Resident Satisfaction-Score (Y_1) Versus Average Employee Engagement-Score (Q39 - I Trust My Immediate Supervisor.)

Next, a forward variable selection technique is used to select a set of Xs that can be used jointly to *predict* the Y variables. That is, it is important to find the best multiple regression model to predict each of Y_1, Y_2 and Y_3. A multiple linear regression model has the form (Equation 5.5):

$$Y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \cdots + \beta_{p-1} x_{i,p-1} + \varepsilon_i \qquad (5.5)$$

where p-1 is the number of selected explanatory variables. Note that this selection procedure does not necessarily select the p-1 top-rated variables obtained from 5.3.2. This happens because some of the X_is are highly correlated, so that the advantage of using one when the other is already in the model is neutralized.

At this point, a plot of each of Y_1, Y_2 and Y_3 versus the 'best' explanatory variables in the ranking list is created; however, this analysis detects an extreme outlier which distorts the regression results. This outlier is identified as the data on 'Port Worthington - 2006.' It appears that residents there are very agitated about something unusual, since their average scores for Y_1, Y_2 and Y_3 are much lower than any of the other 151 locations. This data or outlier is deleted since it is not representative of the population.

It is also important to note that there is much more variability in the Xs than in Y_1, Y_2, and Y_3, since the X variables are averages computed over a few employees and the number of employees of each property is much smaller than the number of residents. The number of employees also varies by location. The X values of properties with a larger number of employees are more reliable than X values of properties with a smaller number of employees. Therefore, it makes sense to place a higher weight on reliable data and

less weight on the unreliable data. Relevant results are reported in the Tables 5.6, 5.7, and 5.8 below.

Table 5.6: Forward Variable Selection Predicting Resident Satisfaction - Y_1

Forward Variable Selection (Multiple Regression) Summary of Stepwise Selection – Y_1 sls = 0.25 sle = 0.5									
Step	Variable Entered	Variable Removed	Label	Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	Q31		Q31	1	0.0656	0.0656	-3.750	10.39	0.0016
2	Q40		Q40	2	0.0391	0.1047	-7.704	6.42	0.0123
3	Q21		Q21	3	0.0341	0.1388	-10.896	5.78	0.0174
4	Q8		Q8	4	0.0287	0.1675	-13.265	5.00	0.0269
5	Q34		Q34	5	0.0240	0.1915	-14.913	4.27	0.0406
6	Q47		Q47	6	0.0186	0.2101	-15.751	3.37	0.0683
7	Q35		Q35	7	0.0141	0.2242	-15.902	2.59	0.1100
8	Q22		Q22	8	0.0131	0.2373	-15.890	2.41	0.1225
9	Q45		Q45	9	0.0090	0.2463	-15.256	1.67	0.1988
10	Q12		Q12	10	0.0101	0.2564	-14.793	1.89	0.1717
11	Q24		Q24	11	0.0065	0.2629	-13.782	1.22	0.2720
12		Q24	Q24	12	0.0065	0.2564	-14.793	1.22	0.2720

Legend		
Variable	**Intercept**	**Description**
Q8	0.1295	I would recommend a Post community to someone seeking an apartment home.
Q12	0.0525	My company attracts and retains outstanding personnel.
Q21	-0.0931	I would recommend Post to a friend seeking employment.
Q22	-0.0532	Team - Working with my co-workers is a positive experience.
Q31	0.1334	Ancillary Services (water billing, phone, CATV, gas.
Q34	-0.0816	Learning and Development.
Q35	-0.0545	Legal / Property Insurance.
Q40	0.0931	I am treated with fairness by my immediate supervisor.
Q45	-0.0545	Senior management is concerned about how people in the organization feel and what they think.
Q47	0.1038	Senior management regularly communicates the direction and plans of the company.

Table 5.7: Forward Variable Selection Predicting Resident Satisfaction – Y_2

Forward Variable Selection (Multiple Regression) Summary of Stepwise Selection – Y_2 sls = 0.25 sle = 0.5									
Step	Variable Entered	Variable Removed	Label	Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	Q31		Q31	1	0.0454	0.0454	-4.242	7.03	0.0089
2	Q34		Q34	2	0.0298	0.0751	-6.663	4.73	0.0312
3	Q40		Q40	3	0.0363	0.1114	-10.046	5.96	0.0159
4	Q21		Q21	4	0.0143	0.1257	-10.175	2.38	0.1253
5	Q10		Q10	5	0.0419	0.1677	-14.403	7.26	0.0079
6	Q47		Q47	6	0.0112	0.1789	-14.069	1.95	0.1643
7	Q43		Q43	7	0.0188	0.1977	-14.860	3.33	0.0703
8	Q8		Q8	8	0.0082	0.2059	-14.078	1.46	0.2295
9	Q46		Q46	9	0.0073	0.2132	-13.163	1.30	0.2561
10		Q47	Q47	8	0.0052	0.2080	-14.391	0.92	0.3379
11	Q20		Q20	9	0.0118	0.2198	-14.145	2.12	0.1477
12	Q36		Q36	10	0.0083	0.2281	-13.378	1.50	0.2235
13	Q41		Q41	11	0.0111	0.2392	-13.022	2.01	0.1586
14	Q42		Q42	12	0.0072	0.2464	-12.093	1.31	0.2544
15		Q36	Q36	11	0.0038	0.2426	-13.534	0.68	0.4097
16	Q15		Q15	12	0.0047	0.2473	-12.236	0.86	0.3551
17		Q15	Q15	11	0.0047	0.2426	-13.534	0.86	0.3551

Legend

Variable	Intercept	Description
Q8	0.1513	I would recommend a Post community to someone seeking an apartment home.
Q10	0.1488	I am proud to work for my company.
Q20	-0.0685	Work Environment - My company provides me with a sense of job security.
Q21	-0.1734	I would recommend Post to a friend seeking employment.
Q31	0.1431	Ancillary Services (water billing, phone, CATV, gas).
Q34	-0.1507	Learning and Development.
Q40	0.1617	I am treated with fairness by my immediate supervisor.
Q41	-0.1321	My immediate supervisor is approachable and easy to talk to.
Q42	0.1051	My immediate supervisor communicates clearly.
Q43	-0.0785	My immediate supervisor recognizes my extra efforts.
Q46	0.1191	Senior Mgmt – There is a high degree of stability among my company's leadership.

Table 5.8: Forward Variable Selection Predicting Resident Satisfaction – Y_3

Forward Variable Selection (Multiple Regression) Summary of Stepwise Selection – Y_3 sls = 0.25 sle = 0.5									
Step	Variable Entered	Variable Removed	Label	Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	Q31		Q31	1	0.0549	0.0549	-3.131	8.59	0.0039
2	Q20		Q20	2	0.0217	0.0766	-4.414	3.46	0.0650
3	Q8		Q8	3	0.0510	0.1276	-10.126	8.54	0.0040
4	Q34		Q34	4	0.0170	0.1446	-10.700	2.89	0.0915
5	Q51		Q51	5	0.0257	0.1703	-12.587	4.46	0.0364
6	Q21		Q21	6	0.0135	0.1839	-12.633	2.37	0.1258
7	Q10		Q10	7	0.0101	0.1940	-12.165	1.79	0.1837
8	Q45		Q45	8	0.0109	0.2049	-11.805	1.92	0.1676
9	Q46		Q46	9	0.0113	0.2161	-11.506	2.01	0.1585
10	Q40		Q40	10	0.0125	0.2286	-11.397	2.25	0.1355
11	Q53		Q53	11	0.0090	0.2377	-10.764	1.64	0.2029
12	Q41		Q41	12	0.0058	0.2434	-9.637	1.05	0.3082
13		Q41	Q41	11	0.0058	0.2377	-10.764	1.05	0.3082

Legend

Variable	Intercept	Description
Q8	0.1693	I would recommend a Post community to someone seeking an apartment home.
Q10	0.0969	I am proud to work for my company.
Q20	-0.0801	Work Environment - My company provides me with a sense of job security.
Q21	-0.0977	I would recommend Post to a friend seeking employment.
Q31	0.1276	Ancillary Services (water billing, phone, CATV, gas).
Q34	-0.0798	Learning and Development.
Q40	0.0596	I am treated with fairness by my immediate supervisor.
Q45	-0.0690	Senior management is concerned about how people in the organization feel and what they think.
Q46	0.0771	Senior Mgmt - There is a high degree of stability among my company's leadership.
Q51	0.0846	My performance reviews are helpful to me in improving my performance.

Finally, an analysis similar to the above iteration is conducted and the outlier 'Port Worthington - 2006' is removed; therefore, weighed least square regression analysis is performed. Specifically, a weight proportional to the number of employee respondents is used so that observations based on a larger number of employee responses are more highly weighted than those from properties with smaller numbers of responses. For example, the top-rated 10 explanatory variables for Y_1 are shown in Table 5.9 below:

Table 5.9: Top 10 Explanatory Variables for Resident Satisfaction – Y_1

Rank	Variable	Description
1	Q40	I am treated with fairness by my immediate supervisor.
2	Q38	My immediate supervisor trusts me.
3	Q8	I would recommend a company community to someone seeking an apartment home.
4	Q24	I feel like an integral part of the team.
5	Q39	I trust my immediate supervisor.
6	Q36	I understand what my immediate supervisor expects of me.
7	Q5	I am aware of my company's vision, mission and core values.
8	Q26	There is adequate communication within my department.
9	Q42	My immediate supervisor communicates clearly.
10	Q43	My immediate supervisor recognizes my extra efforts.

These variables are considered to be most related to Y_1, and individually explain more variability in Y_1 than other variables do. To find the best multiple linear regression model that can be used to predict Y_1, a variable selection is performed using weighted least square regression. The level of significance can be specified for a variable staying in

the model to be 0.15 (i.e., all variables staying in the model will have p-values smaller than 0.15). Variables predicting resident satisfaction – Y_1 is shown below in Table 5.10.

Table 5.10: Variables Predicting Resident Satisfaction – Y_1

Variable	Description
X_1=Q8	I would recommend this community to someone seeking an apartment home.
X_2=Q21	I would recommend the company to a friend seeking employment.
X_3=Q22	Working with my co-workers is a positive experience.
X_4=Q31	Ancillary Services: water billing, phone, CATV, gas.
X_5=Q34	Learning and Development.
X_6=Q35	Legal / Property Insurance.
X_7=Q40	I am treated with fairness by my immediate supervisor.
X_8=Q47	Senior management regularly communicates direction/plans of the company.

More specifically, the model is expressed as (Equation 5.6):

$$Y_1 = 3.5 + 0.14X_1 - 0.10X_2 - 0.05X_3 + 0.13X_4 - 0.07X_5 - 0.05X_6 + 0.09X_7 + 0.08X_8 \quad (5.6)$$

The R-square of this model is 0.2373, meaning that 23.73% of the variability in Y_1 is explained by $X_1,\ldots,X_8$. Suppose that $X_2, \ldots, X_8$ are held constant, then the predicted Y_1 will increase by 0.14 if X_1 increases by 1.

5.4 Validation of Model Using Statistical Analysis

The procedure for testing the model is discussed in this section and the results are reported using validation methods, such as Cross Validation and Holdout Method. The two techniques that are used demonstrate results that confirm that the model is valid.

In order to evaluate the final models for Y_1, Y_2 and Y_3, a company that wishes to measure the relative degrees of engagement for a particular property can check residuals or perform cross validation. Cross validation is a model evaluation method that is more reliable than simply calculating residuals (Kutner, et al., 2005). The problem with residual evaluations is that they may not give an indication of how well a model will predict the response when it is asked to make new predictions for data that have not been used. One way to overcome this problem is to not use the entire data set when fitting a model. Some of the data is removed before training begins. Then, when training is done, the data that is removed can be used to test the performance of the learned model on "new"' data. This is the basic idea for a whole class of model evaluation methods called cross validation (Kutner, et al., 2005).

5.4.1 Methods of Validation

The holdout method is the simplest kind of cross validation. The data set is separated into two sets, called the training set and the testing set. The models are developed using the training set only, and then predict the Y_1, Y_2 and Y_3 for the data in the testing set. Specifically, the validation procedure is as follows:

1) Randomly sample 122 out of the 152 employee-resident responses to use from the matched data. The other 30 pairs are set aside for validation. This is called a 20% holdout; this is quite common in validation studies (Peck, Olsen & Devore, 2001).
2) The 122 pairs are analyzed using the weighted stepwise variable selection (the same as discussed in Chapter 4), restricting the selection to the same pools of explanatory variables used using SLE=0.30 and SLS=0.15 (SLE: Significance Level of Entry; SLS: Significance Level of Staying). RSME (root of mean of

squared errors) is a way to quantify the amount by which an estimator differs from its true value (Sullivan, 2004).

3) The models discussed in Chapter 5 determined in the previous step are used to predict average Y_1, Y_2 and Y_3 for the 30 omitted pairs, and see how good the fit is.

Steps 1, 2 and 3 are repeated five times. The results are reported in the following tables (Table 5.11, 5.12, and 5.13):

Table 5.11: Validation Model with Random Selection for Resident Satisfaction Y_1

Model for Y1									
Random Selection 1		Random Selection 2		Random Selection 3		Random Selection 4		Random Selection 5	
Variables	Estimate	Variables	Estimate	Variables	Estimate	Variables	Estimate	Variables	Estimate
Intercept	3.6936	Intercept	3.6854	Intercept	3.7540	Intercept	3.6341	Intercept	3.6061
Q31	0.0533	Q31	0.0418	Q31	0.0432	Q31	0.0780	Q31	0.0429
Q40	0.1046	Q40	0.0851	Q40	0.0713	Q40	0.1290	Q40	0.1580
Q43	-0.0497					Q37	-0.0643	Q43	-0.0555
RMSE		RMSE		RMSE		RMSE		RMSE	
Training (120obs)	0.3509	Training (120 obs)	0.3389	Training (120obs)	0.3298	Training (120obs)	0.3536	Training (120obs)	0.3337
Testing (30 obs)	0.3308	Testing (30 obs)	0.3389	Testing (30 obs)	0.4223	Testing (30 obs)	0.346	Testing (30 obs)	0.3948

Table 5.12: Validation Model with Random Selection for Intent to Renew Y_2

Model for Y2									
Random Selection 1		Random Selection 2		Random Selection 3		Random Selection 4		Random Selection 5	
Variables	Estimate	Variables	Estimate	Variables	Estimate	Variables	Estimate	Variables	Estimate
Intercept	3.1000	Intercept	2.9270	Intercept	3.1728	Intercept	2.7800	Intercept	3.0331
Q31	0.0503	Q31	0.0560	Q31	0.0638	Q31	0.0805	Q31	0.0469
Q40	0.1220	Q40	0.0875	Q40	0.0629	Q40	0.1609	Q40	0.1101
Q36	0.0917	Q36	0.1291			Q37	0.1153		
Q39	-0.1260	Q24	-0.1022			Q39	-0.1466		
RMSE		RMSE		RMSE		RMSE		RMSE	
Training (120obs)	0.4458	Training (120 obs)	0.4511	Training (120obs)	0.4752	Training (120obs)	0.4746	Training (120obs)	0.4693
Testing (30 obs)	0.5196	Testing (30 obs)	0.4926	Testing (30 obs)	0.4277	Testing (30 obs)	0.4246	Testing (30 obs)	0.4194

Table 5.13: Validation Model with Random Selection for Intent to Renew Y_3

Model for Y3									
Random Selection 1		Random Selection 2		Random Selection 3		Random Selection 4		Random Selection 5	
Variables	Estimate	Variables	Estimate	Variables	Estimate	Variables	Estimate	Variables	Estimate
Intercept	3.6846	Intercept	3.8424	Intercept	3.8419	Intercept	3.6711	Intercept	3.7720
Q31	0.0520	Q31	0.0484	Q31	0.0549	Q31	0.0865	Q31	0.0477
Q8	0.0930	Q40	0.0616	Q51	0.0650	Q51	0.0754	Q40	0.0614
RMSE		RMSE		RMSE		RMSE		RMSE	
Training (120obs)	0.4005	Training (120 obs)	0.4071	Training (120obs)	0.3995	Training (120obs)	0.4042	Training (120obs)	0.4070
Testing (30 obs)	0.4059	Testing (30 obs)	0.4039	Testing (30 obs)	0.4375	Testing (30 obs)	0.4194	Testing (30 obs)	0.4050

It is evident that Q31 and Q40 are chosen for Y_1 and Y_2 each time, confirming that these two variables should be included in the two final models for Y_1 and Y_2, respectively. Some other variables, such as Q43, are chosen sometimes but not always. For Y_3, Q31 is always chosen, but Q8 is not; Q40 and Q51 enter the model sometimes. It is important to note that Q31 relates to Ancillary Services and is not included in the scope of this research since it is not a driver of engagement.

5.5 Validation Results

Thus, it is concluded that Q40 is an important predictor for Y_1 and Y_2. Variables Q43, Q36, Q39, Q24, Q51 and Q8 are not always chosen, partly because this holdout method has a high variance: it may depend heavily on which data points end up in the training set and which end up in the testing set, and thus the evaluation may be significantly different depending on how the division is made.

Another reason for some variables being chosen occasionally is that these variables are on the border-line of being significant. In most cases, the RMSE predicted using the training data in Step 2 is close to that in Step 3 using the testing data. Overall, it appears that the above three two-variable models shown for Y_1, Y_2 and Y_3 are robust,

although there is some question about whether the second variable in the Y_3 model (X_2=Q8) is really needed. This robust/validation shows that the variables selected are robust and that the adjusted RMSEs reported above are reasonable estimates of the "typical error" which would be encountered if the employee average from a property was used to predict the average resident Y_1, Y_2 and Y_3 score. This validation analysis is also useful for showing that the more complex models given in Section 5.3.2 (such as the eight-variable predictor model displayed for Y_1) are overly parameterized. Most of the variables shown there (other than Q31 and Q40) are not particularly useful in predicting residents' average satisfaction. As a result of the statistical analysis, the p-values are higher after a certain number of variables: p-values for Q31 and Q40 were 0.0016 and 0.0029, respectively, for Y_1. Hence, other variables with higher p-values are not as useful as these. On the basis of the p-values, the variables have been ranked within Y_1, Y_2 and Y_3 and then the common variables are identified from Y_1, Y_2 and Y_3 in the order of their p-values to develop a final list of 10 variables, as illustrated in Table 5.14.

Table 5.14: Top Ten Common Drivers of Engagement for Overall Resident Satisfaction

Rank	Engagement Driver	Category	Description
1	Q40	Immediate Supervisor	I am treated with fairness by my immediate supervisor.
2	Q38	Immediate Supervisor	My immediate supervisor trusts me.
3	Q8	Culture	I would recommend this community to someone seeking an apartment.
4	Q24	Team	I feel like an integral part of the team.
5	Q36	Immediate Supervisor	I understand what my immediate supervisor expects of me.
6	Q39	Immediate Supervisor	I trust my immediate supervisor.
7	Q26	Team	There is adequate communication within my department.
8	Q54	Immediate Supervisor	My immediate supervisor assists me in identifying my training or personal development needs.
9	Q42	Immediate Supervisor	My immediate supervisor communicates clearly.
10	Q43	Immediate Supervisor	My immediate supervisor recognizes my extra efforts.

5.6 Summary

While the Statistical Analysis reveals that the drivers of employee engagement are relatively small when analyzed individually, when considered collectively, these drivers can impact overall resident satisfaction. Therefore, specific drivers of engagement have been identified that affect satisfaction and the following model using simple linear regression has been developed (Equation 5.7):

$$Y_i = \beta_0 + \beta_1 x_i + \varepsilon_i \quad (5.7)$$

Industry professionals and other researchers now have an equation using a statistical model that indexes each variable and compares the overall satisfaction among multi-family properties. This model can provide a valuable tool to owners and managers when developing talent management strategies to enhance resident satisfaction, their likelihood to renew, or refer someone to their community. Many of these drivers that are identified in this research are the same drivers that have been identified by other researchers in the field of employee engagement.

CHAPTER 6

NEURAL NETWORK

6.1 Purpose

The previous chapter discusses the use of Statistical Analysis as a methodology for determining factors of employee engagement that affect resident satisfaction. This chapter addresses a second methodological approach, Neural Networks, which are used to predict the level of resident satisfaction based on a given level of employee engagement. In conjunction with statistical techniques and Radar Diagramming, the intent is to identify factors of employee engagement and their impact on resident satisfaction to develop an Employee Engagement Model. Due to the complexity of the data, the Neural Network is selected as a tool to aid in the development of this model.

The data set from which this study draws on is discussed followed by an overview of Neural Networks as a methodological tool, along with the advantages of using this approach. A discussion of the Neural Network software is then provided and concludes with an application of Neural Networks in other research involving resident satisfaction.

6.2 Data Set

Data for this research is drawn from two primary groups (employees and residents) of a multi-family housing firm. The data used in this research is obtained from a research firm specializing in the multi-family housing industry, as discussed in Chapter 3. The data is collected from a survey of 1,516 employees (referred to as “associates”) and 23,795 residents over a three-year period, from 2005 to 2007. The survey of associates collects information on human resource policies and practices, firm

characteristics, and overall levels of satisfaction. Residents are asked questions concerning their overall level of satisfaction, their likelihood to renew their lease, as well as their likelihood of referring someone to his/her community. Responses from both associates and residents are analyzed using three distinct methodological approaches. This chapter discusses the use of Neural Networks to analyze both resident and employee data within the multi-family housing industry. Used in conjunction with Statistical Analysis, as discussed in the previous chapter, and Radar Diagramming, the subject of Chapter 7, the intent is to identify factors of employee engagement and their relative impact on resident satisfaction in order to develop an Employee Engagement Model.

6.3 Neural Network

The neural network is an appropriate modeling tool that is able to capture and represent complex input/output relationships. The motivation for the development of neural network technology stems from the desire to develop an artificial system that can perform "intelligent" tasks similar to those performed by the human brain (Ward Systems, 2007). Neural networks resemble the human brain in the following two ways. First, a neural network acquires knowledge through learning. Second, a neural network's knowledge is stored within inter-neuron connection strengths, known as synaptic weights.

The true power and advantage of neural networks lies in their ability to represent both linear and non-linear relationships, and in their ability to learn these relationships directly from the data being modeled. Traditional linear models are simply inadequate when it comes to modeling data that contains non-linear characteristics (Shapiro and Gross, 1981). A neural network looks for patterns in training sets of data, learns these patterns, and develops the ability to correctly classify new patterns or to make forecasts

and predictions. Neural networks excel at problem diagnosis, decision-making, prediction, and other problems where pattern recognition is important and precise computational answers are not required (Ward Systems, 2007).

This technique is proven effective in identifying the relationship between independent variables and dependent variables, much like regression or other more traditional approaches. The principal difference between Neural Networks and Statistical approaches is that Neural Networks make no assumptions about the Statistical distribution of properties of the data and, therefore, tend to be more useful in practical situations (Paris and Kangari, 2005). Neural Networks are based on an inherently nonlinear approach, giving them additional accuracy when modeling complex data patterns (Ward Systems, 2007). The model for Employee Engagement developed using this technique can be used as a heuristic by industries. The technique can be used by industries to gauge the level of engagement of their employees and what factors organizations need to focus on.

6.3.1 Utilizing Neural Network Software

The software used for this purpose is NeuroShell Predictor (Ward Systems, 2007). The algorithm used in this software also allows it to find the importance of each of the inputs, which can provide valuable insight into what factors affect employee engagement; this can further be used to verify the model developed using other techniques described previously and findings of the expert panel. The software uses the following methodologies:

1. Neural Method - This is based on an algorithm called Turboprop2, a variant of the Cascade Correlation algorithm invented at Carnegie Mellon University by

Scott Fahlman (Hoehfeld and Fahlman, 1992). TurboProp2 dynamically grows hidden neurons and trains very fast. TurboProp2 models are built (trained) in a matter of seconds and, therefore, can be very effective in predicting outcomes.

2. Genetic Training Method - This is a genetic algorithm variation of the General Regression Neural Network (GRNN) invented by Donald Specht (1990). It trains everything in an out-of-sample mode; it is essentially doing a "one-hold-out" technique, also called "jackknife" or "cross validation." If the model is trained using this method, it essentially looks at the training set out-of-sample. This method is, therefore, extremely effective when there are not many patterns on which to train. The genetic training method takes longer to train as more patterns are added to the training set.

The statistics and graphics obtained from NeuroShell® Predictor software include: Actual vs. Predicted; Learning level (R squared, average error, correlation, mean squared error, root mean squared error, % in range); Importance of Inputs; and Scatter plot.

The Neural Network can be trained using different goals of genetic optimization when using the Genetic Training Strategy. These goals include: Maximizing R-Squared; Minimizing average error; Maximizing correlation; Minimizing Mean Squared Error (MSE); Minimizing Root Mean Squared Error (RMSE); and Maximizing a user-definable number within tolerance. Also, the Genetic Training Strategy can be used to minimize the number of unpredictable patterns and perform tighter fitting during optimization (Ward Systems, 2007). These results are important to determine the relationship between the input variables and a corresponding output variable.

6.4 Applicability to Residential Satisfaction

The Neural Network modeling technique is used effectively in other research measuring resident satisfaction (Paris and Kangari, 2005). Variables using four categories are found by these researchers to be significant in determining the level of resident satisfaction. The Neural Network is trained using a complex data set to make accurate predictions. The network predicts output categories of either satisfied or not satisfied and, therefore, proves to be a successful model in forecasting client satisfaction. The model developed by Paris and Kangari (2005) concludes that major variables impacting resident satisfaction include: responsiveness by the property management staff; friendliness of staff; building quality; and overall cleanliness of the apartment community.

There is additional research (Miller and Pulket, 2005) that demonstrates greater resident satisfaction is associated with higher employee engagement and more positive staff views of organizational culture (greater teamwork, participation in decision-making). Research also suggests that good quality of work environment for the staff contributes to a high quality of care for the residents (Sikorska-Simmons, 2006). However, more research is needed to examine the causal nature of this relationship and to further identify the relationship of other factors that influence resident satisfaction. Specifically, this research identifies the relationships between factors that influence resident satisfaction more clearly by performing statistical tests and presenting them through the radar charts. After identifying the relationships, a model is created and trained through the neural network methodology and the algorithms used in the software. This forms the decision support system, where variables of engagement are identified

through statistical tests are the inputs and the level of engagement and/or its relationship with resident satisfaction is the output.

6.5 Developing the Model

A Neural Network model is developed with the input variables as the drivers of employee engagement that are found to be statistically significant after the simple linear regression analysis. The model is developed for each of the output variables: Y_1 (Overall resident satisfaction), Y_2 (Intent to renew) and Y_3 (Referral to others). Out of the two training strategies, Genetic Training Method is found to be more appropriate because it does not extrapolate and, hence, the prediction results lies within the range of the Likert scale and is more accurate for evaluating the importance of inputs. The objective chosen is to maximize R-Square, which is the coefficient of multiple determination, a statistical indicator usually applied to multiple regression analysis. It compares the accuracy of the model to the accuracy of a trivial benchmark model wherein the prediction is just the average of all of the example output values. A perfect fit results in an R-Squared value of 1, a very good fit near 1, and a poor fit near 0. The formula for R-Square is given by (Equation 6.1):

$$R^2 = 1 - \frac{SSE}{SSyy} \qquad (6.1)$$

Where SSE = $\sum (y - \hat{y})^2$, SSy = $\sum (y - \bar{y})^2$, y is the actual value, $\hat{y}$ is the predicted value of y, and $\bar{y}$ is the mean of the y values. SSE is defined as the measure of variation in the Y_i observations (response variable) when the predictor variable X is taken into account. This is known as the sum of squared deviations. SSE denotes the error sum of

squares. If all Y_i observations fall on the fitted regression line, the SSE=O. The greater the variation of Y_i observations around the fitted regression line, the larger the SSE. The total sum of squares is represented by SSy. This is a measure of total variation. It is measured in terms of the deviations of the Y_i around their mean. If all the Y_i observations are the same, then this measure would be equal to zero. The greater the variation among Y_i observations, the total sum of squares is larger. R square represents the coefficient of determination is the proportionate reduction of total variation associated with the use of predictor variable X. It lies between 0 and 1. The larger the R-square is, the more the total variation of Y is reduced by introducing the predictor variable X. The closer it is to 1, the greater is the degree of linear association between X and Y.

If the range of the output is very small, as in this case, where the range of output is between 1 and 5, the mean will be a fairly good predictor. Hence, R-Squared may be somewhat low, in spite of the fact that the predictions are fairly good. When predicting with new data, R-Squared is computed using the mean of the new data, not the mean of the training data.

6.5.1 Using the Genetic Training Strategy

The three models are then trained individually using the Genetic Training Strategy. The following consists of the Genetic Learning Progress:

> **Current generation:** This value represents the percentage of the current generation of individual sets of importance values evaluated by the network. A generation refers to a group of solutions to a problem that are created by survival of the fittest techniques using a genetic algorithm. The best solutions are carried

over to the next generation while the worst solutions are allowed to die (Ward Systems, 2007).

Generations completed: Displays the total number of generations that have been created since learning began.

Generations since last improvement: It represents the number of generations that have been created since an improvement in network performance. A threshold for maximum number of generations without improvement may be pre-set. The lower the threshold, the shorter the training time. The training can be interrupted in the middle, as well if it is not making much progress.

Unpredictable Patterns: It represents the total number of patterns that the Genetic method is unable to predict a value for. The Genetic method will never predict an output greater than the greatest output with which it was trained. It will also never predict an output less than the smallest output with which it is trained.

It then gives the results for the following statistics:

R-squared: The value for R-squared ranges from 0 to 1. The closer the value is to 1, the better the net is able to make predictions. The net is not able to make good predictions if the value is near 0.

Average Error: This is the absolute value of the actual values minus the predicted values divided by the number of patterns.

Correlation(r): This is a measure of how the actual and predicted correlate to each other in terms of direction (i.e., when the actual value increases, does the predicted value increase and vice versa). This is not a measure of magnitude.

The values for r range from 0 to 1. The closer the correlation value is to 1, the more correlated the actual and predicted values are.

MSE: A statistical measure of the differences between the values of the outputs in the training set and the output values the network is predicting. This is the mean overall patterns in the file of the square of the actual value minus the predicted value, i.e., the mean of (actual - predicted)^2. The errors are squared to penalize the larger errors and to cancel the effect of the positive and negative values of the differences.

RMSE: This is the square root of the MSE.

% in Range: This is the percent of network answers that are within the user-specified percentage of the actual answers used to train the network. This option is set in the Network menu. Select inputs/outputs and set training mode by clicking on the Settings button near the selected training strategy.

% same Sign: This is the percent of network answers that are the same sign as the actual answers.

6.5.2 The Importance of Inputs

The importance of input values are a relative measure of how significant each of the inputs is in the predictive model. Weights range from 0 to 1. Higher values are associated with more important variables (inputs). If the importance of input value is ever set to zero, then that input is useless and might as well be omitted (in fact the NeuroShell® Predictor stops using inputs whose relative importance goes to zero). This methodology was used to eliminate the drivers of employee engagement with importance

values near to zero. The model is trained iteratively to find the factors that most significantly affect resident satisfaction. These results are shown in Table 6.1.

Table 6.1: Results of NeuroShell® Predictor Training Sessions

NeuroShell Predictor – Trained Network Information	Training Session											
	1		2		3		4		5		6	
Results of Training Session												
Training Time	9:52		17:45		10:14		10:08		19:34		11:24	
Generations Trained	1,502		3,577		2,269		2,021		3,927		2,449	
Performance	0.1204		0.1827		0.1719		0.1243		0.2320		0.2245	
Avg. Error	0.1343		0.1302		0.1217		0.1648		0.1506		0.1529	
Network Structure												
Training Strategy	Genetic		Genetic		Genetic		Genetic		Genetic		Genetic	
Output Name	RQ1		RQ1		RQ1		RQ49		RQ52		RQ52	
Number of Inputs	10		8		6		6		8		6	
List of Inputs and Their Relative Importance	Q8	0.001	Q8	0.136	Q8	0.102	Q8	0.093	Q8	0.234	Q8	0.193
	Q10	0.173	Q10	0.340	Q10	0.691	Q10	0.684	Q10	0.299	Q10	0.338
	Q16	0.028	Q16	0.068	Q16	0.045	Q16	0.000	Q16	0.057	Q16	0.091
	Q36	0.273	Q36	0.038	Q36	0.102	Q36	0.000	Q36	0.051	Q36	0.037
	Q42	0.001	Q42	0.046	Q48	0.000	Q48	0.080	Q42	0.058	Q48	0.080
	Q46	0.056	Q47	0.022	Q54	0.061	Q54	0.142	Q47	0.022	Q54	0.261
	Q47	0.069	Q48	0.091					Q48	0.053		
	Q48	0.129	Q54	0.260					Q54	0.266		
	Q54	0.243										
	Q57	0.026										

6.6 Findings from Neural Network Model

The Genetic Training Model of the Neural Network reveals the following results in the three iterations of training.

Table 6.2: First Iteration with the Output Variable Y1: Overall Satisfaction by Residents

Question Code	Category	Description	Neural Network		
			Y_1	Y_2	Y_3
Q8	Organization/Culture	I would recommend a company community to someone seeking an apartment home.	3	5	1
Q46	Organization/Culture	There is a high degree of stability among my company's leadership.	9	10	2
Q36	Immediate Supervisor	I understand what my immediate supervisor expects of me.	8	4	3
Q10	Organization/Culture	I am proud to work for my company.	1	1	4
Q57	Organization/Culture	The benefits program has adequate choices to meet my needs.	10	6	5
Q48	Organization/Culture	I trust senior management has the company's best interest in mind.	4	3	6
Q42	Immediate Supervisor	My immediate supervisor communicates clearly.	6	8	7
Q54	Immediate Supervisor	My immediate supervisor assists me in identifying my training or personal development needs.	2	2	8
Q47	Organization/Culture	Senior management regularly communicates the direction and plans of the company.	7	9	9
Q16	Work Environment	I have enough authority to effectively perform my job.	5	7	10

Note: 1-10 (one being the highest) Y_1 = Overall Resident Satisfaction Y_2 = Intent to Renew Y_3 = Referral to Others

Table 6.3: Second Iteration with Output Variable Y1: Overall Satisfaction by Residents

Question Code	Category	Description	Neural Network		
			Y_1	Y_2	Y_3
Q47	Organization/Culture	Senior management regularly communicates the direction and plans of the company.	8	8	8
Q36	Immediate Supervisor	I understand what my immediate supervisor expects of me.	7	7	7
Q48	Organization/Culture	I trust senior management has the company's best interest in mind.	4	4	6
Q16	Work Environment	I have enough authority to effectively perform my job.	5	5	5
Q42	Immediate Supervisor	My immediate supervisor communicates clearly.	6	6	4
Q54	Immediate Supervisor	My immediate supervisor assists me in identifying my training or personal development needs.	2	2	3
Q8	Organization/Culture	I would recommend a company community to someone seeking an apartment home.	3	3	2
Q10	Organization/Culture	I am proud to work for my company.	1	1	1

Note: 1-10 (one being the highest) Y_1 = Overall Resident Satisfaction Y_2 = Intent to Renew Y_3 = Referral to Others
Without Q46 and Q57

Table 6.4: Third Iteration with Output Variable Y1: Overall Satisfaction by Residents

Question Code	Category	Variable	Neural Network		
			Y_1	Y_2	Y_3
Q36	Immediate Supervisor	I understand what my immediate supervisor expects of me.	2	5	6
Q48	Organization/Culture	I trust senior management has the company's best interest in mind.	6	4	5
Q16	Work Environment	I have enough authority to effectively perform my job.	5	6	4
Q8	Organization/Culture	I would recommend a company community to someone seeking an apartment home.	3	3	3
Q54	Immediate Supervisor	My immediate supervisor assists me in identifying my training or personal development needs.	4	2	2
Q10	Organization/Culture	I am proud to work for my company.	1	1	1

Note: 1-10 (one being the highest) Y_1 = Overall Resident Satisfaction Y_2 = Intent to Renew Y_3 = Referral to Others
Without Q47 and Q42

In the final analysis, the three most important drivers of employee engagement impacting resident satisfaction are listed in the Table 6.5 below.

Table 6.5: Top Three Variables from Neural Network Model

Question Code	Category	Description
Q8	Organization/Culture	I would recommend a company community to someone seeking an apartment home.
Q54	Immediate Supervisor	My immediate supervisor assists me identifying my training or personal development needs.
Q10	Organization/Culture	I am proud to work for my company.

6.7 Neural Network Validation

As discussed in the previous chapters, it is essential and necessary to validate a model, in order to conclude if the model is appropriate or not. Two approaches are followed to validate the model:

1) The model is formed using 100 rows of training data and is then used to predict for the remaining 50 rows of data, and the average error between the actual and predicted values, as well as R-Squared for the predicted model, is analyzed.

2) A sensitivity analysis is carried out, in order to see if the model can predict the output for different ranges of input variables ranging from all "1" to all "5" and possible combinations between 1 and 5.

The results from the first approach indicate results that are within a normal range; however, the model cannot be validated since it was only trained for a very specific data with values of output in the range of 3-4 on the Likert Scale, and hence does not respond well to the second method of validation. The validation concludes if the Neural Network model have been more robust, and sample data has a much wider range of responses, then it can result in a higher success for prediction.

6.8 Summary

This chapter provides an overview of Neural Networks, and describes some of the advantages of using this approach to model complex data patterns. The type of software used is presented, followed by a discussion of the ways in which this methodological approach has been used previously in research on resident satisfaction. In previous research, the Neural Network proves to be effective in examining complex data sets involving resident satisfaction (Paris and Kangari, 2005). These findings are significant

for two reasons. Other researchers conclude that the Neural Network methodology is an appropriate tool for using the knowledge to expand future research in the areas of resident satisfaction; however, it offers limited evidence of relationships between input and output variables that are non-linear. The chapter also summarizes that, by using the Neural Network methodology, the relationship between resident satisfaction and variables of employee engagement can be explored in greater detail. There is a growing interest in the relationship between employee engagement and resident satisfaction. However, little is known about the specific relationship of these variables that determine the level of satisfaction within the multi-family housing industry. These results summarize that, while there is a relationship between input variables of engagement and output variables, such as resident satisfaction, the Neural Network model is not reliable in determining the relationship of employee engagement and resident satisfaction. However, this information can be used by owners and managers of multi-family housing to improve both human resource practices and resident satisfaction. The next chapter describes Radar Diagramming, which is used to analyze the data and assist in further explaining the relationship of the input variables of employee engagement to the output variables of resident satisfaction, intent to renew, and the likelihood of a resident referring someone to their community.

CHAPTER 7

RADAR DIAGRAMMING MODEL DEVELOPMENT

7.1 Purpose

This chapter provides an overview of Radar Diagramming and demonstrates how its use can be an effective tool to illustrate the relationship of important variables among different audiences, such as employees and the expert panel. With the use of Radar Diagramming, findings from the Statistical Analysis and Neural Network are graphically demonstrated to show a relationship between the input and output variables. This chapter also includes a discussion of the advantages and disadvantages of using Radar Diagramming as a graphical tool. These illustrations will provide further conclusions and offer additional information to academicians and practitioners about the relationship between drivers of engagement and their impact on resident satisfaction in the multi-family rental housing sector. This chapter concludes with a discussion of these relationships and the application of this new knowledge.

7.2 Data Set

Information used in Radar Diagramming originates with the expert panel, findings from the Statistical Analysis and the Neural Network. A description of the data, as well as the expert panel, is discussed in Chapters 3 and 4. The expert panel includes both human resource professionals and executives from the multi-family housing industry; using the Delphi Method (Okali and Pawoliski, 2004), the panel offers feedback regarding employee engagement and its affect on resident satisfaction.

7.3 Radar Diagramming

A Radar Diagram is a graphical concept of a radar screen for displaying the current state or level of performance in different categories that can then be used as a diagnostic tool to evaluate the level of involvement being expended by a particular team member toward its engagement activities (Luxhoj, Riis & Thorsteinsson, 1997). The use of the Radar Diagram leads to the development of "profiles" that clearly illustrate to management where efforts have been allocated with respect to the management task within the organization. Moreover, the Radar Diagram may also be used to suggest changes in management processes and to evaluate the possible organizational effects of new, improved management initiatives. The shape of the polygon, and hence its area, may be affected by the order in which the parameters are displayed around the radar chart. The principle behind a radar chart is the visual display of several dissimilar parameters; the actual area of the polygon is not as important as the relative differences between engagement factors (Leary, et al., 2002). The diagramming technique is used in conjunction with Statistical Analysis and Neural Network as a graphical visualization of the different factors of employee engagement. For the purposes of simplification and illustration, radar diagramming is selected simply as a tool to use in identifying, analyzing, and comparing value structures of the factors which drive engagement. This method will identify the trends and the patterns followed by different factors.

7.3.1 Comparison of Variables by Expert Panel and Employee

Specific weight factors have been identified by the expert panel (as previously discussed in Chapter 3) and compared to a small pilot sample of employee responses. By graphical representation, as illustrated in Figure 7.1 below, it can be concluded with this

limited population that the expert panel places greater importance on certain factors more than the small sample of employees.

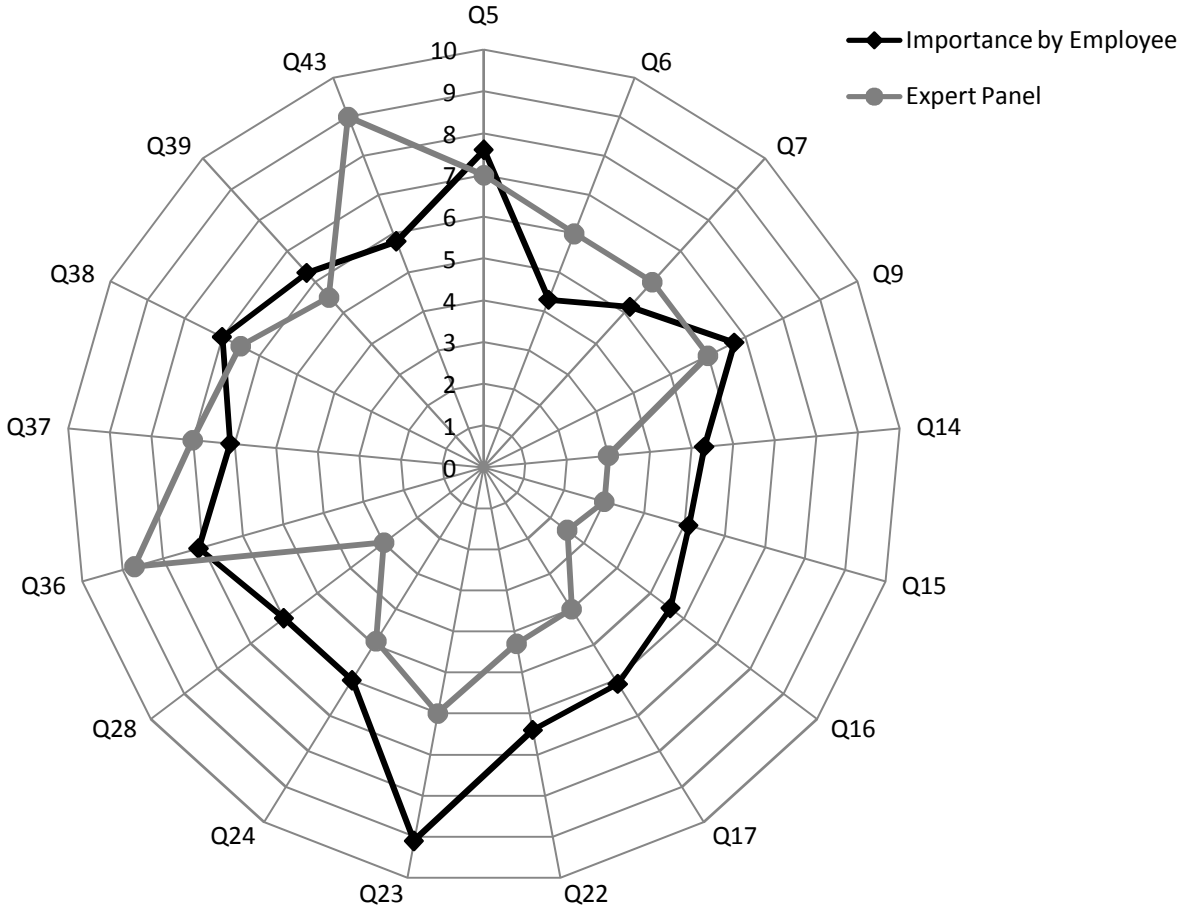

Figure 7.1: Comparison Between Importance by Expert Panel and Importance by Employees

Note: Factors are ranked on a scale of 1-10 by both expert panel and employees.

The tight association between variables indicates that there is a close relationship and, therefore, should be considered as a cluster of engagement drivers. Table 7.1 below illustrates the corresponding legend to plots in Figure 7.1.

Table 7.1: Comparison Between Importance by Expert Panel and Importance by Employees

Variable	Description	Expert Panel	Employee
Q5	I am aware of Organization's vision, mission, and core values.	7.6	7.0
Q6	Organization is achieving its vision and mission.	4.3	6.0
Q7	Organization's vision and mission make me feel that my job is important.	5.2	6.0
Q9	Quality is a shared priority at my company.	6.7	6.0
Q14	I find personal meaning and fulfillment in my work.	5.4	3.0
Q15	I am able to maintain a balance between work and personal commitments.	5.1	3.0
Q16	I have enough authority to effectively perform my job.	5.7	2.5
Q17	I have the tools / technology to efficiently perform my job.	6.1	4.0
Q22	Working with my co-workers is a positive experience.	6.4	4.3
Q23	My ideas and opinions are appreciated.	9.1	6.0
Q24	I feel like an integral part of the team.	6.0	4.9
Q28	My co-workers are committed to doing quality work.	6.0	3.0
Q36	I understand what my immediate supervisor expects of me.	7.1	8.7
Q37	My immediate supervisor encourages innovation.	6.2	7.0
Q38	My immediate supervisor trusts me.	7.0	6.5
Q39	I trust my immediate supervisor.	6.3	5.5
Q43	My immediate supervisor recognizes my extra efforts.	5.8	9.0

A set of input variables are selected for the purposes of illustration and the weights by the experts, as well as a small sample of employees, are plotted. The variables are arranged in clusters for ease of comparison. While this method is an effective conceptual tool that can be used to compare several scenarios, this method can also produce more questions than answers, depending on how variables are classified for other reasons of convention, historical tradition or ideology. Radar diagrams, however, can be an effective tool for making observations, since each axis displays one parameter and the values on each of the axes may be joined to form a central polygon. If the data is appropriately plotted, the area within the polygon can represent a global measure of performance with increasing or decreasing areas reflecting better or poorer overall performance (Leary, et al., 2002).

In Figure 7.1 above, there has been no discussion regarding possible causal relationships. Therefore, it is important to use Radar Diagramming as a method to visualize the factors for a much broader purpose. For example, it is important to understand how executives (expert panel) can perceive the clusters in comparison to those employees who actually respond to and serve the customer (residents). The main weakness of the radar chart is the arbitrary judgment used to value the relative importance of the different scales displayed. Sensitivity analysis will be needed to test the effect of all the variables and assumptions used in the scaling of the parameters chosen. However, what is considered important and its relative weighting will most likely remain an arbitrary judgment, which will need to be reached by consensus (Leary, et al., 2002).

7.3.2 Radar Diagramming Using Results from Statistical Analysis

When analyzing the findings from the Statistical Analysis, as illustrated in Figures 7.2, 7.3, and 7.4 below, it is evident that trust between the employee and his or her supervisor and the supervisor's expectation of the employee are extremely important; this trust is reflected in all three output variables: resident satisfaction, intent to renew, and referral of others. As evidenced by the shape of all three radar diagrams, trust plays a significant role in employee engagement and is highly correlated with the employee taking pride in his or her product enough to refer the community to someone looking for an apartment.

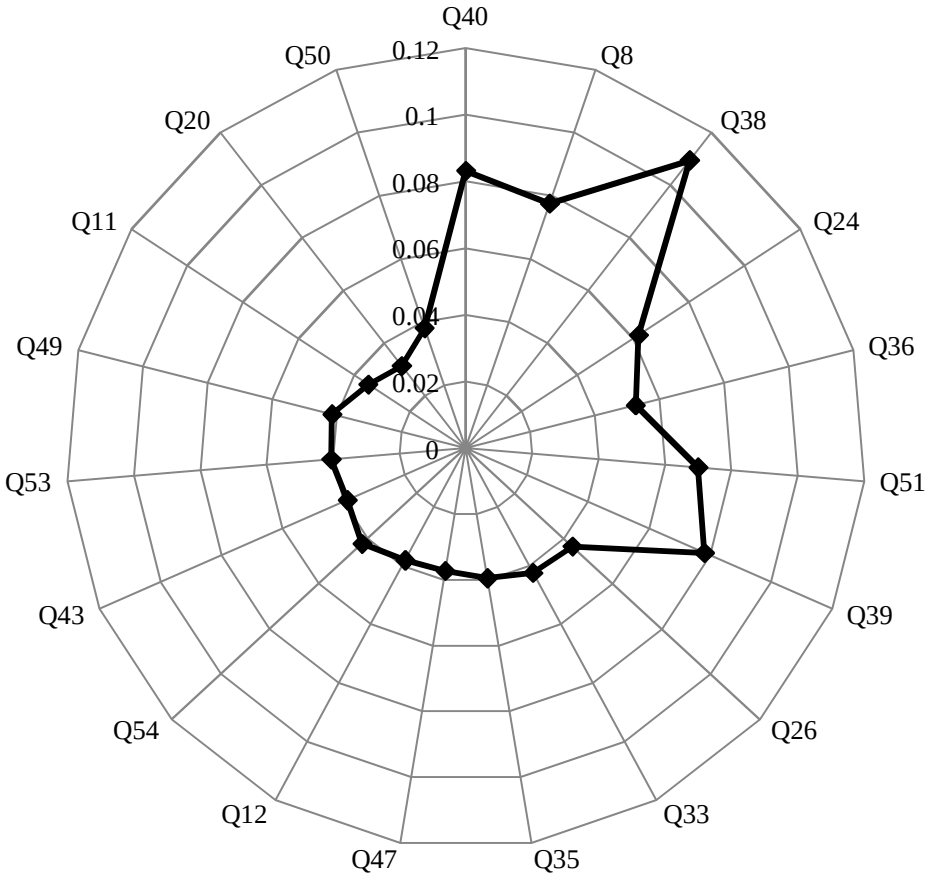

Figure 7.2: Simple Linear Regression for Y_1 - Overall Resident Satisfaction

Table 7.2 below illustrates the corresponding legend to plots in Figure 7.2

Table 7.2: Simple Linear Regression for Y_1 – Overall Resident Satisfaction

Variable	Description	Estimate of Response Variable	R-square
Q31	Ancillary Services	0.0743	0.0656
Q40	I am treated with fairness by my immediate supervisor.	0.0832	0.0582
Q8	I would recommend a company community to someone seeking an apartment home.	0.0776	0.0437
Q38	My immediate supervisor trusts me.	0.1094	0.0344
Q24	I feel like I am an integral part of the team.	0.0620	0.0271
Q36	I understand what my immediate supervisor expects of me.	0.0526	0.0262
Q51	My performance reviews are helpful to me in improving my performance.	0.0700	0.0236
Q39	I trust my immediate supervisor.	0.0782	0.0174
Q26	There is adequate communication in my department.	0.0435	0.0172
Q33	Information Technology	0.0425	0.0170
Q35	Legal/Property Insurance	0.0395	0.0170
Q47	Senior management regularly communicates the direction/plans of the company	0.0373	0.0164
Q12	My company attracts and retains outstanding personnel.	0.0382	0.0162
Q54	My immediate supervisor assists me in identifying my training or personal development needs.	0.0423	0.0156
Q43	My immediate supervisor recognizes my extra efforts.	0.0388	0.0130
Q53	I receive adequate training to effectively perform my job	0.0405	0.0130
Q49	Within the company, there are sufficient options for career growth and mobility	0.0414	0.0098
Q11	My company has earned my loyalty.	0.0350	0.0091
Q20	My company provides me with a sense of job security.	0.0313	0.0090
Q50	Hiring and promotion decisions are impartial.	0.0381	0.0063

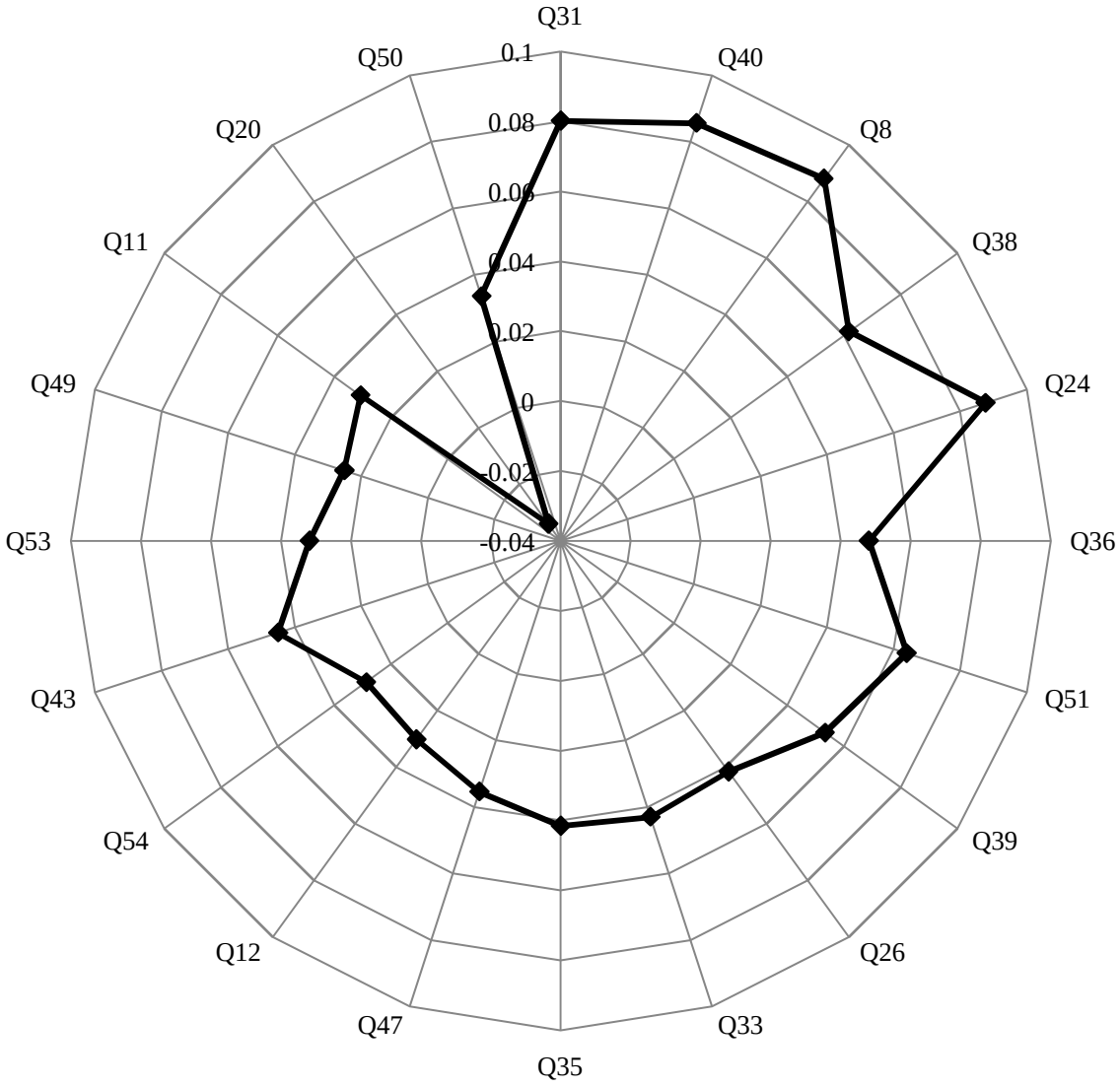

Figure 7.3: Simple Linear Regression for Y_2 – Intent to Renew

The relationship between the employee and the supervisor is a significant driver of engagement. Communication among team members and senior management has an impact on intent to renew. Table 7.3 illustrates the corresponding legend to plots in Figure 7.3.

Table 7.3: Simple Linear Regression for Y_2 – Intent to Renew

Variable	Description	Estimate of Response Variable	R-square
Q31	Ancillary Services	0.0801	0.0454
Q40	I am treated with fairness by my immediate supervisor.	0.0856	0.0367
Q8	I would recommend this community to someone seeking an apartment home.	0.0880	0.0222
Q38	My immediate supervisor trusts me.	0.0618	0.0165
Q24	I feel like I am an integral part of the team.	0.0877	0.0132
Q36	I understand what my immediate supervisor expects of me.	0.0481	0.0130
Q51	My performance reviews are helpful to me in improving my performance.	0.0640	0.0129
Q39	I trust my immediate supervisor.	0.0534	0.0120
Q26	There is adequate communication in my department.	0.0416	0.0114
Q33	Information Technology	0.0430	0.0104
Q35	Legal/Property Insurance	0.0415	0.0082
Q47	Senior management regularly communicates the direction/plans of the company	0.0354	0.0079
Q12	My company attracts and retains outstanding personnel.	0.0302	0.0059
Q54	My immediate supervisor assists me in identifying my training or personal development needs.	0.0288	0.0058
Q43	My immediate supervisor recognizes my extra efforts.	0.0450	0.0055
Q53	I receive adequate training to effectively perform my job.	0.0319	0.0052
Q49	Within the company, there are sufficient options for career growth and mobility.	0.0251	0.0052
Q11	My company has earned my loyalty.	0.0308	0.0051
Q20	My company provides me with a sense of job security.	-0.0340	0.0051
Q50	Hiring and promotion decisions are impartial.	0.0335	0.0050

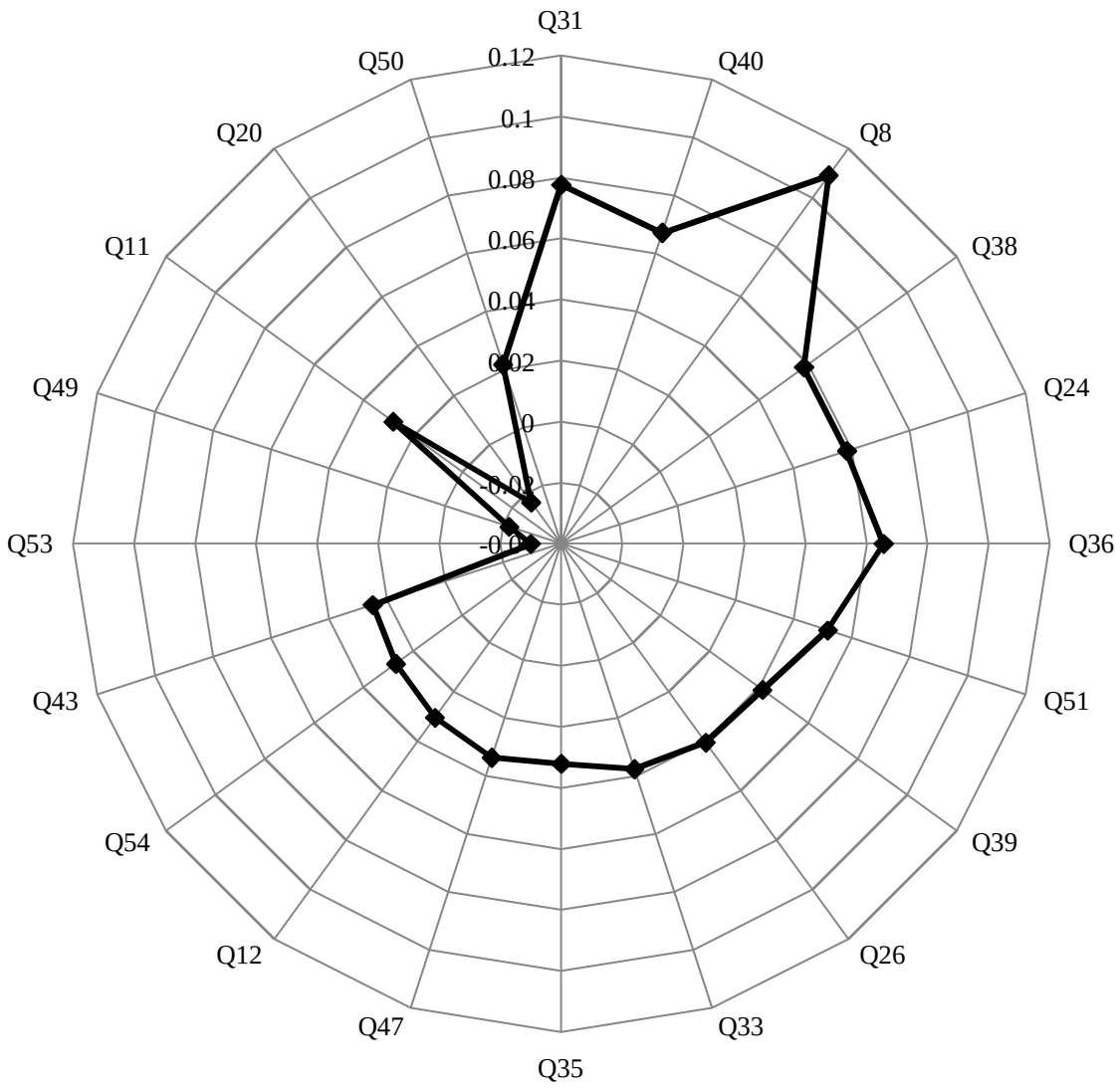

Figure 7.4: Simple Linear Regression for Y_3 – Referral to Others

Variable Q8 illustrates the degree of pride that an employee has in the community at which he or she works. This pride affects the likelihood of the employee referring someone to the community. Table 7.4 illustrates the corresponding legend to plots in Figure 7.4.

Table 7.4: Simple Linear Regression for Y_3 – Referral to Others

Variable	Description	Estimate of Response Variable	R-square
Q31	Ancillary Services	0.0776	0.0549
Q40	I am treated with fairness by my immediate supervisor.	0.0671	0.0290
Q8	I would recommend this community to someone seeking an apartment home.	0.1091	0.0262
Q38	My immediate supervisor trusts me.	0.0583	0.0189
Q24	I feel like I am an integral part of the team.	0.0584	0.0185
Q36	I understand what my immediate supervisor expects of me.	0.0656	0.0159
Q51	My performance reviews are helpful to me in improving my performance.	0.0518	0.0153
Q39	I trust my immediate supervisor.	0.0415	0.0125
Q26	There is adequate communication in my department.	0.0405	0.0114
Q33	Information Technology	0.0376	0.0101
Q35	Legal/Property Insurance	0.0321	0.0083
Q47	Senior management regularly communicates the direction/plans of the company	0.0337	0.0069
Q12	My company attracts and retains outstanding personnel.	0.0304	0.0066
Q54	My immediate supervisor assists me in identifying my training or personal development needs.	0.0269	0.0061
Q43	My immediate supervisor recognizes my extra efforts.	0.0249	0.0052
Q53	I receive adequate training to effectively perform my job.	-0.0300	0.0051
Q49	Within the company, there are sufficient options for career growth and mobility.	-0.0221	0.0046
Q11	My company has earned my loyalty.	0.0280	0.0045
Q20	My company provides me with a sense of job security.	-0.0233	0.0044
Q50	Hiring and promotion decisions are impartial.	0.0217	0.0043

7.3.3 Radar Diagramming Using Results from Neural Network

Although the Neural Network shows slightly different drivers of employee engagement as having more of an effect on resident satisfaction, as compared to the findings from the Statistical Analysis, it is important to note the communication of senior management (Q47 and Q42) is closely related to the communication between the supervisor and the employee. This relationship is illustrated in Figures 7.4 and 7.5. It is also important to note that the Neural Network recognizes the importance of senior management displaying a high degree of stability and communication regularly in the direction and plans of the company. When senior management openly communicates with supervisors and the message is transferred down through all levels of the organizational chart, employees feel as if they are part of the team and this teamwork translates into increased care and concern for the residents. Figure 7.6 demonstrates the lack of importance of training and personal development on a resident's decision to refer someone to his or her community. It is important to note that the low ranking of Q48 – employee's trust that senior management has the employee's best interest in mind – and Q36 – understanding of the immediate supervisor's expectation – should not be totally disregarded due to the limitations of the Neural Network and the limited data sample in which the model could be trained. These findings suggest further investigation into the hidden neurons that are affecting the output.

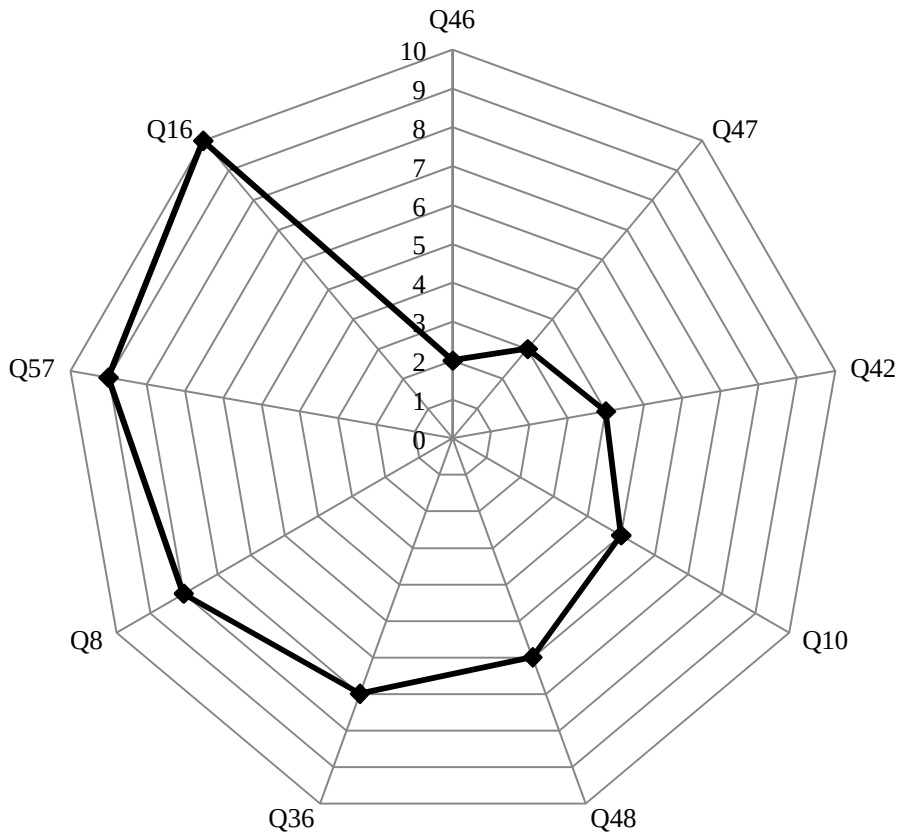

Figure 7.5: Neural Network Results for Y_1 – Overall Resident Satisfaction

Table 7.5 below illustrates the corresponding legend to plots in Figure 7.5.

Table 7.5: Neural Network Results for Y_1 – Overall Resident Satisfaction

Variable	Description	Rank
Q46	There is a high degree of stability among my company's leadership	1
Q47	Senior management regularly communicates the direction and plans of the company.	2
Q42	My immediate supervisor communicates clearly.	3
Q10	I am proud to work for my company.	4
Q48	I trust senior management has the company's best interest in mind.	5
Q36	I understand what my immediate supervisor expects of me.	6
Q8	I would recommend a company community to someone seeking an apartment home.	7
Q57	The benefits program has adequate choices to meet my needs.	8
Q16	I have enough authority to effectively perform my job.	9
Q54	My immediate supervisor assists me in identifying my training or personal development needs.	10

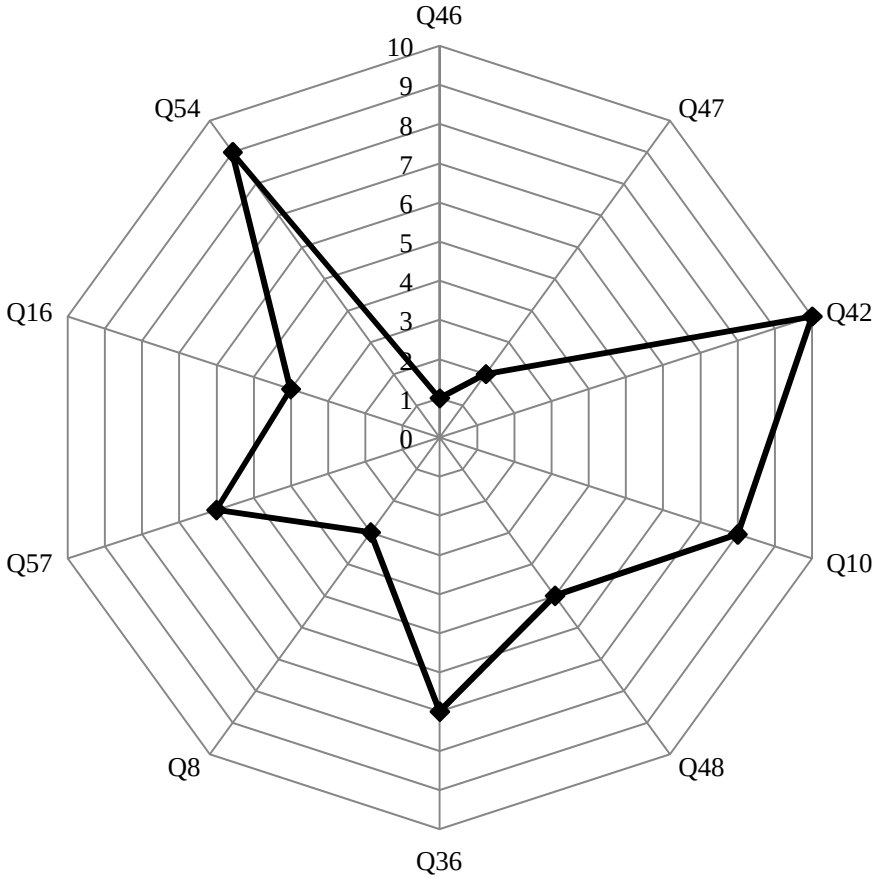

Figure 7.6: Neural Network Results for Y_2 – Intent to Renew

Table 7.6 below illustrates the corresponding legend to plots in Figure 7.6.

Table 7.6: Neural Network Results for Y_2 – Intent to Renew

Variable	Description	Rank
Q46	There is a high degree of stability among my company's leadership	1
Q47	Senior management regularly communicates the direction and plans of the company.	2
Q42	My immediate supervisor communicates clearly.	10
Q10	I am proud to work for my company.	8
Q48	I trust senior management has the company's best interest in mind.	5
Q36	I understand what my immediate supervisor expects of me.	7
Q8	I would recommend a company community to someone seeking an apartment home.	3
Q57	The benefits program has adequate choices to meet my needs.	6
Q16	I have enough authority to effectively perform my job.	4
Q54	My immediate supervisor assists me in identifying my training or personal development needs.	9

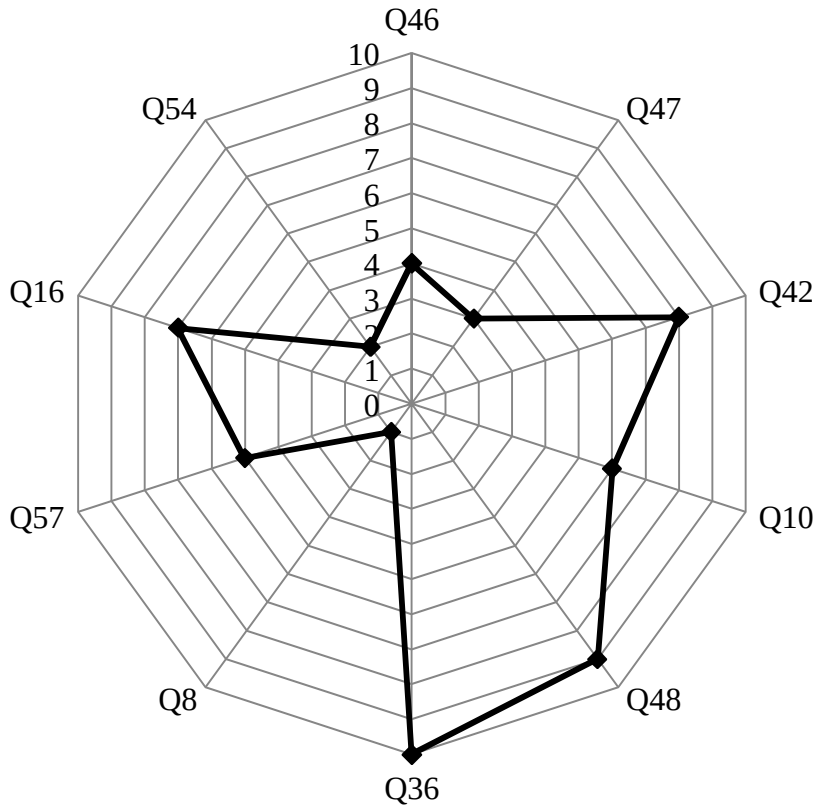

Figure 7.7: Neural Network Results for Y_3 – Referral to Others

Table 7.7 below illustrates the corresponding legend to plots in Figure 7.7.

Table 7.7: Neural Network Results for Y_3 – Referral to Others

Variable	Description	Rank
Q46	There is a high degree of stability among my company's leadership	4
Q47	Senior management regularly communicates the direction and plans of the company.	3
Q42	My immediate supervisor communicates clearly.	8
Q10	I am proud to work for my company.	6
Q48	I trust senior management has the company's best interest in mind.	9
Q36	I understand what my immediate supervisor expects of me.	10
Q8	I would recommend a company community to someone seeking an apartment home.	1
Q57	The benefits program has adequate choices to meet my needs.	5
Q16	I have enough authority to effectively perform my job.	7
Q54	My immediate supervisor assists me in identifying my training or personal development needs.	2

7.4 Summary

An overview of Radar Diagramming has been discussed, as well as strengths and weaknesses of using this graphical tool as a way of displaying the relationship between variables of employee engagement that affect resident satisfaction, intent to renew and the likelihood of a resident referring someone to their community. This exploration of Radar Diagramming summarizes that employee engagement and resident satisfaction are related to a composite of measures which lie at the heart of the organization. Issues that are important to employees and those that managers have influence over can have substantial implications for a further understanding of the true nature of employee engagement and its affect on resident satisfaction. Radar charts provide a useful method of graphically displaying those findings and provide a basis for comparison when communicating these relationships.

CHAPTER 8

PROBABILITY MODEL

8.1 Purpose

The previous chapter discusses the use of Radar Diagramming and how it can be an effective tool to graphically illustrate the relationship between drivers of engagement and their impact on resident satisfaction in the multi-family rental housing industry. To further explain this relationship, a third methodology is used to explore the non-linear and inconclusive relationship between employee engagement and resident satisfaction that results from the Statistical Analysis and Neural Network. In this chapter, a Probability Model is developed to determine the distribution of satisfied residents against an average employee engagement score. For a particular average engagement score, the percentage of satisfied residents can be determined out of a total of satisfied residents.

This chapter first describes the data set used in this research, and then a description of the Probability Model, as an alternative modeling technique, is provided, along with the results. Finally, the chapter concludes with a summary and discussion concerning the application and value in using this approach.

8.2 Data Set

Data for this research is drawn from two primary groups (employees and residents) of a multi-family housing firm. The data used in this research is obtained from a research firm specializing in the multi-family housing industry, as discussed in Chapter 3. The data is collected from a survey of 1,516 employees (referred to as “associates”) and 23,795 residents over a three-year period, from 2005 to 2007. The survey of

associates collects information on human resource policies and practices, firm characteristics, and overall levels of satisfaction. Residents are asked questions concerning their overall level of satisfaction, their likelihood to renew their lease, as well as their likelihood of referring someone to his/her community. Responses from both associates and residents are analyzed using three distinct methodological approaches. This chapter discusses the use of a Probability Model to analyze both resident and employee data within the multi-family housing industry. Used in conjunction with Statistical Analysis, as discussed in Chapter 4, and Neural Networks, the subject of Chapter 6, the intent of the Probability Model is to explain the non-linearity and the inconclusive results of the previous two modeling techniques. In the previous models, the failure to produce conclusive results creates the need to explore an alternative modeling technique, such as a Probability Model.

8.3 Probability Model

The Probability Model is an appropriate modeling tool that is able to specify the possible outcomes for a sample space, and provide assumptions which are based on the calculation of probabilities for events composed of those outcomes (Agresti and Franklin, 2006). In a differentiated environment, the probability that a stimulus *which has not been seen before* will be correctly recognized and associated to its appropriate class (the probability of correct generalization) approaches the same configuration as the probability of a correct response to the previously reinforced stimulus (Rosenblatt, 1958). Such a procedure amounts to a process of curve fitting and extrapolation, in the hope that the constants which describe one set of curves will hold good for other curves in similar

situations. A Probability Model, being derived from basic physical variables, is not specific to any one particular situation. In principle, it can be generalized to cover any form of behavior in any system for which the physical parameters are known. A Probability Model constructed on this foundation should be considerably more powerful than the other two which have been previously proposed (Lancet, Sadovsky & Seidemann, 1993). In this research, it will not only explain what behavior may occur in satisfied residents in a given property, but it becomes increasingly qualitative as they are generalized. In this specific case, a Probability Model can provide a description of the relation between two variables, X and Y, that are not deterministically related (Peck, et al., 2001). More generally, the proposed model provides a better understanding of the relationship between an average employee engagement score and the number of satisfied residents. Knowledge of the distribution of satisfied residents against employee engagement scores may help answer some basic questions related to satisfied residents. One important question is: *"At what point does an employee have to be engaged to ensure at least 70% of the satisfied residents"?*

8.3.1 Methodology

In order to construct a probability model, a threshold of resident satisfaction is set at 4 on a scale from 1 to 5; in this scale, 1 to 3 is not satisfied and any rating of 4 and above is satisfied. Then, the question of interest is: *"What is the distribution of average satisfied residents' satisfaction-score of a multi-family rental property for a particular value of average employee engagement-score X (on scale of 1-5)?"* To answer this question, the concept of a probability distribution is used to determine the probability distribution function for the survey data. The probability distribution function (PDF) for a

discrete random variable (average employee engagement score X in this case) is a function that assigns a probability to each value of the random variable. The probability that the random variable X assumes for any specific value x_i is the value of the PDF for x_i and is denoted P_x (x_i). Collectively, these discrete values x_i of X along with their associated probabilities constitute the probability distribution function (Wardrop, 1995). It satisfies the following conditions:

(i) $0 \leq P_x(x_i) \leq 1$ (8.1)

(ii) $P_x(x_i) = 1$ (8.2)

In which (i = 1, 2, 3, 4, 5)

In order to determine the probability distribution function (PDF), the Histogram Interpretation method is used (Sullivan, 2004). Probability histograms are constructed like relative frequency histograms, except the vertical axis represents the probability of a value of the random variable rather than its relative frequency (Sullivan, 2004). The most common form of the histogram is obtained by splitting the range of the data into equal-sized bins (called classes). Then, for each bin, the number of points from the data set that fall into each bin is counted. That is:

- Vertical axis: Frequency (i.e., counts for each bin) or the percentage values of occurrence.
- Horizontal axis: Response variable.

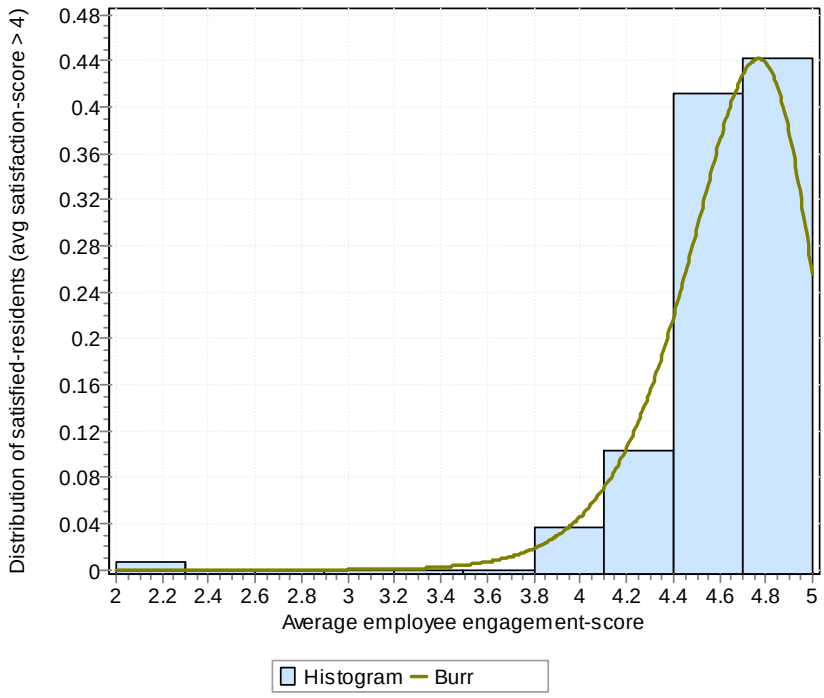

Figure 8.1: A Histogram of Left-Skewed Distribution (Survey data for Q54)

Once a histogram has been developed, its nature can then be studied to fit a probability distribution to the data set. As indicated in Figure 8.1, the distribution for Q54 is not symmetric and is left-skewed. A symmetric distribution is one in which the "two halves" of the histogram appear as mirror-images of one another. A skewed (non-symmetric) distribution is a distribution in which there is no such mirror-imaging. For skewed distributions, it is quite common to have one tail of the distribution considerably longer or drawn out relative to the other tail. A "skewed right" distribution is one in which the tail is on the right side. A "skewed left" distribution is one in which the tail is on the left side. The histogram above is for a distribution that is skewed left (Wardrop, 1995).

Skewed data often occur due to lower or upper bounds on the data. That is, data that have a lower bound are often skewed right, while data that have an upper bound are often skewed left. Skewness can also result from start-up effects. For example, in reliability applications, some processes may have a large number of initial failures that could cause left skewness. On the other hand, a reliability process could have a long start-up period where failures are rare, resulting in right-skewed data.

Once the data distribution has been obtained, it is necessary to determine the best-fit distribution by trying different commonly known skewed distributions, like Weibull, Gamma, Chi-square and Burr, depending on the shape of the distribution (Peck, et al., 2001). Using statistical analysis software, EasyFit, to analyze the shape, it is concluded that the Three-Parameter Burr Distribution is the most appropriate for fitting the data (Mathwave Technologies, 2009).

8.3.2 Three-Parameter Burr Distribution

The three-parameter Burr type distribution was first introduced in the statistical literature by Burr (1942), and has gained special attention in the past two decades due the importance of using it in practical situations. It has been applied in the areas of reliability studies and failure time modeling (Abd-Elfattah and Assar, 2005). Burr distribution is a continuous probability distribution for a non-negative random variable. It is also known as the Singh-Maddala distribution and is one of a number of different distributions sometimes called the "generalized log-logistic distribution" (Maddala, 1996). The Burr distribution has a flexible shape and controllable scale and location which makes it appealing to fit to data. It is frequently used to model insurance claim sizes and

household income (Tadikamalla, 1980). The parameters that determine the nature and shape of Burr distribution are as follows.

8.3.3 Parameters

A shape parameter is any parameter of a probability distribution that is neither a location parameter nor a scale parameter. Such a parameter must affect the shape of a distribution, rather than simply shifting it (as a location parameter does) or stretching/shrinking it (as a scale parameter does). A scale parameter determines the spread of a probability distribution. The larger the scale parameter, the more spread out the distribution. The location parameter determines where the origin will be located. The Three-Parameter Burr Distribution takes into account three parameters (two shape parameters and one scale parameter) to form a distribution function. The location parameter γ is zero for a Three-Parameter Burr Distribution. The parameters of the Burr distribution are as follows:

κ- continuous shape parameter ($\kappa > 0$)

α- continuous shape parameter ($\alpha > 0$)

β- continuous scale parameter ($\beta > 0$)

γ- continuous location parameter ($\gamma = 0$ yields the three-parameter Burr distribution)

The domain is defined as:

$$\gamma \leq x \leq +\infty \tag{8.3}$$

8.3.4 Probability Density Function

The concept of a population as a smooth curve is needed as a mathematical device to prove many of the results that can be used to obtain probabilities. The smooth curve corresponding to a population is called its probability density function and can be written as follows (Wardrop, 1995):

$$f(x) = \frac{\alpha\kappa\left(\frac{x}{\beta}\right)^{\alpha-1}}{\beta\left(1+\left(\frac{x}{\beta}\right)^{\alpha}\right)^{\kappa+1}} \tag{8.4}$$

8.3.5 Cumulative Probability Distribution Functions

The cumulative probability distribution functions for a random variable X is defined as the probability that the random variable is less than or equal to a specific value X (Wardrop, 1995). It is represented in the following equation:

$$F(x) = 1 - \left(1 + \left(\frac{x}{\beta}\right)^{\alpha}\right)^{-k} \tag{8.5}$$

As illustrated in Figures 8.2 through 8.21, the cumulative distribution function gives us a percentage of satisfied residents for a given less than or equal to employee engagement score; for example, if an employee engagement score is X, the model defines the least percentage of Y of the satisfied residents, which is the sum of the percentages of all satisfied residents for a score of less than or equal to X out of the total satisfied residents.

8.4 Results Using the Probability Model

The following figures illustrate the results using the probability model for each of the 10 drivers of engagement.

Q8 – I would recommend this community to someone seeking an apartment home.

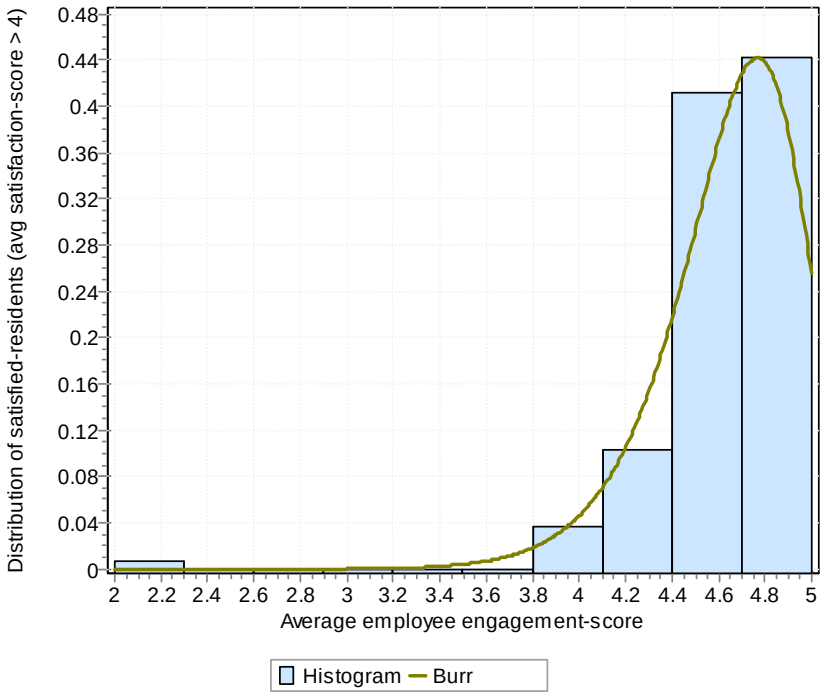

Figure 8.2: Probability Density Function for Q8

Parameters:

Burr (487.08, 19.122, 6.6078)
Mean: 4.6492
Mode: 4.7675
Variance: 0.09068

Figure 8.2 illustrates that the data for Q8 does not follow the usual trend as seen for other questions (engagement drivers). The Probability Density Function for Q8 does not exactly follow a Burr distribution, but to maintain the uniformity of results and allowing for the possibility that this may be an outlier data, it has been considered to be a Burr distribution and given the results for the same. The figure above also illustrates that the data is concentrated in a very small region (4-5) and, hence, the low variance. It also

means that a higher employee engagement score (>4) would lead to more satisfied residents recommending their community to someone seeking an apartment home.

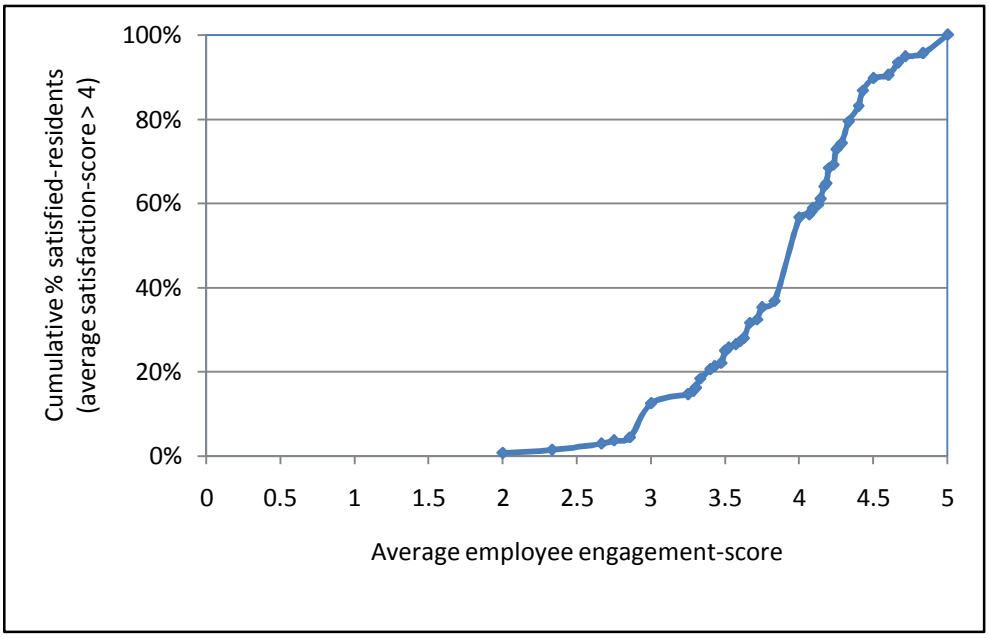

Figure 8.3: Cumulative Distribution Function for Q8

The results indicate that 40% of the satisfied residents had a corresponding average employee engagement score of 4.58 or below. A relatively small incremental increase to 4.84 could achieve 70% of the satisfied residents.

Q 24 – I feel like an integral part of the team.

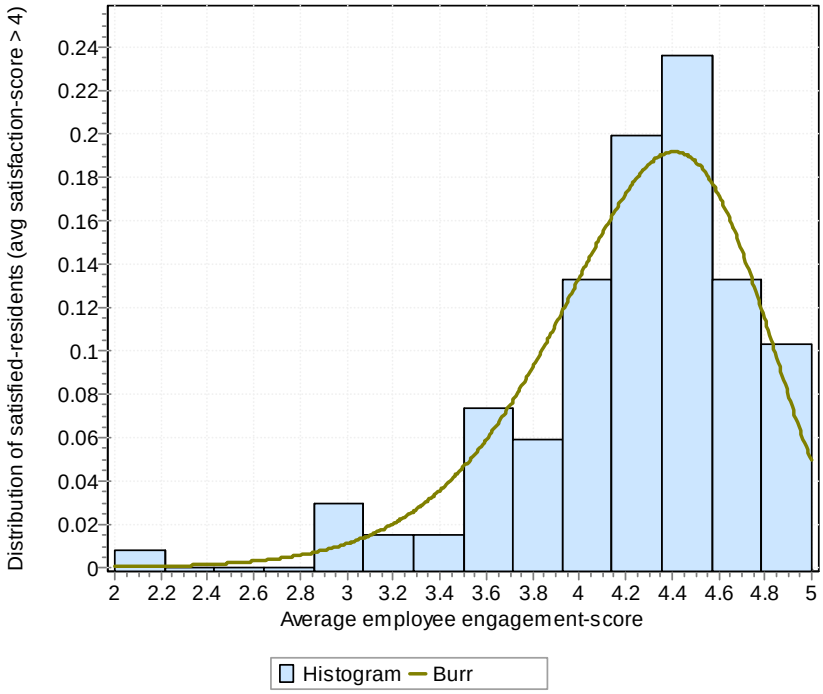

Figure 8.4: Probability Density Function for Q24

Parameters

Burr (399.73, 10.773, 7.7614)
Mean: 4.2478
Mode: 4.4105
Variance: 0.22726

Figure 8.4 illustrates that the data seems to be distributed over a wider range of employee engagement score, i.e. from 2 to 5, and the maximum number of satisfied residents are for score of X= 4.41. This also indicates that if an employee feels like part of the team, a team effort can lead to better resident satisfaction at all levels of employee engagement.

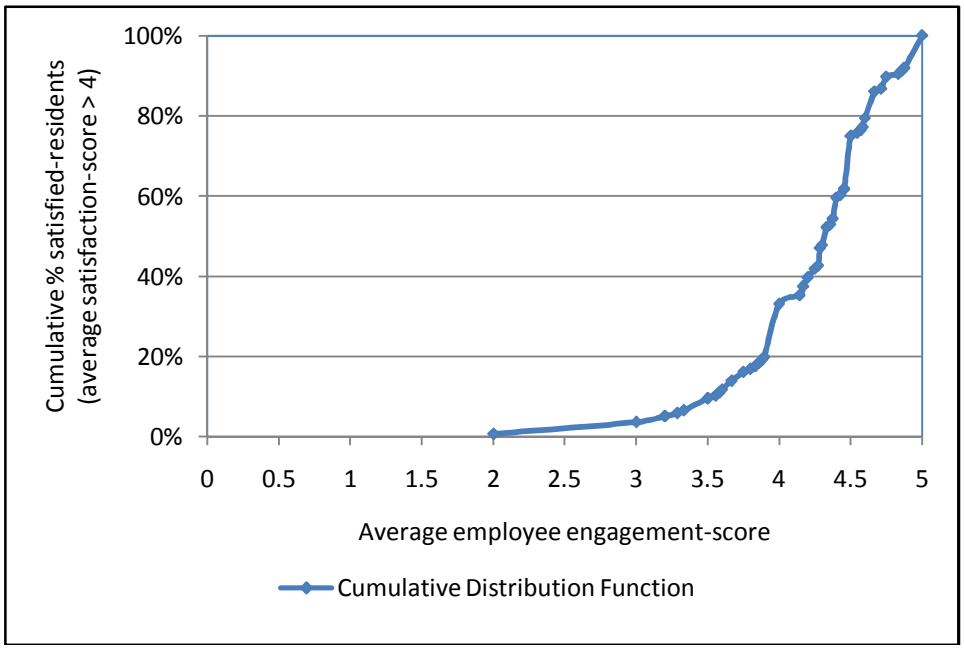

Figure 8.5: Cumulative Distribution Function for Q24

The results indicate that 40% of the satisfied residents had a corresponding average employee engagement score of 4.2 or below. It also demonstrates that a relatively small incremental increase to 4.48 (average employee engagement level) could achieve 70% of the satisfied residents.

Q 26 – There is adequate communication within my department.

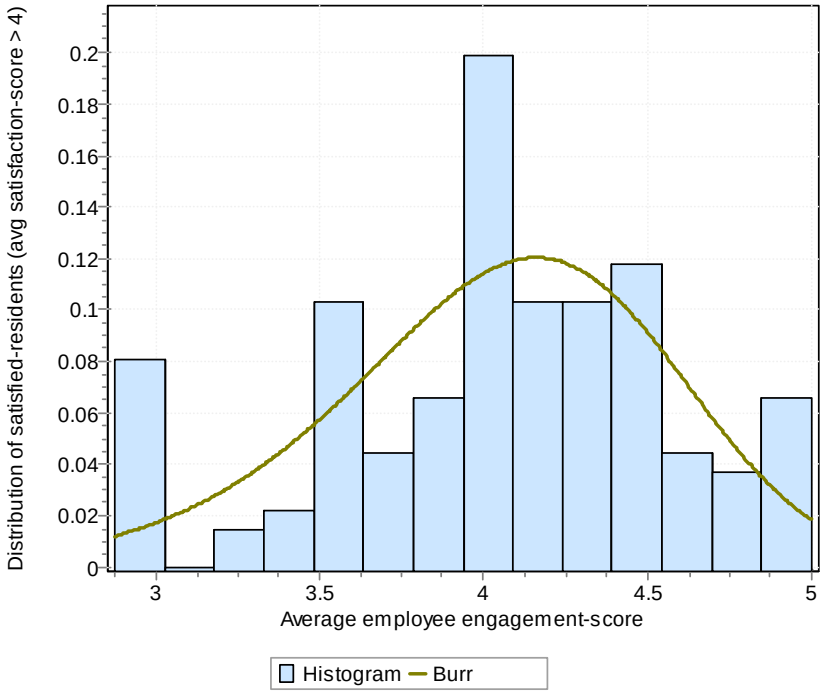

Figure 8.6: Probability Density Function for Q26

Parameters

Burr (6.1259, 9.7541, 5.074)
Mean: 4.0341
Mode: 4.16
Variance: 0.28422

Figure 8.6 illustrates that a fair number of residents seem to be satisfied for even a low rating of 3. This is more of a uniform distribution with a steep rise for the interval 3.9 to 4.1. An important observation is that good communication within the employee's department can lead to better resident satisfaction at all levels of employee engagement.

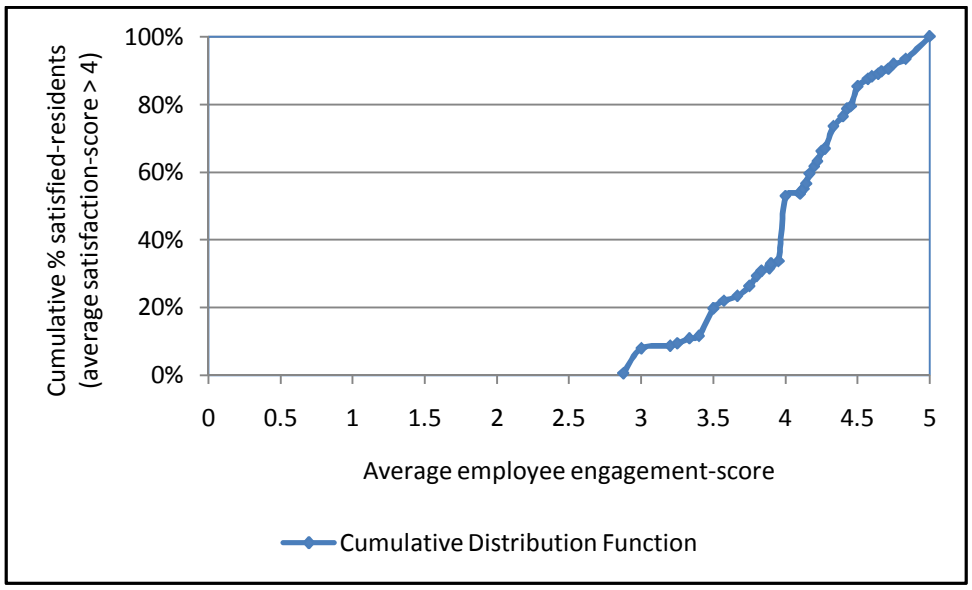

Figure 8.7: Cumulative Distribution Function for Q26

The results indicate that 40% of the satisfied residents had a corresponding average employee engagement score of 3.98 or below. A relatively small incremental increase to 4.3 average engagement score would result in 70% of the satisfied residents.

Q 36 – I understand what my immediate supervisor expects of me.

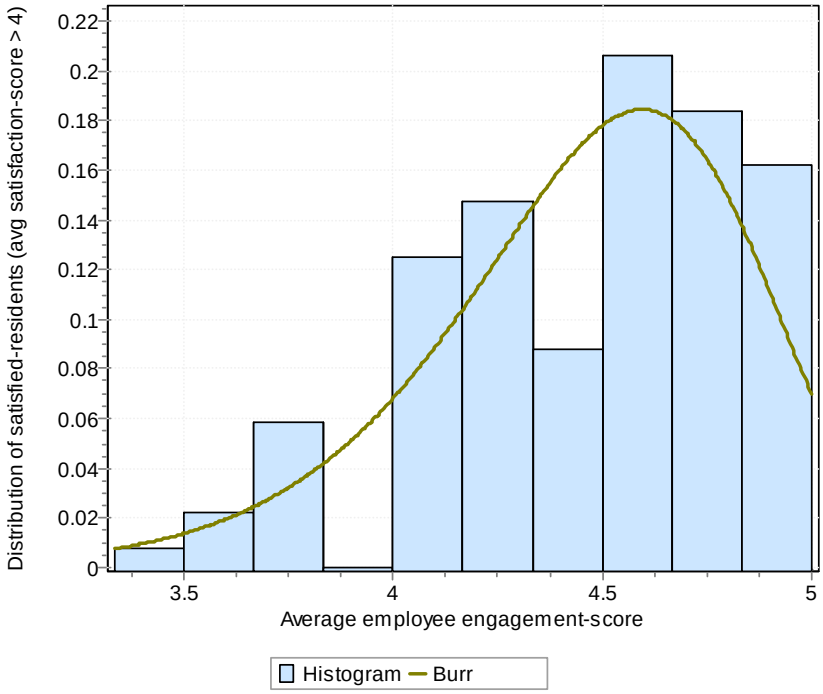

Figure 8.8: Probability Density Function for Q36

Parameters

Burr (188.68, 13.901, 6.7354)
Mean: 4.4514
Mode: 4.5952
Variance: 0.15388

Figure 8.8 illustrates a low variance distribution with a maximum number of satisfied residents lying in the intervals from 4 to 5. This indicates that an employee who has an idea of what is expected of him will make him do his job better, and that a corresponding engagement score ultimately leads to an improved resident satisfaction. This is only possible when there is a good understanding between the employee and the supervisor.

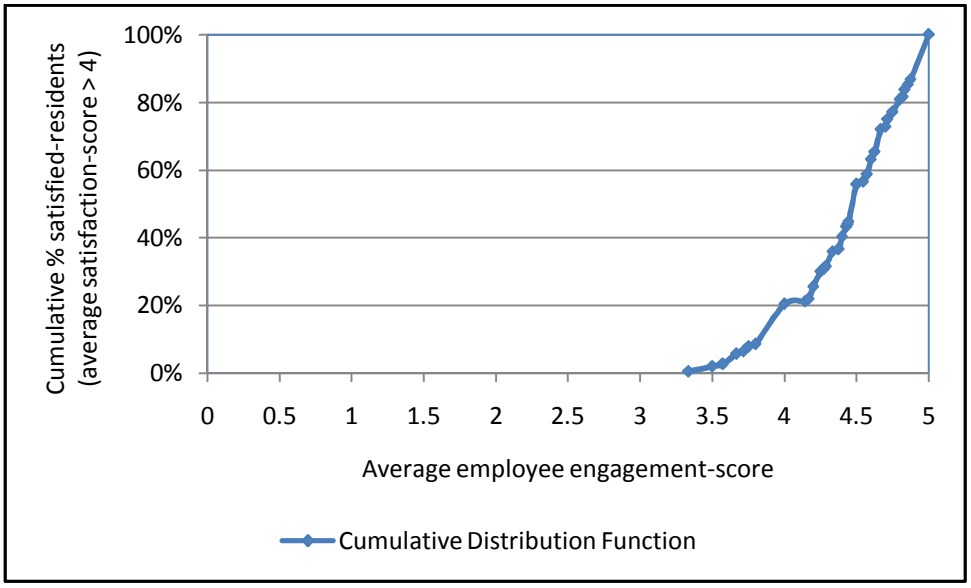

Figure 8.9: Cumulative Distribution Function for Q36

The results indicate that 40% of the satisfied residents had a corresponding average employee engagement score of 4.4 or below. It also demonstrates that a relatively small incremental increase to 4.64 (average engagement score) would result in 70% of the satisfied residents.

Q 38 – My immediate supervisor trusts me.

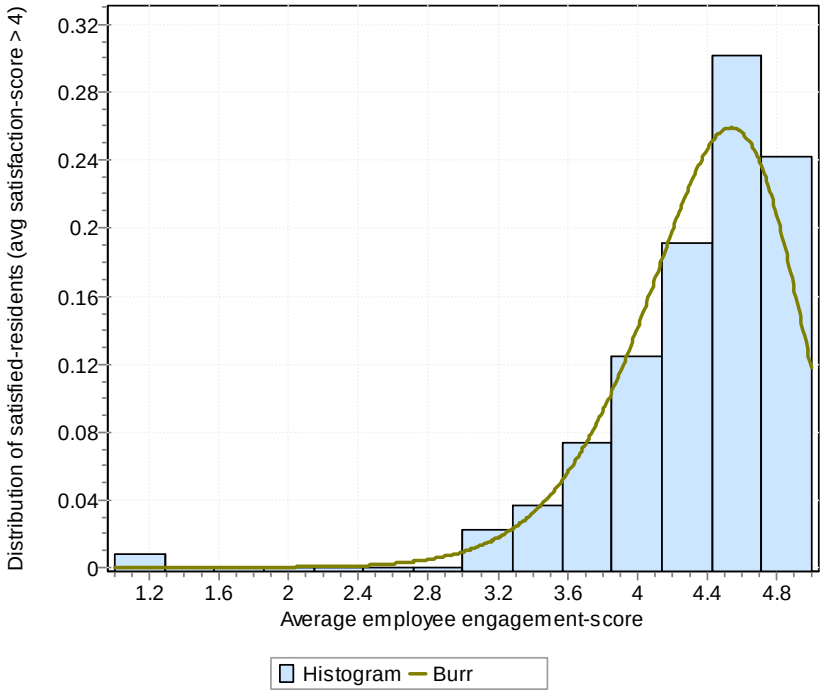

Figure 8.10: Probability Density Function for Q38

Parameters

Burr (479.09, 11.267, 7.919)
Mean: 4.3778
Mode: 4.5412
Variance: 0.22166

Figure 8.10 illustrates that the number of satisfied residents show a uniform increase with the increase in the employee engagement score X until 4.5, and there is a decrease in the number of satisfied residents with a corresponding employee engagement score of 4.5 and above. The more the trust between the supervisor and the employee, the higher the employee engagement score will be, resulting in an increase in resident satisfaction.

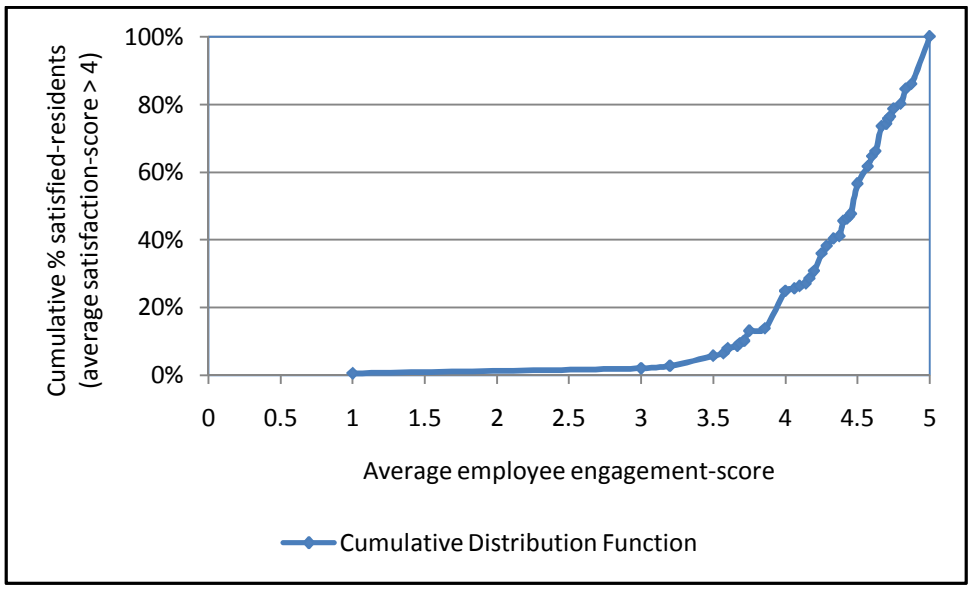

Figure 8.11: Cumulative Distribution Function for Q38

The results indicate that 40% of the satisfied residents had a corresponding average employee engagement score of 4.33 and below. It also demonstrates that a relatively small incremental increase to 4.65 (average engagement score) would result in 70% of the satisfied residents.

Q 39 – I trust my immediate supervisor.

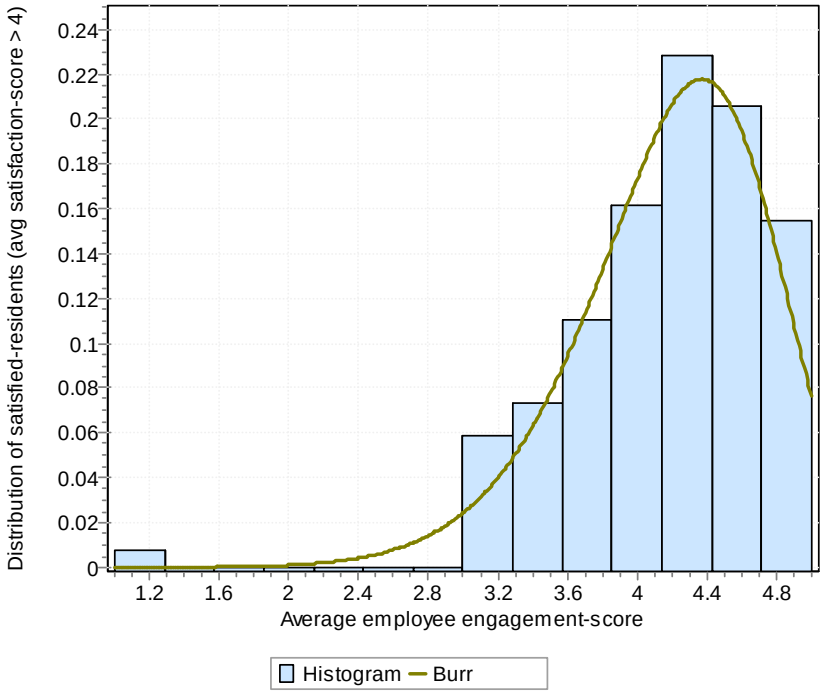

Figure 8.12: Probability Density Function for Q39

Parameters

Burr (366.14, 9.1318, 8.5407)
Mean: 4.1961
Mode: 4.3715
Variance: 0.30302

Figure 8.12 illustrates that the maximum number of satisfied residents lie in a range from 3 to 5, but some are even satisfied at a low engagement score of 1, which also increases the variance. The maximum responses (satisfied residents) are for X=4.2. The more trust between the supervisor and the employee, the more the employee engagement score increases and the higher the resident satisfaction, which is similar to results of Q38.

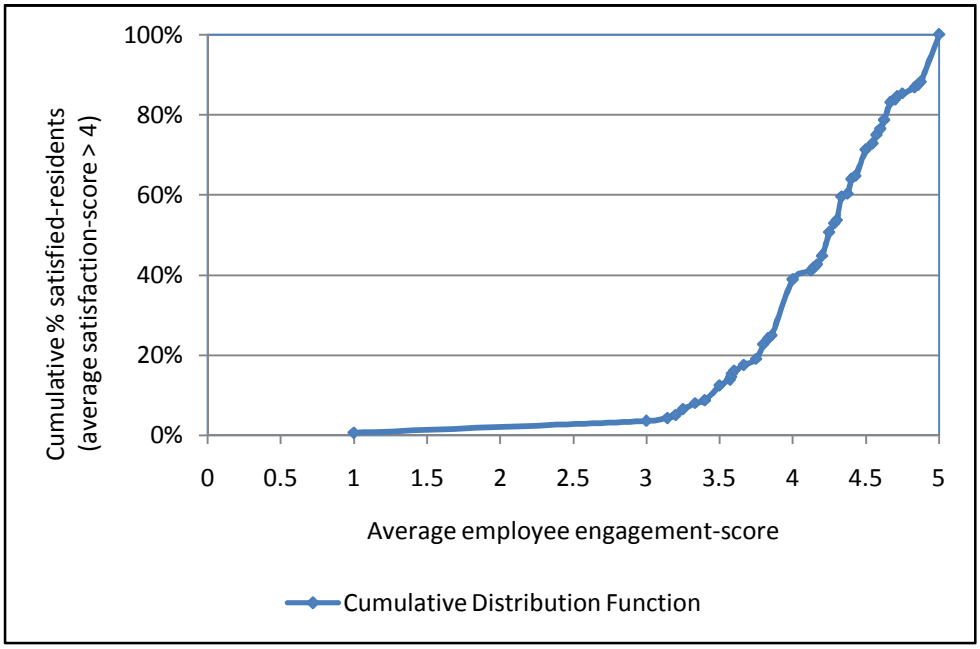

Figure 8.13: Cumulative Distribution Function for Q39

The results indicate that 40% of the satisfied residents had an average employee engagement score of 4.06 and below. It also demonstrates that an increase to 4.5 (average engagement score) would result in 70% of the satisfied residents.

Q 40 – I am treated with fairness by my immediate supervisor.

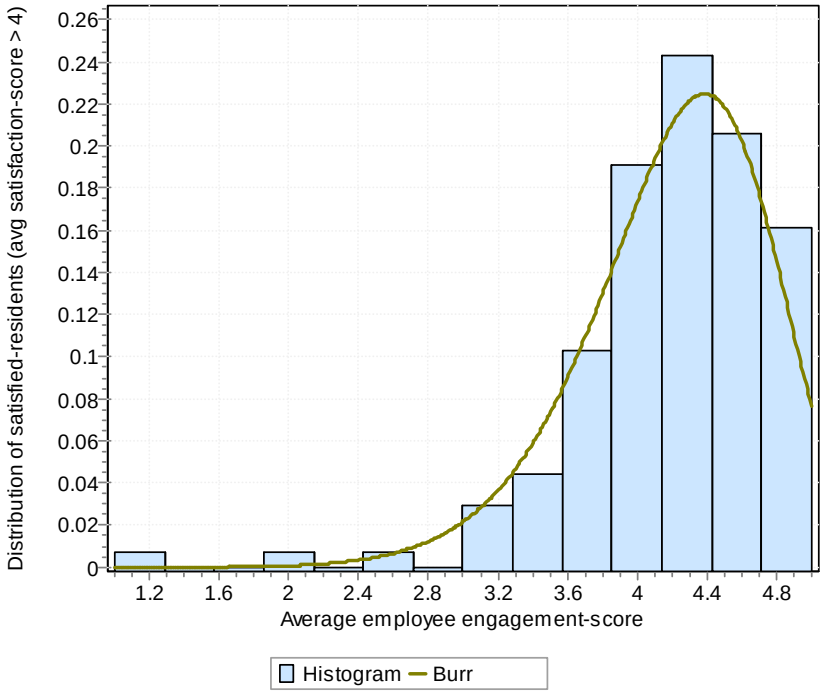

Figure 8.14: Probability Density Function for Q40

Parameters

Burr (587.86, 9.4547, 8.7144)
Mean: 4.2138
Mode: 4.3873
Variance: 0.28602

Figure 8.14 illustrates that the data seems to be more widely distributed with responses even at low engagement scores of 1, 2, and 2.5. But the maximum responses (satisfied residents) are still in the range from 3 to 5, which could indicate that being treated with fairness leads to a better employee engagement score and an improved resident satisfaction.

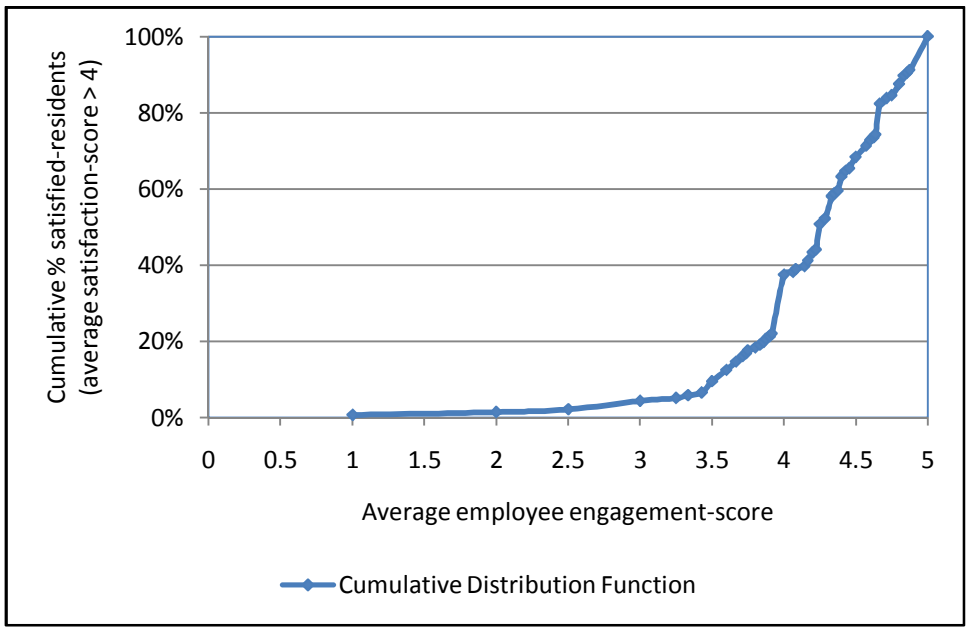

Figure 8.15: Cumulative Distribution Function for Q40

The results indicate that 40% of the satisfied residents had a corresponding average employee engagement score of 4.14 and below. It also demonstrates that a relatively small incremental increase to 4.55 (employee engagement level) would result in 70% of the satisfied residents.

Q 42 - My immediate supervisor communicates clearly.

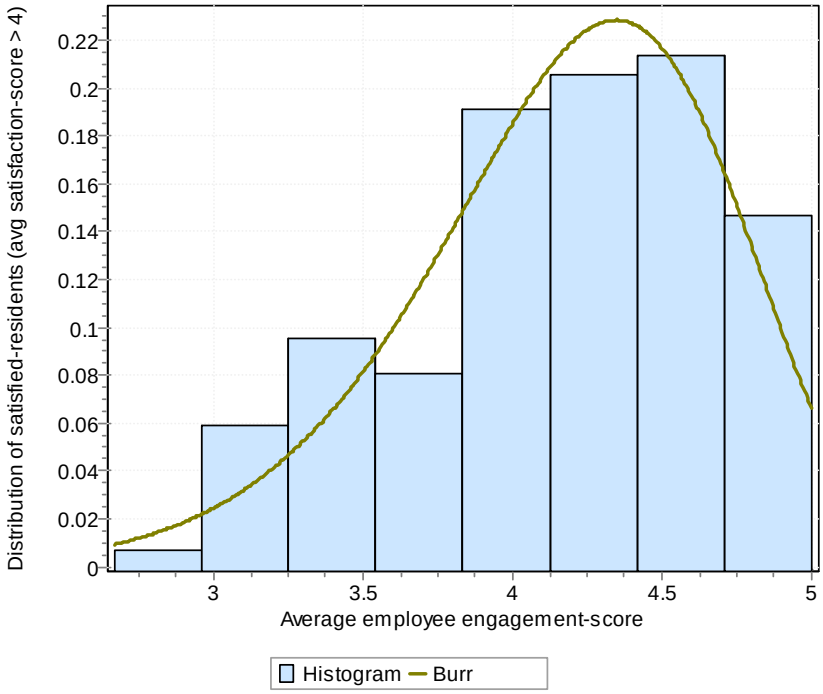

Figure 8.16: Probability Density Function for Q42

Parameters

Burr (259.21, 9.3249, 7.9825)
Mean: 4.1728
Mode: 4.3451
Variance: 0.28832

Figure 8.16 illustrates a more or less equal number of satisfied residents for an employee engagement score range from 4 to 5 and the range of responses vary from 2.8 to 5, which indicates a good level of communication between the employee and the supervisor ultimately leads to better resident satisfaction.

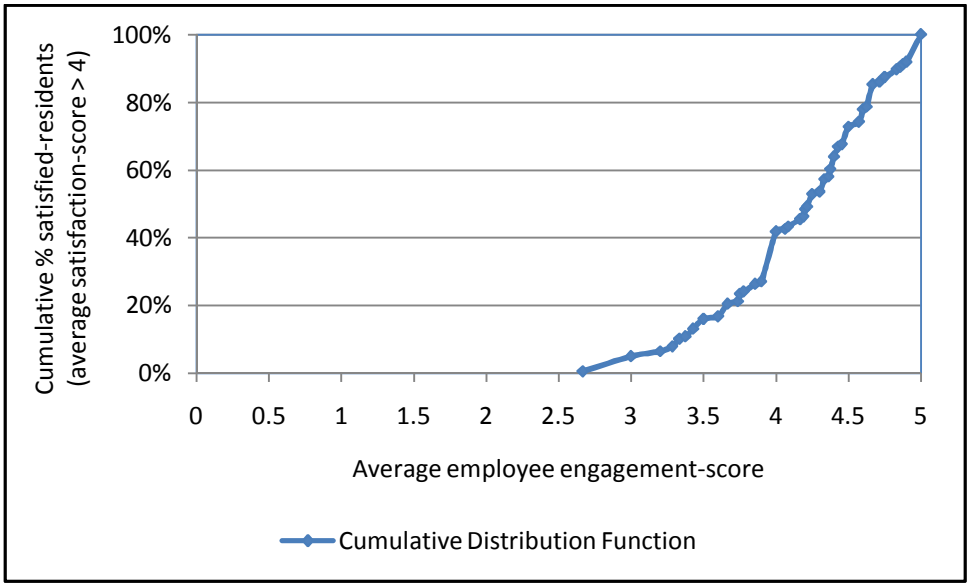

Figure 8.17: Cumulative Distribution Function for Q42

The results indicate that 40% of the satisfied residents had a corresponding average employee engagement score of 4.0 and below. It also demonstrates that an increase to 4.47 (employee engagement level) would result in 70% of the satisfied residents.

Q 43 – My immediate supervisor recognizes my extra efforts.

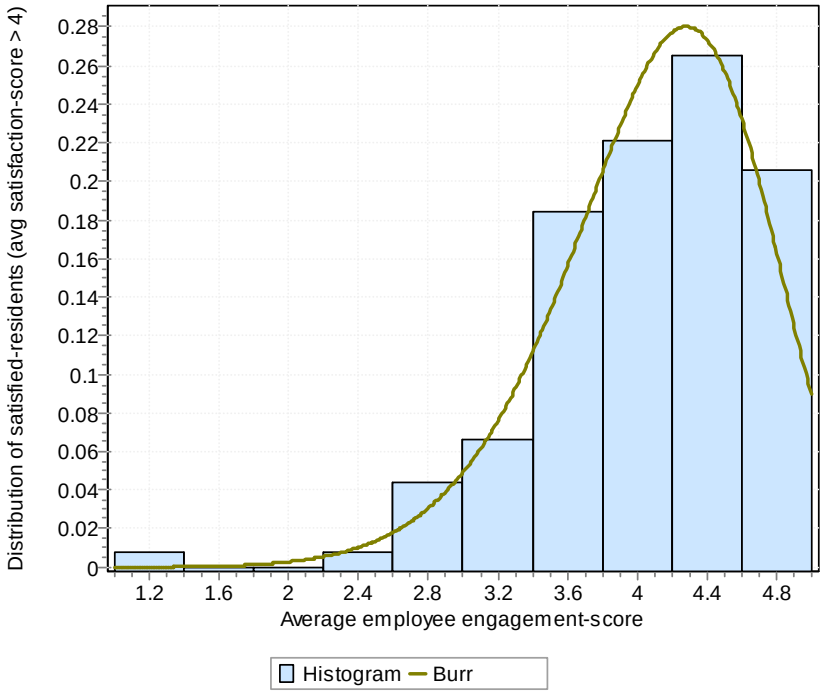

Figure 8.18: Probability Density Function for Q43

Parameters

Burr (391.96, 8.2276, 8.988)
Mean: 4.1027
Mode: 4.2817
Variance: 0.35224

Figure 8.18 illustrates that the satisfied residents seem to be distributed over a wider range of employee engagement scores, with a majority of residents concentrated in the range from 2.5 to 5 and a few of them even at a low engagement score of 1. The maximum number of satisfied residents are for X= 4.1. This higher variance of the data indicates that employee efforts are recognized at all levels.

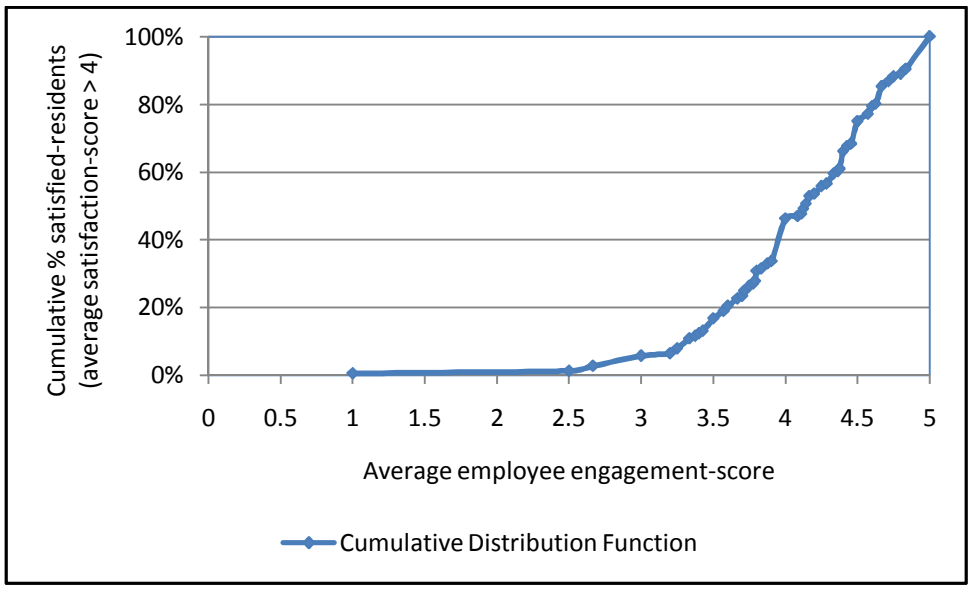

Figure 8.19: Cumulative Distribution Function for Q43

The results indicate that 40% of the residents satisfied had a corresponding average employee engagement score of 3.95 and below. It also demonstrates that a relatively small incremental increase to 4.47 (employee engagement level) would result in 70% of the satisfied residents.

Q 54 – My immediate supervisor communicates clearly.

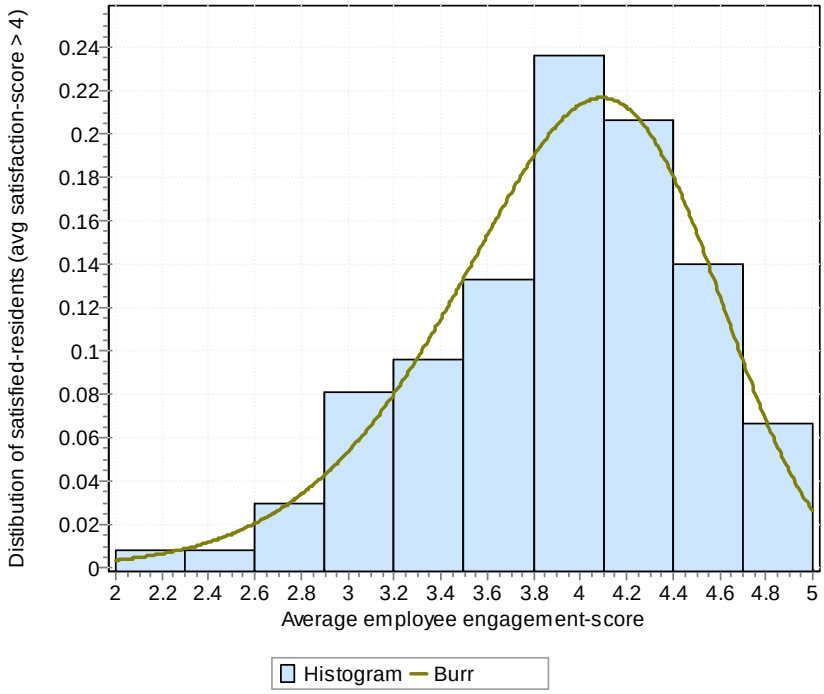

Figure 8.20: Probability Density Function for Q54

Parameters

Burr (202.8, 8.1073, 8.0135)
Mean: 3.923
Mode: 4.0942
Variance: 0.33162

This a good distribution with responses ranging from 2 to 5 and more uniformly distributed with the mean (3.92) close to mode (4.09). This also indicates a better communication between the supervisor and the employee at all levels of engagement score, which also leads to better resident satisfaction.

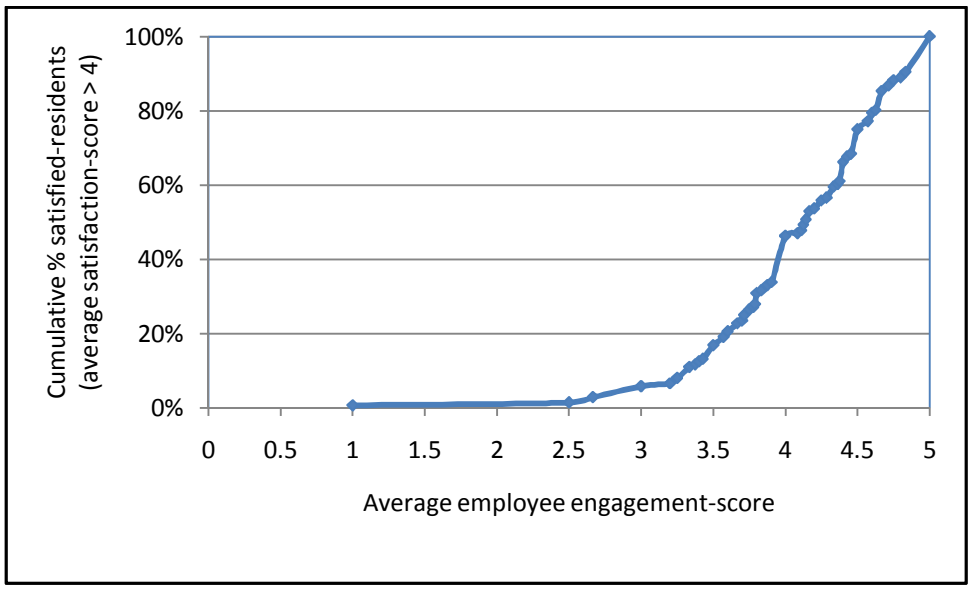

Figure 8.21: Cumulative Distribution Function for Q54

The results indicate that 40% of the satisfied residents had a corresponding average employee engagement score of 3.9 and below. It also demonstrates that a relatively small incremental increase to 4.23 (employee engagement level) would result in 70% of the satisfied residents.

Table 8.1: Minimum Values for Engagement Drivers (on a scale of 1-5)

Question	At least 40% Satisfied Residents	At least 70% Satisfied Residents	Difference
Q40	4.14	4.55	0.41
Q38	4.33	4.65	0.32
Q8	4.58	4.84	0.26
Q24	4.20	4.48	0.28
Q36	4.40	4.64	0.24
Q26	3.98	4.3	0.32
Q39	4.06	4.5	0.44
Q42	4.00	4.47	0.47
Q43	3.95	4.47	0.52
Q54	3.90	4.23	0.33

Table 8.1 shows the minimum values for each Engagement Driver to get at least 70% and 40% of the satisfied residents. It is important to note that the minimum level of engagement for the top 10 drivers of engagement is at least 3.9, in order to get 40% of the satisfied residents; if the level of engagement is 4.23, this will result in 70% of the satisfied residents.

8.5 Summary

A Probabilistic Model is one of the most informative yet simplest techniques for evaluating distributional assumptions, and has become more popular in recent years when attempting to explain non-linearity (Shapiro and Gross, 1981). While correlation and regression both indicate association between variables, correlation studies assess the strength of that association. In this case, the use of a Probabilistic Model is used to demonstrate the distribution of the satisfied residents' satisfaction-score for a particular average level of employee engagement-score. The next chapter, Chapter 9, concludes this study with a summary, discussion of the contributions, and recommendations for future research.

CHAPTER 9

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS FOR FUTURE RESEARCH

9.1 Purpose

The objectives of this research were: 1) To identify and classify characteristic drivers of a multi-family rental property employee engagement and its affect on residents satisfaction; and 2) To develop an Employee Engagement Model (EEM) that allows multi-family apartment rental property owners and managers to determine the distribution of the satisfied residents for a given average level of employee engagement score. This research utilizes statistical, neural network, and probability modeling techniques for developing the EEM. This has particular relevance as the multi-family housing industry continues to struggle to find new ways to reduce employee turnover, maximize employee engagement and increase resident satisfaction.

This chapter first summarizes the research process used to investigate employee engagement, as it relates to resident satisfaction in the multi-family housing industry. Conclusions are drawn from an extensive review of literature, feedback from an expert panel, and findings from Statistical Analysis, Neural Network and Probability Modeling.

9.2 Summary

This research was divided into nine chapters. Chapter 1 described the industry challenges, provided a comprehensive background study, and presented a problem statement which formed the objective of the study. A comprehensive review of related literature was conducted and included in Chapter 2, along with the results of feedback gathered from a panel of experts to define variables that affect resident satisfaction.

Thirty-five factors that contribute to employee engagement appeared in the review of more than 400 articles in the areas of human resources, psychology, management, real estate, and housing. The frequency of these factors were organized and ranked from highest to lowest and then were used to form a composite list of 15 factors that contribute to employee engagement.

Chapter 3 outlined the research methodology used in this research and discussed the data that was analyzed in this research. The data was obtained from a consulting firm that serves the multi-family housing industry. The data set included 1,516 employee responses and 23,795 residents over a three-year span, from 2005 to 2007. Responses from the employees were matched to the responses from the residents, which created 152 communities that were then analyzed. Three modeling techniques were used with the data. The techniques included Statistical Analysis, Neural Network, and Probability Modeling. Findings from these techniques form the Employee Engagement Model. Chapters 4 and 5 explained the statistical analysis; specifically, Simple Linear Regression, Cumulative Logistic Regression and Weighted Multiple Linear Regression were used to analyze the data and test the level of significance for each driver of engagement. The numerical model was developed and validated, along with a final set of sensitivity analysis, which served as validation for the results of the top 10 drivers of engagement.

Chapter 6 described how a Neural Network was used to analyze the relationship between the variables and explore the impact of these variables on resident satisfaction. Findings from these modeling techniques resulted in inconclusive evidence concerning the relationship between drivers of employee engagement and its impact on resident

satisfaction. After training the model using a portion of the data and validating the model utilizing the remaining data, the Neural Network was found to not be robust enough to make significant conclusions about the relationship between the drivers of engagement and resident satisfaction, intent to renew, or the likelihood of someone referring a person to his or her community.

Chapter 7 on Radar Diagramming further confirmed the findings from the Statistical Analysis and Neural Network by graphically illustrating the variables and their relationship by forming patterns in the shape of a polygon. Chapter 8 described the use of a probability model that demonstrates the distribution of the satisfied residents for a particular average score of employees' engagement rating for a given property. In this chapter, a Probability Model, as an alternative modeling technique, was used to explore the non-linear and inconclusive relationship between employee engagement and resident satisfaction that resulted from the Statistical Analysis and Neural Network.

9.3 Conclusions

This research resulted in several conclusions, the first of which was that the following hypothesis was confirmed: *the relationship between an average percentage of satisfied residents satisfaction-score and average level of employee engagement-score is a Burr Distribution with a skewness to the left.* It was concluded that all three objective functions of residents satisfaction, including: Y_1 = Resident Satisfaction, Y_2 = Intent to renew, and Y_3 = Likelihood of referring someone to his/her community, had a positive coefficient of correlation with key employee engagement drivers. The correlation coefficients indicated that Q40, which is "Immediate Supervisor- I am treated with fairness by my immediate supervisor", is most highly correlated with Y_1, Y_2, and Y_3.

Similarly, these findings revealed that the next significant variable is Q38, which is "Immediate Supervisor – My immediate supervisor trusts me." The results of this research indicated the p-values for Y_1 range from 0.0029 to 0.3911. The p-values for Y_2 range from 0.0189 to 0.3689 and the p-values for Y_3 range from 0.0372 to 0.3819. The p-value is used to measure the significance of an explanatory variable, the lower the p-value, the greater the significance of the variable.

The second conclusion found that the 10 characteristic drivers of employee engagement identified in this research, as shown in Table 9.1, were in conformance and consistent with drivers identified by other researchers from the retail, banking, hospitality, and health care industries. It was found that the level of attachment that an employee has to the organization was one of the most common drivers of engagement among all industries, including the multi-family housing industry. Communication was another key driver of engagement that is significant, followed closely by the relationship between the employee and his/her supervisor. A clear understanding of what is expected of the employee from the supervisor was also a major driver of engagement. Supervisors who foster a supportive work environment by displaying concern for employees' needs and feelings by providing positive feedback and recognizing the discretionary efforts of their employees equated to greater satisfaction among residents. Table 9.1 describes the top 10 significant drivers identified in this research. It also provides an employee engagement level for each of the 10 drivers which has a corresponding 40% of the satisfied residents. These 10 drivers were categorized by their relationship to immediate supervisor, work culture and team.

Table 9.1: Top Ten Common Drivers of Engagement and the Level of Engagement for Overall Resident Satisfaction

Number	Engagement Driver	Category	Description	At Least 40% Satisfied Residents	At Least 70% Satisfied Residents	Difference
1	Q40	Immediate Supervisor	I am treated with fairness by my immediate supervisor.	4.14	4.55	0.41
2	Q38	Immediate Supervisor	My immediate supervisor trusts me.	4.33	4.65	0.32
3	Q8	Culture	I would recommend this community to someone seeking an apartment home.	4.58	4.84	0.26
4	Q24	Team	I feel like an integral part of the team.	4.20	4.48	0.28
5	Q36	Immediate Supervisor	I understand what my immediate supervisor expects of me.	4.40	4.64	0.24
6	Q39	Immediate Supervisor	I trust my immediate supervisor.	3.98	4.30	0.32
7	Q26	Team	There is adequate communication within my department.	4.06	4.50	0.44
8	Q54	Immediate Supervisor	My immediate supervisor assists me in identifying my training or personal development needs.	4.00	4.47	0.47
9	Q42	Immediate Supervisor	My immediate supervisor communicates clearly.	3.95	4.47	0.52
10	Q43	Immediate Supervisor	My immediate supervisor recognizes my extra efforts.	3.90	4.23	0.33

A third conclusion of this research revealed that the Neural Network produced inconclusive results for the following reasons: 1) The data set was too small to accurately

train the model; 2) The model was over parameterized due to the high concentration of satisfied or very satisfied residents; and 3) The responses were coded using a Likert Scale, rather than simply a "yes" or "no" answer. Future research should consider these limitations.

A fourth conclusion of this research was, while one single variable (driver) of employee engagement is not statistically significant, the combination of two or more drivers acting in concert with one another affected resident satisfaction. For example, Q38 and Q40 both related to the interaction with the employee's supervisor, and combined have an effect on resident satisfaction. These findings agreed with both the expert panel and other noted researchers, such as Heskett, et al. (1997), who explored the linkage between employee and customer satisfaction. These researchers also found a strong correlation between employee engagement and employee perceptions of their own capability to deliver service in what is called the Service Profit Chain. These findings also agreed with a 1997 meta-analysis by Gallup Organization that found engaged and satisfied employees were positively related to customer satisfaction (Harter, et al., 2002).

A fifth conclusion of this research was that average employee engagement levels of employees for the top 10 drivers must be a minimum of 3.9 to achieve 40% of the satisfied residents. The results also showed that a small incremental increase can result in 70% of the satisfied residents. By using a probability model, owners and managers can determine the distribution of satisfied residents for a particular average level of employee engagement. This probability model could provide more conclusive results than other methodological approaches.

9.4 Strengths and Limitations of the Model

This employee engagement model has both strengths and limitations. The first strength is that this research has a strong underpinning of background studies, along with an expansive list of factors that contribute to employee engagement. These findings from a wide range of industries lay the groundwork for the hypothesis that guided the analytical portion of this study. Further, this model is strengthened by the input of an expert panel within the multi-family housing industry, which concentrated on the specific needs and concerns of this sector. Reflecting on the trends in the multi-family housing, such as increased employee turnover and rising operating costs in the areas of salaries and personnel, raises questions around ways to improve the entire talent management process, in order to increase organizational effectiveness and improve business outcomes. Results from this research indicated a collective association between engagement and resident satisfaction and identified 10 key drivers of employee engagement to further describe this relationship. Previously, the number of existing studies that measure engagement and that examine relationship between employment engagement and resident satisfaction has been very limited, particularly within this sector. The findings in this research now offer academicians a model in which to build further studies around engagement within the multi-family housing industry. This research also offers industry practitioners new information on which to develop talent management processes that contribute to higher levels of resident satisfaction and, ultimately, a more favorable bottom line.

A limitation of the model is that it represents a macro vs. micro model, since the data comes from only one organization and uses a self-reported survey instrument. The

dataset, as described previously, was drawn from research firm specializing in the multi-family housing industry; the data was drawn from employees and residents affiliated with the same multi-housing company based in the Southeast. Results should be interpreted cautiously given the limitations inherent in this study. First, analyzing relationships among particular categories of variables is difficult; therefore, it is assumed that these variables are independent of each other. It is difficult to determine if the covariance among the variables is attributable to valid relationships, since the vast majority of all residents in this study are satisfied. The scaling may be different with other companies. In this company a scale of 1-5 was used and the vast majority of respondents ranged from satisfied to very satisfied. This could be different in other companies. As noted earlier, the Neural Network produced inconclusive results because the data set was too small to accurately train the model, and because the responses were coded using a Likert Scale, rather than simply a "yes" or "no" answer.

Another limitation of the EEM model, more specifically, the primary predictor variable of resident satisfaction (Q31 – Ancillary Services) was not included as part of this model. It related to the manner in which residents are billed for services, such as cable, water and garbage. Another limitation of this study was that the large number of corporate employees that contribute to the overall development of the organization's culture were not included in this analysis, since these employees could not be matched to a particular property.

9.5 Recommendations for Future Research

Results from this research showed that a relationship exists between employee engagement and resident satisfaction. Future research should focus on which positions

within the on-site management team of a multi-family housing community have a higher impact on resident satisfaction. Findings also indicate that the tenure of the on-site staff impacts resident satisfaction. Even more basically, research should be undertaken to understand the importance of the maintenance staff and their impact on resident satisfaction. Research should be expanded to consider which job functions and positions contribute more to overall resident satisfaction, and which lead to decreased satisfaction levels. Questions regarding the impact of personal service by a leasing consultant versus on-line rental options should also be raised, particularly considering the increased reliance on Web-based sales and marketing.

Specific drivers of engagement that affect resident satisfaction are identified in this research; however, the cost associated with increasing engagement was not explored and would add a valuable contribution to this body of knowledge. In addition, other factors, such as ancillary services, design features of the actual units, and management procedures regarding technology interface, as well as the location of the property, should also be considered for future research and should be integrated into the current model. It is recommended that a correlation analysis be conducted between human resource practices and organizational processes relating to customer service and retention, particularly in the area of training, work force deployment and staff allocation among properties. Strategic studies around the impact of supervisor training and team development should also be considered. Questions that broaden the knowledge base around issues, such as training, performance review, hiring, testing, job description, managerial consistency, employee commitment, product loyalty, and service satisfaction, can further expand the impact of management practices on organizational outcomes.

The organization (work environment) is a powerful influence in the area of employee engagement. Companies can make improvements to bridge the gap between the discretionary effort people want to invest and how effectively organizations tap into and channel their commitment and energy. Further research should examine the means, and the affiliated costs, of bridging this gap. There is no one "perfect model" for a high performance work culture; however, if organizations within the multi-family housing sector focus on specific drivers of engagement and tap into employees' discretionary effort, employees will go the "extra mile" and this increased engagement will be reflected in responses by the customer; in this research, these responses are measured in resident satisfaction, intent to renew and referrals.

The model presented in this dissertation identified 10 drivers of engagement that affected resident satisfaction. These engagement drivers should be shaped and focused to create a high performance culture that supports the execution of business strategy. The model also offered a basis for understanding how employee engagement levels affect resident satisfaction. As multi-family housing owners and managers fine tune their organizational processes, they are now equipped with a model that predicts the likelihood of resident satisfaction for a particular level of employee engagement. This new knowledge provides a model for owners and managers to use to increase resident satisfaction by creating a competitive advantage through improved processes specifically in the areas of human resource strategies, such as talent management. As a result of this research, multi-family owners and managers now have a tool that can strengthen the bond between their employees and residents, especially satisfaction levels which can, in turn,

dramatically influence important business outcomes, one of which is increased financial performance.

APPENDIX A

REVIEW OF LITERATURE MATRIX
FACTORS THAT CONTRIBUTE TO ENGAGEMENT

			Employee Engagement Variables																																		
			Clear Expectations	Proper Equipment	"Opportunity to do my best"	Recognition/Praise	Concern/Caring Environment	Professional Development/Training	Feedback "opinions count"	Sense of Purpose "Worthwhile"	Quality Work	Friends at Work	Performance Evaluation	Opportunity to Grow	Trust	Values	Emotions/Emotional	Compensation/Pay/Benefits/Health/Medical	Employee Incentives	Culture	Job Fit	New Hire Development/Employee	Sense of Security	Intrinsic Motivation	Employee/Employer Collaboration	Supervisor/Leader	Working Conditions	Community Involvement	Teamwork	Work / Life Balance	Support for Diversity	Strategic Management	Commitment to Employees	Systems	Open Communication	Longevity / Tenure	Workplace Design
Tab#	**Source**	**Methodology**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
1	Abma (2007)	Employee Survey				1											1				1							1									
2	Bacal (2004)	Journal Article													1										1								1				
3	Banks (2206)	Case Study-Firestar	1					1										1	1		1					1			1	1	1						
4	Barling & Frone (2003)	Book-Psychology of Workplace Safety											1																					1			
5	Baruch (1999)	Study/Comparative Analysis							1								1									1				1							
6	Bassi (2007)	Likert Survey-HBR												1							1					1				1				1			
7	Berry (2006)	Case Study-Intercontinental Hotel											1											1		1							1				
8	Beslin & Reddin (2006)														1																						
9	Bliese & Castro (2000)	Study Sample			1						1							1				1							1				1				
10	Bobinski (2004)	Opinion Article	1												1																				1		
11	Bowers (2001)	Likert																		1																	
12	Brim (2006)	Opinion Article																			1													1			
13	Brim (2002)	Q12 Survey	1	1	1	1	1	1	1	1	1	1	1	1														1								1	
14	Buckingham (2001)	Opinion Survey Research Q12	1	1	1	1	1	1	1	1	1	1	1	1							1														1		
15	Byrnes (2006)	Case Study-Nucor Steel							1									1		1						1											
16	Campbell (2006)	Case Study-Can West Media Works				1			1								1									1				1							
17	Cartwright & Holmes (2006)									1																											
18	Cawley, Keeping & Levy (1998)	Meta Analysis	1																																		
19	Choi, Huh & Kang (2003)	Algorithm	1																																		
20	Clay (2007)	Journal Article												1																							
21	Clifton, D. (2003)	Opinion Article						1													1																
22	Clifton, D. & Harter	Q12 Survey	1	1	1	1	1	1	1	1	1	1	1	1																	1						
23	Clifton, J. (2006)	Opinion Article																	1																		
24	Coffman (2002)	Gallup Journal-Q12 Survey	1	1	1	1	1	1	1	1	1	1	1	1			1				1					1										1	
25	Coffman (2002)	Interview																													1						
1-410	Total Frequency * (see Appendix for comprehensive list)		**128**	**82**	**51**	**79**	**44**	**92**	**116**	**91**	**97**	**88**	**97**	**86**	**57**	**41**	**64**	**58**	**45**	**60**	**75**	**32**	**50**	**33**	**44**	**59**	**52**	**35**	**133**	**86**	**32**	**41**	**50**	**27**	**69**	**37**	**5**

Tab#	Source	Methodology	Employee Engagement Variables																																			
			Clear Expectations	Proper Equipment	"Opportunity to do my best"	Recognition/Praise	Concern/Caring Environment	Professional Development/Training	"Feedback "opinions count"	Sense of Purpose "Worthwhile"	Quality Work	Friends at Work	Performance Evaluation	Opportunity to Grow	Trust	Values	Emotions/Emotional	Compensation/Pay/Benefits/Health/Medical	Employee Incentives	Culture	Job Fit	New Hire Development/Employee Orientation	Sense of Security	Intrinsic Motivation	Employee/Employer Collaboration	Supervisor/Leader	Working Conditions	Community Involvement	Teamwork	Work / Life Balance	Support for Diversity	Strategic Management	Commitment to Employees	Systems	Open Communication	Longevity / Tenure	Workplace Design
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
26	Coffman (2002)	Interview																																			
27	Coffman (2003)	Q12 Survey	1	1	1	1	1	1	1	1	1	1	1	1																				1			
28	Coffman (2003)	Interview-Human Sigma				1															1					1											
29	Coffman & Gonzalez-Molina	Q12 Survey	1	1	1	1	1	1	1	1	1	1	1	1				1											1	1							
30	Cohen & Prusak (2007)	Case Studies																																			
31	Conchie (2004)	Opinion Article															1									1											
32	Cooper (2006)	Case Study-Ritz Carlton				1														1																	
33	Crabtree (2006)	Journal Article									1																										
34	Crabtree (2006)	3 Case Studies															1					1				1					1				1		
35	Crabtree (2003)	Q12 Survey	1	1	1	1	1	1	1	1	1	1	1	1							1				1												
36	Crabtree (2004)	Q12 Survey	1	1	1	1	1	1	1	1	1	1	1	1											1												
	Crabtree (2004)	Case Study																												1							
37	Crabtree (2004)	Case Study							1	1					1		1				1																
38	Crabtree (2005)	Q12 Survey	1	1	1	1	1	1	1	1	1	1	1	1															1		1			1		
39	Crawford (2006)	Opinion Article				1								1										1						1				1		
40	Daw (2001)	Journal Article																																			
41	de Koning (2004)	Journal Article																																			
42	de Koning & Miller (2003)	Journal Article																1	1													1					
43	Eakin (2002)	Q12 Survey	1	1	1	1	1	1	1	1	1	1	1	1			1							1			1		1								
44	Earl, Dunn Lampe & Buskin (2006)	Q12 Survey Results	1	1	1	1	1	1	1	1	1	1	1	1											1			1			1						
45	Ellingwood (2001)	Journal Article																				1															
46	Elsey (2005)	Case Study				1		1								1												1		1							
47	Emrich (2006)	Case Study							1										1									1									
48	Esposito (2006)	Interview																											1								
49	Finney (2006)	Case Study																																	1		
50	Flade (2006)	Case Study-Human Sigma	1	1	1	1	1	1	1	1	1	1	1	1							1				1				1								
51	Flade (2003)	Survey	1				1			1																			1								
52	Fleming (2006)	Journal Article															1								1	1	1		1		1						
53	Fleming (2007)	Interview																																			

Tab#	Source	Methodology	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
		Employee Engagement Variables	Clear Expectations	Proper Equipment	"Opportunity to do my best"	Recognition/Praise	Concern/Caring Environment	Professional Development/Training	"Feedback "opinions count"	Sense of Purpose "Worthwhile"	Quality Work	Friends at Work	Performance Evaluation	Opportunity to Grow	Trust	Values	Emotions/Emotional Connection/Psychological	Compensation/Pay/Benefits/Health/Medical	Employee Incentives	Culture	Job Fit	New Hire Development/Employee Orientation	Sense of Security	Intrinsic Motivation	Employee/Employer Collaboration	Supervisor/Leader	Working Conditions	Community Involvement	Teamwork	Work / Life Balance	Support for Diversity	Strategic Management	Commitment to Employees	Systems	Open Communication	Longevity / Tenure	Workplace Design
54	Florida (2005)	Interview			1								1							1	1		1														
55	Frederickson & Losada	*Non Linear Dynamic Model-Broaden & Build Theory																																			
56	Friedman (2006)	Magazine Article																				1															
57	Gade (2005)																			1							1	1	1		1	1				
58	Galagan (1985)														1															1							
59	Gallup Organization (2002)	Q12 Survey	1	1	1	1	1	1	1	1	1	1	1	1																				1			
60	Galt (2006)	Case Study								1										1																	
61	Garvey (2004)	Case Studies																																			
62	Gasser (2006)																																				
63	Gault (2006)			1		1		1					1									1			1		1										
64	Gelade & Ivery (2003)	Likert Scale Survey	1		1														1	1						1										
65	Gollan (2007)	Case Study																												1					1		
66	Gopal (2006)	Q12	1	1	1	1	1	1	1	1	1	1	1	1							1														1		
67	Gopal (2004)	Q12	1	1	1	1	1	1	1	1	1	1	1	1							1								1								
68	Gopal (2003)															1																					
	Gopal (2004)														1																						
69	Gopal (2004)													1			1						1				1			1							
70	Gopal (2004)	Case Study													1														1						1		
71	Grazier (2007)	Personal Opinion																1							1												
72	Grazier (2007)	Personal Opinion												1																1							
	Grazier (2007)	Personal Opinion																												1		1					
73	Grazier (2007)	Personal Opinion													1				1							1			1	1			1				
74	Grazier (2007)	Personal Opinion																			1					1			1								
75	Grazier (2007)	Personal Opinion																												1							
76	Gunn (2003)	Case Study													1	1				1									1								
77	Harter (2001)	Q12	1	1	1	1	1	1	1	1	1	1	1	1																1							
78	Harter (2006)						1	1																		1											

			Employee Engagement Variables																																		
			Clear Expectations	Proper Equipment	"Opportunity to do my best"	Recognition/Praise	Concern/Caring Environment	Professional Development/Training	Feedback "opinions count"	Sense of Purpose "Worthwhile"	Quality Work	Friends at Work	Performance Evaluation	Opportunity to Grow	Trust	Values	Emotions/Emotional Connection/Psychological	Compensation/Pay/Benefits/Health/Medical	Employee Incentives	Culture	Job Fit	New Hire Development/Employee Orientation	Sense of Security	Intrinsic Motivation	Employee/Employer Collaboration	Supervisor/Leader	Working Conditions	Community Involvement	Teamwork	Work / Life Balance	Support for Diversity	Strategic Management	Commitment to Employees	Systems	Open Communication	Longevity / Tenure	Workplace Design
Tab#	**Source**	**Methodology**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
79	Harter, Hayes & Schmidt (2002)	Q12	1	1	1	1	1	1	1	1	1	1	1	1															1								
80	Harter, Schmidt & Keyes	Q12	1	1	1	1	1	1	1	1	1	1	1	1																							
81	Hasenoehrl (2006)	Customer Service Case Study																											1	1							
82	Hellman (1997)	Review of Case Studies															1				1																
83	Hendricks (2006)	Case Study				1																							1								
84	Hoffman (2006)														1																	1					
85	Hom, Caranikas-Walker, Prussia & Griffeth (1992)	Review of 17 Research Studies															1						1							1							
86	Hoover (2005)																																		1		
	Huff (2006)	Case Studies				1							1							1									1	1							
87	Huff (2006)																																				
88	ISR Surveys	Survey Group																							1				1	1							
89	Ittner, Larcker & Meyer																																				
90	Ittner, Larcker & Meyer (1997)																	1												1							
91	Jackson (2007)																																1				
92	Jacobe (2002)	Q12	1	1	1	1	1	1	1	1	1	1	1	1	1				1																		
93	Jones & Harter (2005)	Q12 Survey	1	1	1	1	1	1	1	1	1	1	1	1			1				1											1					
94	Julier (2006)												1			1	1										1	1	1	1							
95	Julier (2005)				1	1	1		1			1					1		1													1		1	1		
96	Kaplan & Norton (1996)								1		1	1	1	1			1												1			1					
97	Kaplan & Norton (1996)						1												1		1						1		1								
98	Kent (2007)		1		1		1			1					1		1			1										1					1		
99	Kilsby & Beyer (1996)	Personal Interviews											1								1						1		1								
100	Kluger & Van-Dijk (2007)				1								1																	1							
101	Konrad (2006)	Survey				1		1	1				1					1			1						1		1				1				
102	Kravitz & Martin (1986)		1		1										1											1				1							
103	Krueger (2004)																						1						1								
104	Krueger & Killham (2006)					1			1											1					1						1						
105	Krueger & Killham (2005)								1					1			1													1	1						

Tab#	Source	Methodology	Employee Engagement Variables																																	
			Clear Expectations	Proper Equipment	"Opportunity to do my best"	Recognition/Praise	Concern/Caring Environment	Professional Development/Training	"Feedback "opinions count"	Sense of Purpose "Worthwhile"	Quality Work	Friends at Work	Performance Evaluation	Opportunity to Grow	Trust	Values	Emotions/Emotional Connection/Psychological	Compensation/Pay/Benefits/Health/Medical	Employee Incentives	Culture	Job Fit	New Hire Development/Employee Orientation	Sense of Security	Intrinsic Motivation	Employee/Employer Collaboration	Supervisor/Leader	Working Conditions	Community Involvement	Teamwork	Work / Life Balance	Support for Diversity	Strategic Management	Commitment to Employees	Systems	Open Communication	Longevity / Tenure	Workplace Design
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
106	Krueger & Killham (2006)		1		1	1																														
107	Lahiri & Jensen (2007)					1			1				1																								
108	Lampe & Earl (2006)					1									1				1		1		1									1				
109	Leadership Advantage (2006)																									1		1		1						
110	Lockwood (2006)			1							1									1		1							1							
111	Lopez, Hodges & Jim Harter				1	1	1	1							1		1					1		1								1				
112	Lowenstein & Cassar					1			1								1															1				
113	Luthans (2007)				1			1																												
114	Luthans & Peterson (2002)						1																													
115	Mader & Leibner (2007)			1		1							1					1								1			1				1		
116	Maitland (2006)											1		1		1			1																
117	Marshall (2005)							1																												
118	Masarech (2004)						1											1			1									1						
119	Maslow (1943)	Theory of Motivation																						1												
120	McDaniel, Whetzel, Schmidt & Maurer (1994)		1		1	1	1					1					1				1					1			1			1			
121	McEwen (2001)											1						1																		
122	McEwen (2002)																			1											1					
123	McKeown (2006)						1		1		1				1								1				1		1							
124	McSwain-Campbell & Jacobe (2002)		1		1												1				1							1	1				1		
125	Meyer, Vandenberghe & Becker (2004)									1										1				1	1			1			1				
126	Mika (2007)																																			
127	Morrison (2003)						1														1					1									
128	Muoio (2007)					1	1	1		1						1												1								
129	Needleman, Buerhaus, Mattke, Stewart & Zelevinsky (2002)																							1						1		1				
130	Nisbet (2006)						1											1								1								1		

Tab#	Source	Methodology	Employee Engagement Variables																																					
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
			Clear Expectations	Proper Equipment	"Opportunity to do my best"	Recognition/Praise	Concern/Caring Environment	Professional Development/Training	Feedback "opinions count"	Sense of Purpose "Worthwhile"	Quality Work	Friends at Work	Performance Evaluation	Opportunity to Grow	Trust	Values	Emotions/Emotional Connection/Psychological	Compensation/Pay/Benefits/Health/Medical	Employee Incentives	Culture	Job Fit	New Hire Development/Employee Orientation	Sense of Security	Intrinsic Motivation	Employee/Employer Collaboration	Supervisor/Leader	Working Conditions	Community Involvement	Teamwork	Work / Life Balance	Support for Diversity	Strategic Management	Commitment to Employees	Systems	Open Communication	Longevity / Tenure	Workplace Design
131	Nottage (2006)																																							
132	Numata, Schulzer, Van der Wal, Globerman, Semeniuk, Balka & Fitzgerald (2006)			1	1	1									1					1										1	1							
133	Obringer (2006)		1						1												1								1										
134	Occupational Outlook Handbook (2006-2007)															1																							
135	Parsley (2005)				1		1	1	1	1	1																												
136	Parsley (2005)														1				1																				
137	Paton (2006)		1																											1								
138	Paton (2005)		1			1							1				1							1	1														
139	Paton (2005)		1				1														1																		
140	Paton (2006)		1					1													1						1											
141	Paton (2007)		1																							1			1									
142	Paton (2007)		1			1						1			1		1																		1				
143	Paton (2007)		1							1													1		1					1								
144	Paton (2006)		1			1	1																1															
145	Peters (2007)		1		1								1			1							1						1									
146	Phelps (2001)		1																											1								
147	Phelps (2002)																		1										1									
148	Phelps (2004)				1						1						1					1																
149	Phelps, Timmerman & McDonald (2003) Phelps, Timmerman & McDonald (2003) Phelps, Timmerman & McDonald (2003)				1		1						1										1	1					1								1	
150	Piper (2006)		1																											1								
151	Pond (2007)							1						1								1								1								
152	Pounds (2006)						1																							1								
153	Pounds (2006)				1				1												1					1									1			
154	Rampersad (2006)																	1											1		1							

Tab#	Source	Methodology	Employee Engagement Variables																																	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
			Clear Expectations	Proper Equipment	"Opportunity to do my best"	Recognition/Praise	Concern/Caring Environment	Professional Development/Training	Feedback "opinions count"	Sense of Purpose "Worthwhile"	Quality Work	Friends at Work	Performance Evaluation	Opportunity to Grow	Trust	Values	Emotions/Emotional Connection/Psychological	Compensation/Pay/Benefits/Health/Medical	Employee Incentives	Culture	Job Fit	New Hire Development/Employee Orientation	Sense of Security	Intrinsic Motivation	Employee/Employer Collaboration	Supervisor/Leader	Working Conditions	Community Involvement	Teamwork	Work / Life Balance	Support for Diversity	Strategic Management	Commitment to Employees	Systems	Open Communication	Longevity / Tenure	Workplace Design
155	Ratanjee (2005)			1		1						1			1								1														
156	Rath					1			1																				1				1			
157	Rath (2006)		1			1	1	1																												
158	Rath (2004)											1								1										1						1
159	Rath (2007)								1																		1				1			1		
160	Rath & Clifton (2004)														1											1			1							
161	Rieger (2006)		1	1		1						1						1	1	1									1				1			
	Rieger & de Koning (2003)			1						1											1			1	1											
	Rieger & de Koning (2003)					1										1																				
	Rieger & de Koning (2004)			1		1																			1					1						
162	(2004)																																			
163	Rieger (2006)			1										1										1					1					1	1	
164	Rieger & Kamins (2006)									1	1													1		1										
165	Roberts & Hogan (2001)														1						1		1	1												
166	Robertson (2006)		1					1																					1		1					
167	Robinson, Perryman & Hayday (2007)	IES Model			1	1						1		1	1	1				1				1			1	1	1							
168	Robinson & Hayday (2007)		1			1			1							1																	1	1		
169	Robinson (2006)				1													1					1					1	1							
170	Robinson (2006)			1	1						1			1											1					1	1					
171	Robinson (2006)		1														1		1																	
172	Robinson (2006)			1	1	1															1			1						1						
173	Robinson (2003)			1					1			1	1			1																				
174	Robinson (2003)																																	1		
175	Robinson (2004)		1													1	1				1	1	1			1			1					1	1	
176	Robinson (2006)										1										1													1		
177	Robinson (2006)			1	1	1															1			1				1					1		

			Employee Engagement Variables																																		
			Clear Expectations	Proper Equipment	"Opportunity to do my best"	Recognition/Praise	Concern/Caring Environment	Professional Development/Training	Feedback "opinions count"	Sense of Purpose "Worthwhile"	Quality Work	Friends at Work	Performance Evaluation	Opportunity to Grow	Trust	Values	Emotions/Emotional Connection/Psychological	Compensation/Pay/Benefits/Health/Medical	Employee Incentives	Culture	Job Fit	New Hire Development/Employee Orientation	Sense of Security	Intrinsic Motivation	Employee/Employer Collaboration	Supervisor/Leader	Working Conditions	Community Involvement	Teamwork	Work / Life Balance	Support for Diversity	Strategic Management	Commitment to Employees	Systems	Open Communication	Longevity / Tenure	Workplace Design
Tab#	**Source**	**Methodology**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
178	Saks (2006)											1									1									1			1				
179	Sargent (2006)									1							1												1								
180	Sarvadi (2005)		1			1																				1			1		1				1		
181	Sasaki & Norquist (2005)				1				1						1						1												1				
182	Schiemann (2006)																	1								1					1	1	1				
183	Schmidt & Hunter (1998)	Meta-Analysis	1			1							1																1								
184	Schmidt (2004)					1				1																				1	1						
185	Schneider (2006)				1												1													1							
186	Schoeff (2006)											1								1				1						1							
187	Scott (2006)															1													1								
188	Seijts & Crim (2006)						1		1											1													1	1	1		
189	Shaffer (2004)				1				1																1					1							
190	Skuturna (2006)				1	1											1				1						1										
191	Smith (2005)				1											1								1					1								
192	Smith & Rutigliano (2002)		1									1			1																						
193	Smith & Rutigliano (2002)																						1							1			1				
194	Smith & Rutigliano (2002)					1	1	1	1	1						1						1							1				1				
195	Smith & Rutigliano (2002)		1			1								1				1		1		1					1						1				
196	Suffes (2004)									1													1														
197	Teresko (2004)																			1																	
199	Tett & Meyer (1993)				1	1							1																								
200	Thackray (2001)					1			1			1						1											1								
201	Thatcher (2005)				1									1													1										
202	The Point (2006)			1														1											1								
203	The Walker Group (2006)														1														1								
204	Tornow & Wiley					1												1		1								1	1	1							
205	Trinka (2006)					1			1					1											1		1					1		1			
206	Tritch (2003)		1		1	1					1						1					1					1								1		
207	Tritch (2003)										1						1										1		1				1				

			Employee Engagement Variables																																		
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Tab#	Source	Methodology	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
209	Tschida (2005)					1					1							1			1			1	1												
210	Tschida (2005)																1		1												1					
211	Tucker (2004)				1	1	1	1	1																									1			
212	Tucker (2002)									1		1		1		1					1										1					
213	Tucker (2002)										1																	1								
214	Tucker & Allman (2004)					1																															
215	Ulrich, Halbrook, Meder, Stuchlik & Thorpe		1					1	1	1	1	1			1		1				1		1			1	1	1				1				
216	UniXL (2006)																			1		1														
217	Verhoef & Langerak (2002)																						1			1										
218	Wagner (2001)		1	1	1	1	1	1	1	1	1	1	1	1								1							1							
219	Wagner (2004)								1								1			1		1				1				1						
220	Wagner (2004)																1	1									1		1							
221	Wagner (2005)																	1									1					1		1		
222	Wagner (2005)		1	1	1	1	1	1	1	1	1	1	1	1							1	1				1	1		1					1		
223	Wagner (2005)																1										1							1		
224	Wagner (2006)									1					1		1		1									1	1							
225	Wagner & Harter (2007)			1														1					1		1									1		
226	Wagner & Harter (2006)					1									1				1		1			1		1	1									
227	Wagner & Harter (2006)																									1										
228	Wagner & Harter (2006)		1	1	1	1	1	1	1	1	1	1	1	1				1	1									1			1					
229	Wagner & Harter (2006)																												1							
230	Wagner & Harter (2007)															1							1		1		1	1								
231	Wagner, Wawer & Harter (2006)		1	1	1	1	1	1	1	1	1	1	1	1																	1		1		
232	Wagner, Drumond & Harter (2007)							1	1				1			1			1								1									
233	Wagner (2006)		1			1				1													1							1						
234	Waite (2004)		1														1																			

			Employee Engagement Variables																																		
			Clear Expectations	Proper Equipment	"Opportunity to do my best"	Recognition/Praise	Concern/Caring Environment	Professional Development/Training	Feedback "opinions count"	Sense of Purpose "Worthwhile"	Quality Work	Friends at Work	Performance Evaluation	Opportunity to Grow	Trust	Values	Emotions/Emotional Connection/Psychological	Compensation/Pay/Benefits/Health/Medical	Employee Incentives	Culture	Job Fit	New Hire Development/Employee Orientation	Sense of Security	Intrinsic Motivation	Employee/Employer Collaboration	Supervisor/Leader	Working Conditions	Community Involvement	Teamwork	Work / Life Balance	Support for Diversity	Strategic Management	Commitment to Employees	Systems	Open Communication	Longevity / Tenure	Workplace Design
Tab#	**Source**	**Methodology**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
235	Welch (2005)		1			1			1												1						1		1				1				
240	Wilson (2006)										1																		1	1							
241	Wilson (2006)					1	1		1						1						1							1	1								
242	Winseman (2002)					1			1																1								1		1		
243	Woodruffe (2006)									1															1												
244	Young (2005)				1			1						1	1	1			1		1					1				1					1		
245	Zangari & Smith (2001)		1							1								1										1	1								
246	Burrage, Rik (2006)			1		1	1		1											1									1					1			
247	Coffman & Gonzalez-Molina									1		1										1			1			1	1			1					
248	Connelly (2002)		1		1	1						1								1										1						1	
249	Crabtree (2004)				1									1								1										1	1	1			
250	Ellingwood (2002)					1			1									1		1																	
251	Hall (2006)													1				1					1			1			1								
252	Kaufman (2002)				1																								1			1					
253	Phelps (2001)		1		1	1				1	1				1								1														
254	Rath		1		1																1								1								
255	Robison, J. interviewing V. Allman & Tucker (2004)				1						1					1	1							1								1					
256	Rutigliano (2001)					1	1		1				1									1							1								
257	Smith & Rutigliano (2001)			1																1									1								
258	Smith & Rutigliano (2001)					1	1		1				1			1		1			1	1				1											
259	Smith & Rutigliano (2003)						1					1																				1					
260	Smith & Rutigliano		1				1			1		1	1		1												1	1	1						1		
261	Tucker																			1		1															
262	Anonymous (2007)					1																															
263	APA Article (2007)									1																1			1								
264	Australian Psychology Review Article (2006)		1			1									1			1																			
265	Business Communicator Article (2005)		1				1						1								1					1			1								

Tab#	Source	Methodology	Clear Expectations 1	Proper Equipment 2	"Opportunity to do my best" 3	Recognition/Praise 4	Concern/Caring Environment 5	Professional Development/Training 6	Feedback "opinions count" 7	Sense of Purpose "Worthwhile" 8	Quality Work 9	Friends at Work 10	Performance Evaluation 11	Opportunity to Grow 12	Trust 13	Values 14	Emotions/Emotional Connection/Psychological 15	Compensation/Pay/Benefits/Health/Medical 16	Employee Incentives 17	Culture 18	Job Fit 19	New Hire Development/Employee Orientation 20	Sense of Security 21	Intrinsic Motivation 22	Employee/Employer Collaboration 23	Supervisor/Leader 24	Working Conditions 25	Community Involvement 26	Teamwork 27	Work / Life Balance 28	Support for Diversity 29	Strategic Management 30	Commitment to Employees 31	Systems 32	Open Communication 33	Longevity / Tenure 34	Workplace Design 35
266	Business Communicator Article (2005)					1				1	1		1					1											1				1			
267	Canadian Corporate Newswire Press Release (2007)		1	1	1				1				1			1			1									1								
268	CIPD Article (2007)							1			1																									
269	CIPD Article (2006)						1												1																	
270	CIPD Article (2007)			1		1									1	1										1			1	1						
271	Communication World Article (2005)		1			1		1					1					1														1				
272	Compuware Press Release (2006)			1											1													1	1							
273	Corante Press Release (2006)						1					1						1										1								
274	Employee Benefits Article (2007)								1																		1									
275	Employee Benefits Article (2006)		1				1									1				1																
276	Employee Benefits Article (2006)								1														1				1									
277	Gallup Article (1999)		1	1	1	1	1	1	1	1	1	1	1	1												1	1								
278	Gallup Article (1999)		1	1	1	1	1	1	1	1	1	1	1	1							1								1			1			
279	Gallup Article (1999)		1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1														
280	Gallup Article (1999)		1	1	1	1	1	1	1	1	1	1	1	1									1			1									
281	Gallup Article (1999)		1	1	1	1	1	1	1	1	1	1	1	1												1									
282	Gallup Article (1999)		1	1	1	1	1	1	1	1	1	1	1	1		1		1											1		1				
283	Gallup Article (1999)		1	1	1	1	1	1	1	1	1	1	1	1														1	1						
284	Gallup Article (1999)		1	1	1	1	1	1	1	1	1	1	1	1										1											
285	Gallup Article (1999)		1	1	1	1	1	1	1	1	1	1	1	1					1																
286	Gallup Article (1999)		1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1		1							1							

Tab#	Source	Methodology	Employee Engagement Variables																																	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
			Clear Expectations	Proper Equipment	"Opportunity to do my best"	Recognition/Praise	Concern/Caring Environment	Professional Development/Training	"Feedback "opinions count"	Sense of Purpose "Worthwhile"	Quality Work	Friends at Work	Performance Evaluation	Opportunity to Grow	Trust	Values	Emotions/Emotional Connection/Psychological	Compensation/Pay/Benefits/Health/Medical	Employee Incentives	Culture	Job Fit	New Hire Development/Employee Orientation	Sense of Security	Intrinsic Motivation	Employee/Employer Collaboration	Supervisor/Leader	Working Conditions	Community Involvement	Teamwork	Work / Life Balance	Support for Diversity	Strategic Management	Commitment to Employees	Systems	Open Communication	Longevity / Tenure	Workplace Design
287	Gallup Article (1999)		1	1	1	1	1	1	1	1	1	1	1	1		1													1			1					
288	Gallup Article (1999)		1	1	1	1	1	1	1	1	1	1	1	1				1	1						1					1				1			
289	Gallup Article (1999)		1	1	1	1	1	1	1	1	1	1	1	1					1									1						1			
290	Gallup Article (2002)		1	1	1	1	1	1	1	1	1	1	1	1																					1		
291	Gallup Article (2001)		1	1	1	1	1	1	1	1	1	1	1	1					1		1			1					1						1		
292	Gallup Article (2002)		1	1	1	1	1	1	1	1	1	1	1	1										1				1									
293	Gallup Article (2003)		1	1	1	1	1	1	1	1	1	1	1	1		1			1	1	1			1				1		1							
294	Gallup Article (2001)		1	1	1	1	1	1	1	1	1	1	1	1			1					1															
295	Gallup Article (2005)		1	1	1	1	1	1	1	1	1	1	1	1			1		1			1								1							
296	Gallup Article (2006)		1	1	1	1	1	1	1	1	1	1	1	1											1												
297	Gallup Article (2006)		1	1	1	1	1	1	1	1	1	1	1	1		1		1				1									1						
298	Gallup Article (2005)		1	1	1	1	1	1	1	1	1	1	1	1				1																			
299	Gallup Article (2002)		1	1	1	1	1	1	1	1	1	1	1	1			1												1								
300	Gallup Article (2001)		1	1	1	1	1	1	1	1	1	1	1	1								1				1											
301	Gallup Article (2004)		1	1	1	1	1	1	1	1	1	1	1	1		1					1								1			1		1	1	
302	Gallup Article (2001)		1	1	1	1	1	1	1	1	1	1	1	1				1					1										1		1		
303	Gallup Article (2001)		1	1	1	1	1	1	1	1	1	1	1	1							1								1				1				
304	Gallup Article (2002)		1	1	1	1	1	1	1	1	1	1	1	1	1									1						1							
305	Gallup Article (2001)		1	1	1	1	1	1	1	1	1	1	1	1	1														1				1				
306	Gallup Article (2003)		1	1	1	1	1	1	1	1	1	1	1	1						1							1							1			
307	Herald Express Article (2007)						1																1								1						
308	Hewitt Associates-Press Release (2004)					1				1	1	1	1			1									1			1	1	1		1	1		1	1	
309	IES Article (2004)																	1			1									1				1			
310	Kenexa Press Release (2007)							1																							1						
311	Management Issues News Article (2006)					1		1		1				1				1											1	1			1		1		
312	Management Issues News Article (2005)					1				1				1									1				1		1		1						

Tab#	Source	Methodology	Employee Engagement Variables																																		
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
			Clear Expectations	Proper Equipment	"Opportunity to do my best"	Recognition/Praise	Concern/Caring Environment	Professional Development/Training	Feedback "opinions count"	Sense of Purpose "Worthwhile"	Quality Work	Friends at Work	Performance Evaluation	Opportunity to Grow	Trust	Values	Emotions/Emotional Connection/Psychological	Compensation/Pay/Benefits/Health/Medical	Employee Incentives	Culture	Job Fit	New Hire Development/Employee Orientation	Sense of Security	Intrinsic Motivation	Employee/Employer Collaboration	Supervisor/Leader	Working Conditions	Community Involvement	Teamwork	Work / Life Balance	Support for Diversity	Strategic Management	Commitment to Employees	Systems	Open Communication	Longevity / Tenure	Workplace Design
313	Management Issues News Article (2006)					1		1							1		1					1	1							1							
314	Management Issues News Article (2005)		1					1		1	1																1										
315	Management Issues News Article (2005)					1							1	1				1								1		1									
316	Management Issues News Article (2006)					1				1	1						1		1						1					1	1						
317	Management Issues News Article (2006)					1	1	1	1				1					1			1	1	1					1									
318	Management Issues News Article (2006)					1			1						1	1			1								1				1				1		
319	Management Issues News Article (2006)						1				1		1										1		1			1							1		
320	Management Issues News Article (2004)									1	1			1				1			1									1					1		
321	Management Issues News Article (2007)						1				1					1							1			1		1			1	1				
322	Management Services Article (2003)									1								1											1					1		
323	Marketing Week Article (2006)									1	1																				1					
324	Marketing Week Article (2006)																				1	1	1													
325	PR Newswire Press Release (2006)					1	1		1		1				1					1								1	1		1					
326	PR Newswire Press Release (2006)					1					1						1						1	1			1	1		1			1		
327	PR Newswire Press Release (2006)		1			1								1	1								1				1									

			Employee Engagement Variables																																	
			Clear Expectations	Proper Equipment	"Opportunity to do my best"	Recognition/Praise	Concern/Caring Environment	Professional Development/Training	"Feedback "opinions count"	Sense of Purpose "Worthwhile"	Quality Work	Friends at Work	Performance Evaluation	Opportunity to Grow	Trust	Values	Emotions/Emotional Connection/Psychological	Compensation/Pay/Benefits/Health/Medical	Employee Incentives	Culture	Job Fit	New Hire Development/Employee Orientation	Sense of Security	Intrinsic Motivation	Employee/Employer Collaboration	Supervisor/Leader	Working Conditions	Community Involvement	Teamwork	Work / Life Balance	Support for Diversity	Strategic Management	Commitment to Employees	Systems	Open Communication	Longevity / Tenure	Workplace Design
Tab#	Source	Methodology	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
328	Purdue University Press Release (2004)		1				1				1							1			1											1				
329	Ragan Article (2007)							1																				1	1							
330	Ragan Article (2007)			1									1																	1						
331	Ragan Article (2007)					1				1											1					1			1							
332	Ragan Article (2007)						1									1												1					1			
333	RBS Press Release (2007)																																1			
334	Solutions for People, Processes and Paper Article (2004)		1			1			1					1	1			1			1				1			1		1				1	
335	Strategic Communication Management Article (2005)														1												1									
336	Strategic HR Review Article (2005)					1			1			1	1					1				1				1								1		
337	T+D Article (2006)		1												1							1				1					1				
338	T+D Article (2006)		1				1	1	1						1												1		1							
339	T + D Article, executive update (2006)		1		1				1				1					1										1								
340	The Companion Article (2007)										1							1					1					1								
341	US Newswire Press Release (2006)				1	1												1													1			1	
342	-2007					1		1					1												1				1							
343	-2006		1			1													1			1													
344	-2006			1					1																				1							
345	Avolio & Sosik (1999)						1									1																				
346	Bisaha & Blizzard (2005)		1															1																		
347	Black (2001)					1					1		1								1	1			1											
348	Blizzard (2002)								1		1											1					1	1					1		
349	Blizzard (2005)					1	1								1			1													1				
350	Blizzard (2005)																							1				1						1		
351	Blizzard (2005)							1														1				1			1							

Tab#	Source	Methodology	Employee Engagement Variables																																					
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
			Clear Expectations	Proper Equipment	"Opportunity to do my best"	Recognition/Praise	Concern/Caring Environment	Professional Development/Training	"Feedback "opinions count"	Sense of Purpose "Worthwhile"	Quality Work	Friends at Work	Performance Evaluation	Opportunity to Grow	Trust	Values	Emotions/Emotional Connection/Psychological	Compensation/Pay/Benefits/Health/Medical	Employee Incentives	Culture	Job Fit	New Hire Development/Employee Orientation	Sense of Security	Intrinsic Motivation	Employee/Employer Collaboration	Supervisor/Leader	Working Conditions	Community Involvement	Teamwork	Work / Life Balance	Support for Diversity	Strategic Management	Commitment to Employees	Systems	Open Communication	Longevity / Tenure	Workplace Design
352	Blizzard (2005)																1	1			1					1						1				1		
353	Blizzard (2005)					1			1																1	1			1						1			
354	Blizzard (2002)				1	1							1			1			1	1	1			1					1		1							
355	Blizzard (2002)		1														1																					
	Blizzard (2002)		1	1	1				1									1								1						1						
356	Blizzard (2002)					1					1				1						1								1						1			
357	Blizzard (2002)										1											1			1					1								
358	Blizzard (2002)				1													1	1																1			
359	Blizzard (2002)								1					1				1									1											
360	Blizzard (2003)																			1										1								
361	Blizzard (2003)										1			1									1	1		1												
362	Blizzard (2003)					1														1									1					1	1	1		
363	Blizzard (2003)		1					1						1											1				1									
	Blizzard (2003)		1					1			1	1			1		1																					
364	Blizzard (2003)		1			1																		1					1		1							
365	Blizzard (2004)					1					1																								1			
366	Blizzard (2004)																			1										1					1			
367	Brooks (2002)			1		1					1					1															1							
368	Brooks (2002)																		1						1												
369	Carroll (2003)				1					1			1								1													1			
	Crabtree (2005)					1			1				1				1		1																			
	Crabtree (2005)		1			1									1	1										1			1									
370	Crabtree (2005)														1			1				1			1								1					
371	Cropanzano & Mitchell (2005)				1																1		1							1							
372	The Economist (2006)																			1							1		1		1						
373	GAIEF (2006)		1	1		1	1	1	1			1	1				1																		1		
374	Gallup Article (2002)					1																															

Tab#	Source	Methodology	Clear Expectations	Proper Equipment	"Opportunity to do my best"	Recognition/Praise	Concern/Caring Environment	Professional Development/Training	Feedback "opinions count"	Sense of Purpose "Worthwhile"	Quality Work	Friends at Work	Performance Evaluation	Opportunity to Grow	Trust	Values	Emotions/Emotional Connection/Psychological	Compensation/Pay/Benefits/Health/Medical	Employee Incentives	Culture	Job Fit	New Hire Development/Employee Orientation	Sense of Security	Intrinsic Motivation	Employee/Employer Collaboration	Supervisor/Leader	Working Conditions	Community Involvement	Teamwork	Work / Life Balance	Support for Diversity	Strategic Management	Commitment to Employees	Systems	Open Communication	Longevity / Tenure	Workplace Design
375	Gallup Article (2001)					1						1				1				1				1	1	1		1			1					
376	Gallup Article (2001)		1						1														1										1			
377	Gallup Poll News Service (1998)					1									1					1																
378	Gallup Poll News Service (2002)							1				1											1								1					
379	Gallup Poll News Service-various		1	1		1	1	1	1						1					1	1				1				1			1				
380	Gelade & Young (2005)					1			1			1								1		1		1												
381	Gopal (2005)													1																						
382	Jacobe (2003)							1									1				1									1			1			
383	Jacobe (2003)				1												1																			
384	Jacobe (2003)						1										1		1																	
385	Jacobe (2002)					1					1				1						1			1	1				1	1			1			
386	Jacobe (2002)		1		1																			1					1							
387	Jacobe (2002)					1			1								1		1																	
388	Jones (2001)					1						1												1						1						
389	Joyner (2006)									1					1						1															
390	Keifer (2003)					1											1				1								1			1				
391	Keifer (2003)			1																									1			1				
392	Lyons (2003)						1					1								1																
393	Lyons (2003)																1				1			1						1	1	1				
394	May, Gilson & Harter (2004)			1	1				1																				1							
395	McMurray (2003)			1	1				1							1																				
396	Moore (2002)		1			1		1	1			1							1				1									1				
397	Moore (2001)		1			1																										1				
398	Moore & Jacobe (2002)		1														1	1			1	1			1	1						1				
399	Pratt & Ashforth					1						1				1				1													1				
	Rhoades, Eisenberger & Armeli (2001)		1							1					1				1							1					1					

			Employee Engagement Variables																																		
			Clear Expectations	Proper Equipment	"Opportunity to do my best"	Recognition/Praise	Concern/Caring Environment	Professional Development/Training	Feedback "opinions count"	Sense of Purpose "Worthwhile"	Quality Work	Friends at Work	Performance Evaluation	Opportunity to Grow	Trust	Values	Emotions/Emotional Connection/Psychological	Compensation/Pay/Benefits/Health/Medical	Employee Incentives	Culture	Job Fit	New Hire Development/Employee Orientation	Sense of Security	Intrinsic Motivation	Employee/Employer Collaboration	Supervisor/Leader	Working Conditions	Community Involvement	Teamwork	Work / Life Balance	Support for Diversity	Strategic Management	Commitment to Employees	Systems	Open Communication	Longevity / Tenure	Workplace Design
Tab#	**Source**	**Methodology**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
400	Robison (2002)					1											1												1								
401	Robison (2007)		1						1			1				1	1		1				1				1										
402	Ryan & Deci (2000)		1																						1												
403	Saad (2003)						1				1									1				1												1	
404	Saad (1999)					1							1				1																	1			
405	Schaufelli, Salanova, Gonzalez-Roma & Bakker (2002)		1					1										1							1												
406	Silvestro (2002)																			1								1	1					1			
407	Winseman (2002)				1	1				1				1																					1		
408	Wright & Staw (1999)					1	1				1												1					1									
409	Wright & Bonett (1997)			1										1											1				1								
410	Wright & Cropanzano (2000)																		1										1								
411	Schwede, Davies, Purdey (2008)	Survey																																			1
412	Carsia, Tiernan (2002)	Self Assessment																		1																	1
413	Peponis, et al. (2007)	Survey																		1																	1
414	Schneider (2007)	Survey																																			1
415	Gensler (2006)	Survey																																			1
			128	**82**	**51**	**79**	**44**	**92**	**116**	**91**	**97**	**88**	**97**	**86**	**57**	**41**	**64**	**58**	**45**	**60**	**75**	**32**	**50**	**33**	**44**	**59**	**52**	**35**	**133**	**86**	**32**	**41**	**50**	**27**	**69**	**37**	**5**

APPENDIX B

SAMPLE EXPERT PANEL LETTER AND SURVEY

SAMPLE EXPERT PANEL LETTER

(Expert Panel Letter)

Dear _____:

I'm working on my Ph.D. dissertation in the area of employee engagement and resident satisfaction in the multi-family housing industry. I would like for you to be in my research study by providing your feedback to the attached questionnaire.

As a recognized expert in the field of multi-family housing, I believe that your knowledge and experience will provide invaluable information for a critical phase of my doctoral research. During this phase of my work, a group of 15 experts and experienced professionals will participate in a survey based on my initial review of literature and informal discussions with professionals like you. The survey will take about 20 minutes to complete. There is no compensation or benefit to being in the study, but I hope to provide you with the findings that will benefit your company. There is no risk involved in filling out the survey and the survey responses will be kept anonymous.

Please let me know if you have any questions regarding the attached survey. For your convenience, I have included a self-addressed envelope. I appreciate your input and will be happy to share my results as they become available. Thank you again for your continued support.

Enthusiastically,

Debbie R. Phillips

Enclosure

EXPERT PANEL SURVEY

The purpose of this research is to develop an employee engagement model for the multi-family housing industry that identifies those drivers of employee engagement that affect resident satisfaction.

Employee engagement can be defined as an employee putting forth extra discretionary effort, as well as the likelihood of the employee being loyal and remaining with the organization over the long haul (Clifton, 2002).

*In your opinion, please rate the following factors **(low, medium or high)** as they impact resident satisfaction:*

Employees receive **recognition/praise** when they meet performance goals.

Low Medium High

Employees have the **proper tools/equipment** to perform their job.

Low Medium High

Employees work in an environment where **people care** about them.

Low Medium High

Employees receive **professional development/training** in their role.

Low Medium High

Employees receive **regular feedback** about their performance.

Low Medium High

Employees are committed to doing **quality work**.

Low Medium High

Employees feel that there is a **high level of trust** from their supervisor.

Low Medium High

Employees have the **opportunity to grow** within the organization.

Low Medium High

Employees endorse and believe in the **culture** of their company.

Low Medium High

Employees are placed in the **right job** for their skills.

Low Medium High

Employees understand what the company **expects** from them.

Low Medium High

Employees are encouraged to have a **work/life balance**.

Low Medium High

Employees understand that the company **supports diversity**.

Low Medium High

Employees feel a **commitment** from senior management.

Low Medium High

Employees' **opinions count** in the organization.

Low Medium High

Employees feel they are **compensated adequately** for their job.

Low Medium High

Employees work together as a **team** to accomplish the company goals.

Low Medium High

Employees feel good about their **company benefits**

Low Medium High

_____(Write in another factor)

Low Medium High

_____(Write in another factor)

Low Medium High

APPENDIX C

ASSOCIATE SURVEY QUESTIONS USED BY KINGSLEY & ASSOCIATES

ASSOCIATE SURVEY QUESTIONS

Question#	Question Name
Q1	Please rate your overall satisfaction as a Post associate:
Q2	I would describe the change in my level of job satisfaction in the past year as:
Q3	In a year, I see myself…
Q401	Achievement of company goals
Q402	Adequate authority to perform job functions
Q403	Balance between work and personal commitments
Q404	Benefits
Q405	Career growth opportunity
Q406	Company leadership
Q407	Compensation
Q408	Constructive and timely feedback
Q409	Co-workers
Q410	Culture
Q411	Immediate supervisor
Q412	Interesting / challenging job functions
Q413	Job security
Q414	On-the-job training
Q415	Physical work environment
Q416	Quality of product & services
Q417	Reasonable expectations / workload
Q418	Recognition of achievement
Q419	Team environment
Q420	Tools / technology
Q5	I am aware of Post's vision, mission, and core values
Q6	Post is achieving its vision and mission
Q7	Post's vision and mission make me feel that my job is important
Q8	I would recommend a Post community to someone seeking an apartment home
Q9	Quality is a shared priority at my company
Q10	I am proud to work for my company
Q11	My company has earned my loyalty
Q12	My company attracts and retains outstanding personnel
Q13	My company is committed to providing an exceptional level of service

Q14	Work Env – I find personal meaning and fulfillment in my work
Q15	Work Env – I am able to maintain a balance between work and personal commitment
Q16	Work Env – I have enough authority to effectively perform my job
Q17	Work Env – I have the tools / technology to efficiently perform my job
Q18	Work Env – The work I do makes a difference to my company
Q19	Work Env – My company takes a direct interest in my well-being
Q20	Work Env – My company provides me with a sense of job security
Q21	I would recommend Post to a friend seeking employment
Q22	Team – Working with my co-workers is a positive experience
Q23	Team – My ideas and opinions are appreciated
Q24	Team – I feel like an integral part of the team
Q25	Team – There is adequate communication between departments
Q26	Team – There is adequate communication within my department
Q27	Team – My company is accepting of associates with diverse backgrounds
Q28	Team – My co-workers are committed to doing quality work
Q29	Team – In my team people are held accountable for low performance
Q30	Accounting (accounts payable / receivable, general lender)
Q31	Ancillary Services (water billing, phone, CATV, gas)
Q32	Human Resources (benefits, payroll)
Q33	IT (information technology)
Q34	Learning and Development
Q35	Legal / Property Insurance
Q36	Immed Super – I understand what my immediate supervisor expects of me
Q37	Immed Super – My immediate supervisor encourages innovation
Q38	Immed Super – My immediate supervisor trusts me
Q39	Immed Super – I trust my immediate supervisor
Q40	Immed Super – I am treated with fairness by my immediate supervisor
Q41	My immediate supervisor is approachable and easy to talk to
Q42	My immediate supervisor communicates clearly
Q43	My immediate supervisor recognizes my extra efforts
Q44	Senior management involves people in decisions that impact their job or environment
Q45	Senior management is concerned about how people in the organization feel and what they think
Q46	Senior Mgmt – There is a high degree of stability among my company's leadership

Q47	Senior Mgmt – Senior management regularly communicates the direction and plans of the company
Q48	I trust senior management has the company's best interest in mind
Q49	Within Post there are sufficient options for career growth and mobility
Q50	Hiring and promotion decisions are impartial
Q51	My performance reviews are helpful to me in improving my performance
Q52	In my job, I am developing skills that are useful to my career
Q53	I receive adequate training to effectively perform my job
Q54	My immediate supervisor assists me in identifying my training or personal development needs
Q55	I am compensated fairly for my work and responsibility
Q56	My performance impacts my compensation adjustments / bonuses
Q5	The benefits program has adequate choices to meet my needs
*Q58	Do you believe that there are better ways that Post could express the value it places on you as an Associate?

*Q58 entered in the 2006 and 2007 surveys, but no responses for 2006.

APPENDIX D

RESIDENT SURVEY QUESTIONS USED BY KINGSLEY & ASSOCIATES

RESIDENT SURVEY QUESTIONS

Question#	Question Name
Q1	Please rate your overall satisfaction as a resident.
Q201	Print Ad
Q202	Internet listing/Ad
Q203	Radio Ad
Q204	Preferred Employer Program
Q205	Signage
Q206	Personal Referral
Q207	Referral from Locator/Relocation Firm
Q208	Tradeshow/Event
Q209	Other:
Q301	Apartment features/finishes
Q302	Community amenities
Q303	Community policies
Q304	Floor plans
Q305	Lease terms
Q306	Location/convenience
Q307	Price
Q308	Property appearance/quality
Q309	Security/personal safety
Q310	Staff/management
Q311	Company's reputation
Q312	Other
Q4	Prior to moving here I was familiar with the company name.
Q5	Overall satisfaction with management
Q6	Communication
Q7	Accessibility
Q8	Responsiveness
Q9	Problem resolution
Q10	Accommodation of special requests
Q11	Professionalism/courtesy
Q12	Convenience of office hours
Q13	Rent collection procedures
Q14	How long does it generally take management to respond to non-emergency

	calls?
Q15	Overall satisfaction with leasing process
Q16	Ease of move-in
Q17	Have you made a request for maintenance?
Q18	Do you currently utilize an on-line work order system to request maintenance service?
Q19	How long does it generally take for maintenance to respond to non-emergency calls?
Q20	How often are your maintenance / service requests resolved in a satisfactory manner?
Q21	Overall satisfaction with maintenance
Q22	Professionalism/courtesy
Q23	Quality of work
Q24	Notification of completed work
Q25	Cable/satellite provider
Q26	Community planned resident activities
Q27	Fitness center
Q28	Laundry facilities
Q29	Peace of mind
Q30	Quality of building
Q31	Recycling program
Q32	Swimming pool
Q33	Visual appeal of the community
Q34	Building maintenance
Q35	Landscaping
Q36	Lighting
Q37	Signage
Q38	Floor plan/design and layout
Q39	Bathroom (s)
Q40	Carpet/flooring
Q41	Cabinets and countertops
Q42	Heating and A/C
Q43	Kitchen appliances
Q44	Light fixtures
Q45	Paint/wall treatments
Q46	Appearance
Q47	Availability

Q48	Lighting
Q49	If you had to make the decision today, how likely would you be to renew your lease
Q5001	Apartment features/finishes
Q5002	Access to public transportation
Q5003	Building maintenance
Q5004	Community management
Q5005	Community features
Q5006	Home purchase
Q5007	Length of lease
Q5008	Location
Q5009	Parking
Q5010	Pet Policy
Q5011	Property appearance
Q5012	Quality of building
Q5013	Relocation/transfer
Q5014	Rental rate
Q5015	Security
Q5016	Space requirements
Q5101	Apartment features/finishes
Q5102	Building maintenance
Q5103	Mgmt. – Accessibility
Q5104	Mgmt. - Communication
Q5105	Mgmt. – Responsiveness
Q5106	Rent collection procedures
Q5107	Community planned resident activities
Q5108	Heating and A/C
Q5109	Maintenance staff
Q5110	Parking
Q5111	Property appearance
Q5112	Quality of building
Q5113	Recreational facilities
Q52	Would you recommend this community to others?
Q53	Based on the quality of the community and services provided, how would you rate the value?

Q54	How long have you been a resident of this apartment community?
Q55	What is your gender?
Q56	What is your age
Q57	What is your marital status?
Q58	What is your household income? (Optional)
Q59	Are there any specific issues or concerns about which you would like to be contacted by a company representative?

APPENDIX E

ASSOCIATE DEMOGRAPHICS

ASSOCIATE DEMOGRAPHICS

Associate Gender Breakdown								
	2005		2006		2007		Total	
	#	%	#	%	#	%	#	%
Male	210	45.1%	241	47.0%	242	45.1%	693	45.7%
Female	234	50.2%	263	51.3%	292	54.4%	789	52.0%
Unknown or Other	22	4.7%	9	1.8%	3	0.6%	34	2.2%

Age Range of Associates								
	2005		2006		2007		Total	
	#	%	#	%	#	%	#	%
Under 25	29	6.2%	43	8.4%	68	12.7%	140	9.2%
25-34	147	31.5%	156	30.4%	177	33.0%	480	31.7%
35-44	145	31.1%	155	30.2%	150	27.9%	450	29.7%
45-54	84	18.0%	106	20.7%	98	18.2%	288	19.0%
55-64	36	7.7%	40	7.8%	38	7.1%	114	7.5%
Unknown or Other	25	5.4%	13	2.5%	6	1.1%	44	2.9%

Associate Years of Working								
	2005		2006		2007		Total	
	#	%	#	%	#	%	#	%
Less than 1	64	13.73%	100	19.49%	105	19.55%	269	17.74%
1 to 2	53	11.37%	99	19.30%	142	26.44%	294	19.39%
3 to 4	56	12.02%	48	9.36%	45	8.38%	149	9.83%
5 to 6	82	17.60%	76	14.81%	61	11.36%	219	14.45%
7 to 10	92	19.74%	90	17.54%	69	12.85%	251	16.56%
11 to 14	33	7.08%	30	5.85%	37	6.89%	100	6.60%
15 to 19	38	8.15%	33	6.43%	37	6.89%	108	7.12%
20+	26	5.58%	28	5.46%	38	7.08%	92	6.07%
Unknown	22	4.72%	9	1.75%	3	0.56%	34	2.24%

APPENDIX F

RESIDENT DEMOGRAPHICS

RESIDENT DEMOGRAPHICS

Resident Gender Breakdown								
	2005		2006		2007		Total	
	#	%	#	%	#	%	#	%
Male	4366	52.8%	4261	52.8%	3644	48.9%	12271	51.6%
Female	148	1.8%	230	2.8%	283	3.8%	661	2.8%
Unknown or Other	3751	45.4%	3586	44.4%	3526	47.3%	10863	45.7%

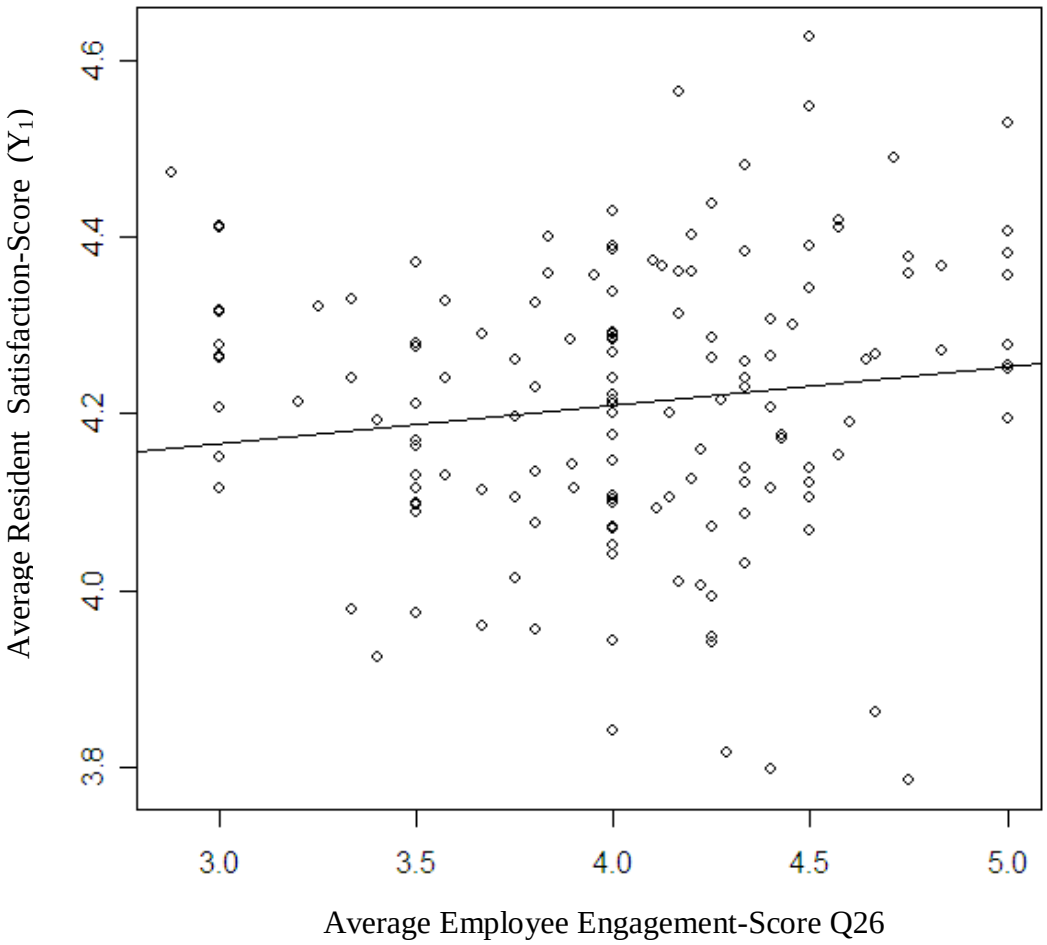
Age Range of Residents								
	2005		2006		2007		Total	
	#	%	#	%	#	%	#	%
Under 25	1490	19.2%	1434	19.1%	1137	16.5%	4061	18.3%
25-34	3985	51.3%	3655	48.7%	3364	48.9%	11004	49.7%
35-44	1327	17.1%	1299	17.3%	1335	19.4%	3961	17.9%
45-54	724	9.3%	803	10.7%	782	11.4%	2309	10.4%
55-64	422	5.4%	475	6.3%	422	6.1%	1319	6.0%
65+	179	2.3%	195	2.6%	147	2.1%	521	2.4%

Years of Residence								
	2005		2006		2007		Total	
	#	%	#	%	#	%	#	%
0-6 Months	2098	25.79	2091	26.47	1745	24.02	5934	25.7%
6-12 Months	2038	25.05	2087	26.41	1946	26.79	6071	26.2%
1-3 Years	2941	36.15	2609	33.02	2454	33.78	8004	34.6%
3-5 Years	693	8.52	717	9.07	739	10.17	2149	9.3%
5+ Years	365	4.49	397	5.02	380	5.23	1142	4.9%

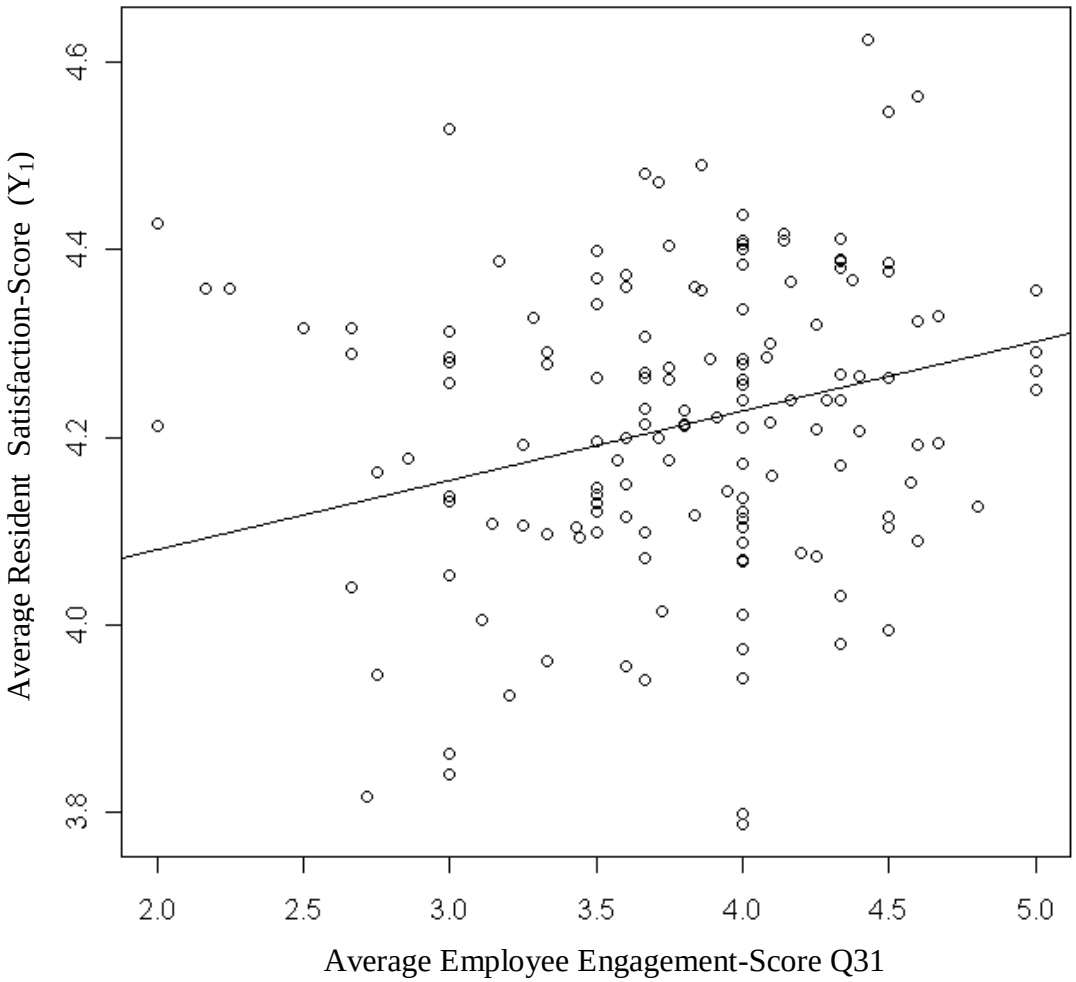
APPENDIX G

SCATTERPLOTS FROM STATISTICAL ANALYSIS FOR Y_1, Y_2, AND Y_3 VERSUS OTHER VARIABLES

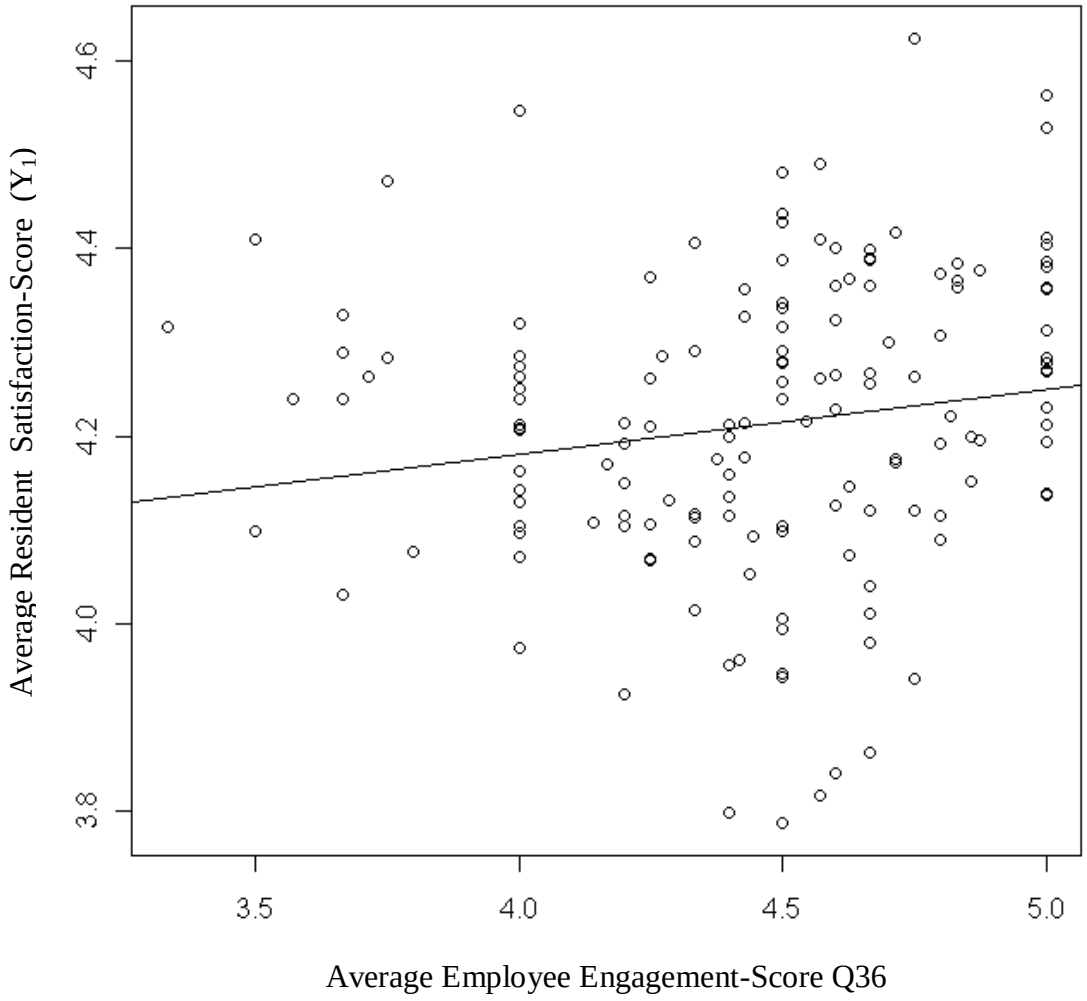
SCATTERPLOTS FROM STATISTICAL ANALYSIS
FOR Y1, Y2 & Y3 VERSUS OTHER VARIABLES



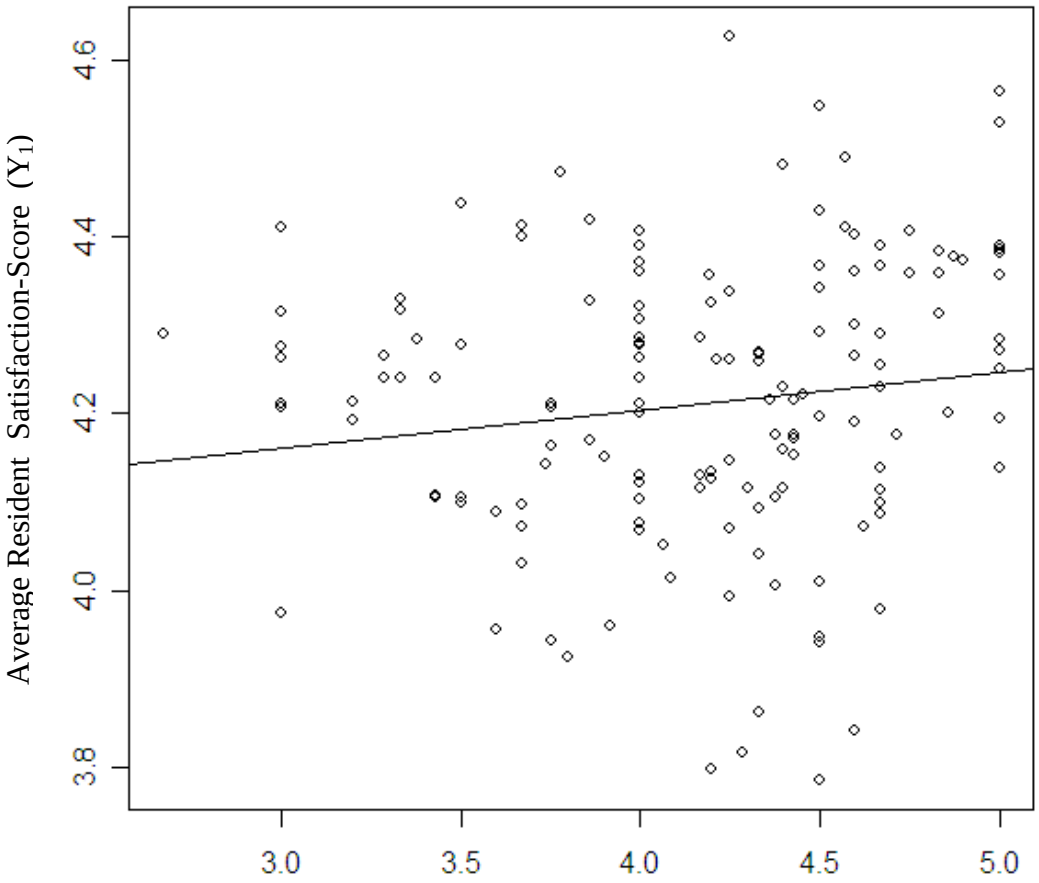
Average Resident Satisfaction-Score (Y_1) versus
Average Employee Engagement-Score
(Q26 – My Immediate Supervisor Assists Me in Identifying my Training or Personal Development Needs.)



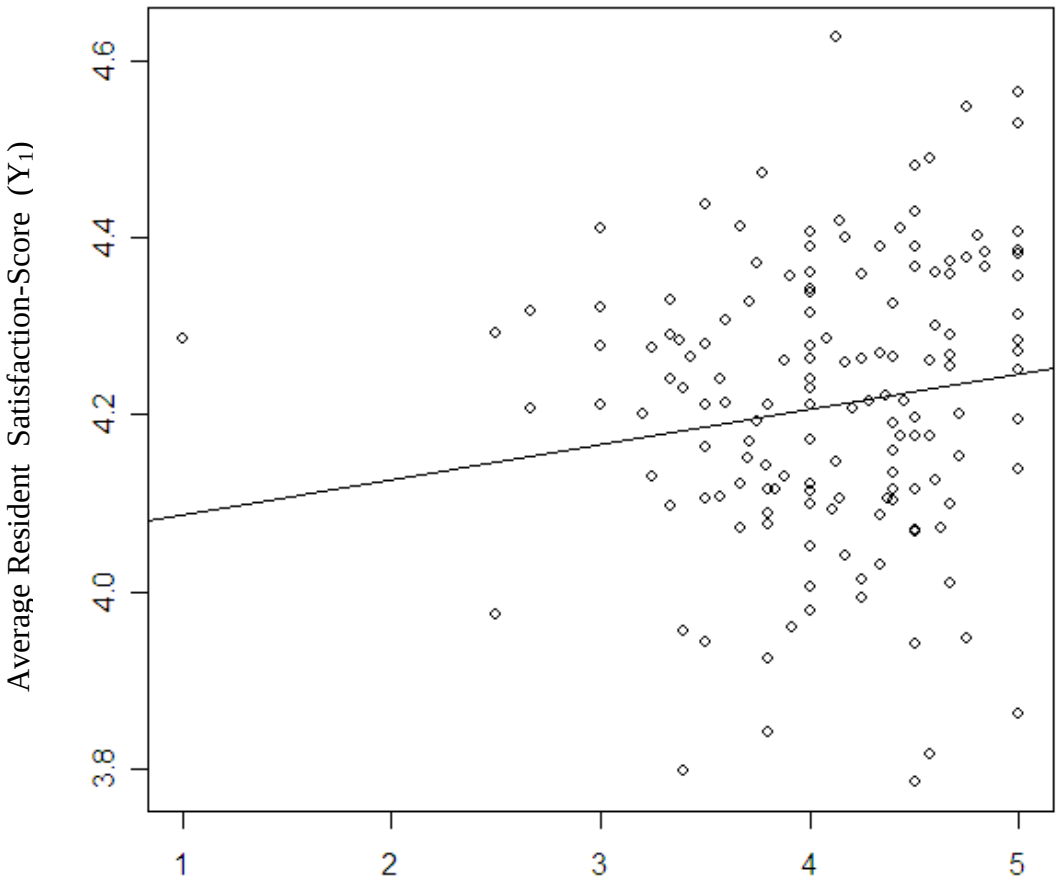
Average Resident Satisfaction-Score (Y_1) versus
Average Employee Engagement-Score
(Q31 – Ancillary Services (Water Billing, Phone, CATV, Gas.)



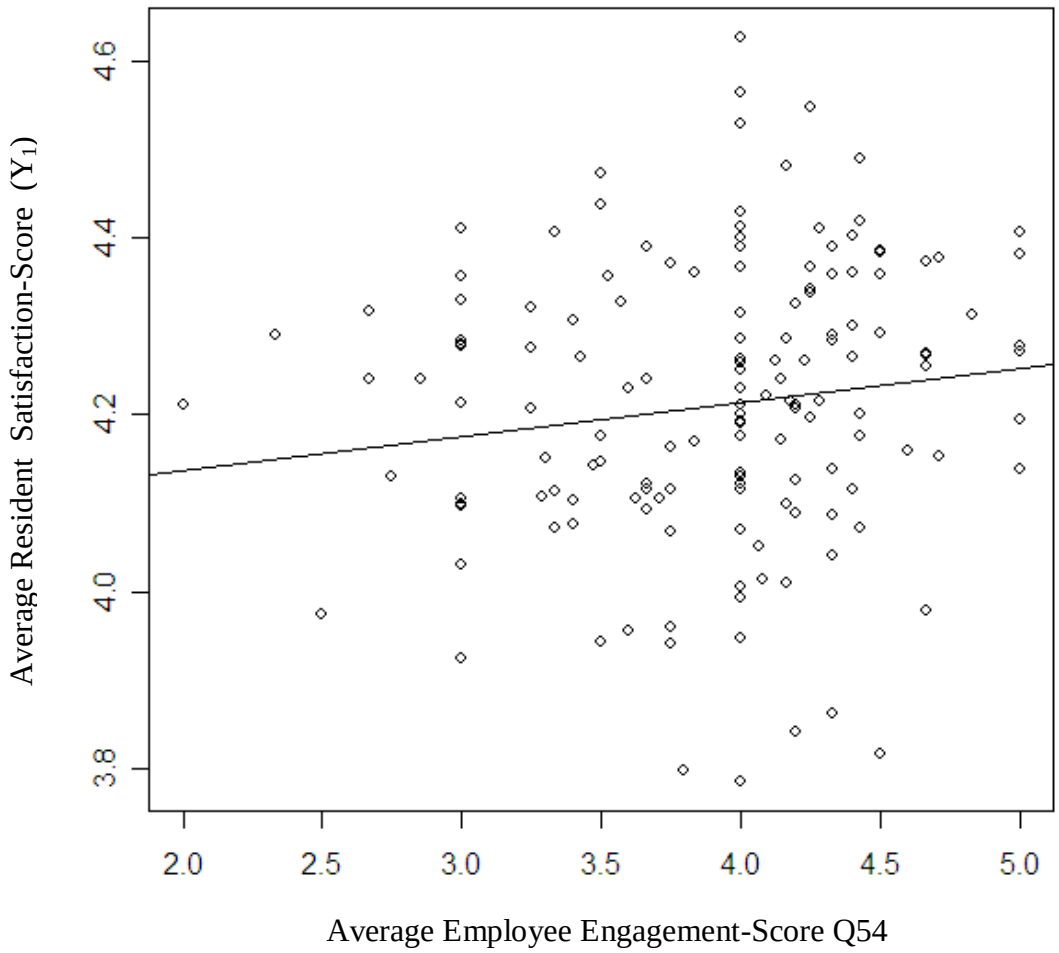
Average Resident Satisfaction-Score (Y_1) versus Average Employee Engagement-Score (Q36 – Immediate Supervisor – I Understand What My Immediate Supervisor Expects of Me.)



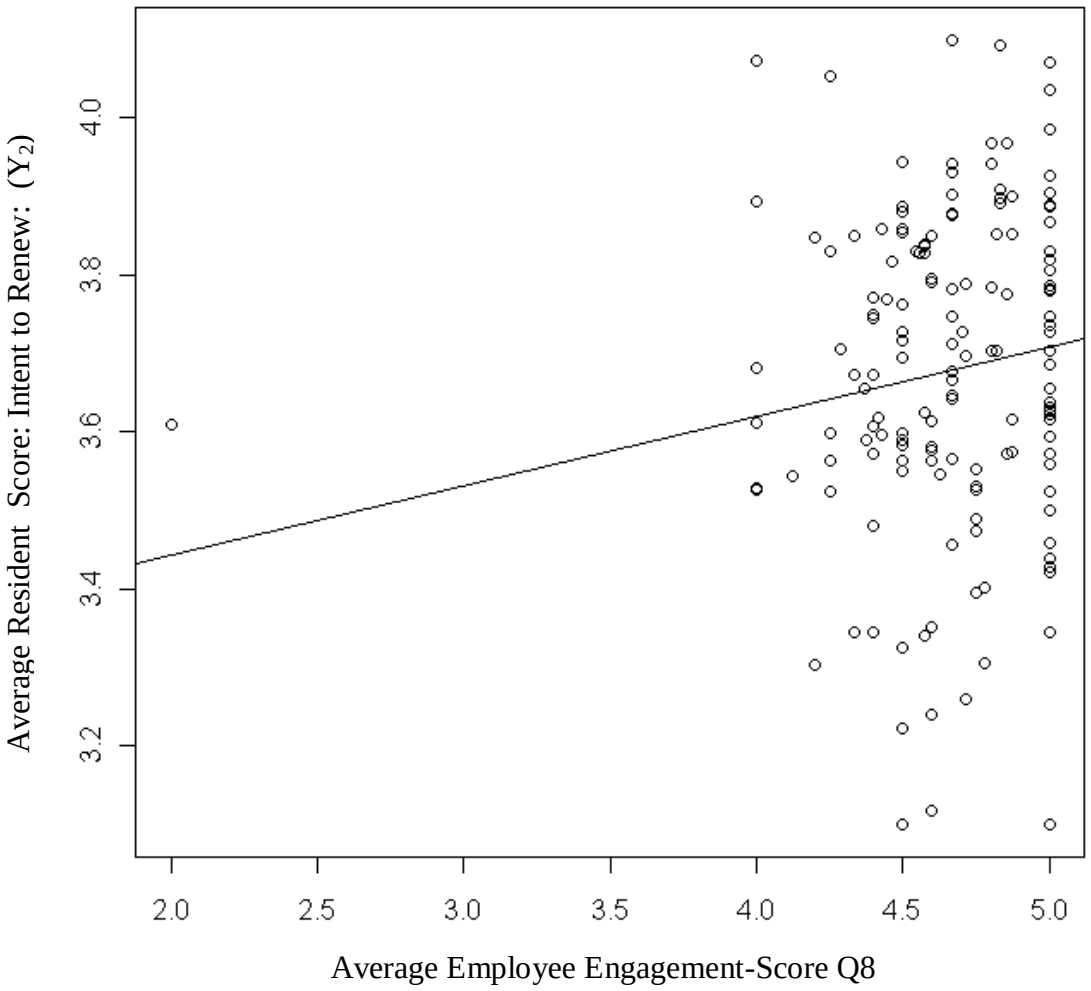
Average Resident Satisfaction-Score (Y_1) versus
Average Employee Engagement-Score
(Q42 – My Immediate Supervisor Communicates Clearly.)



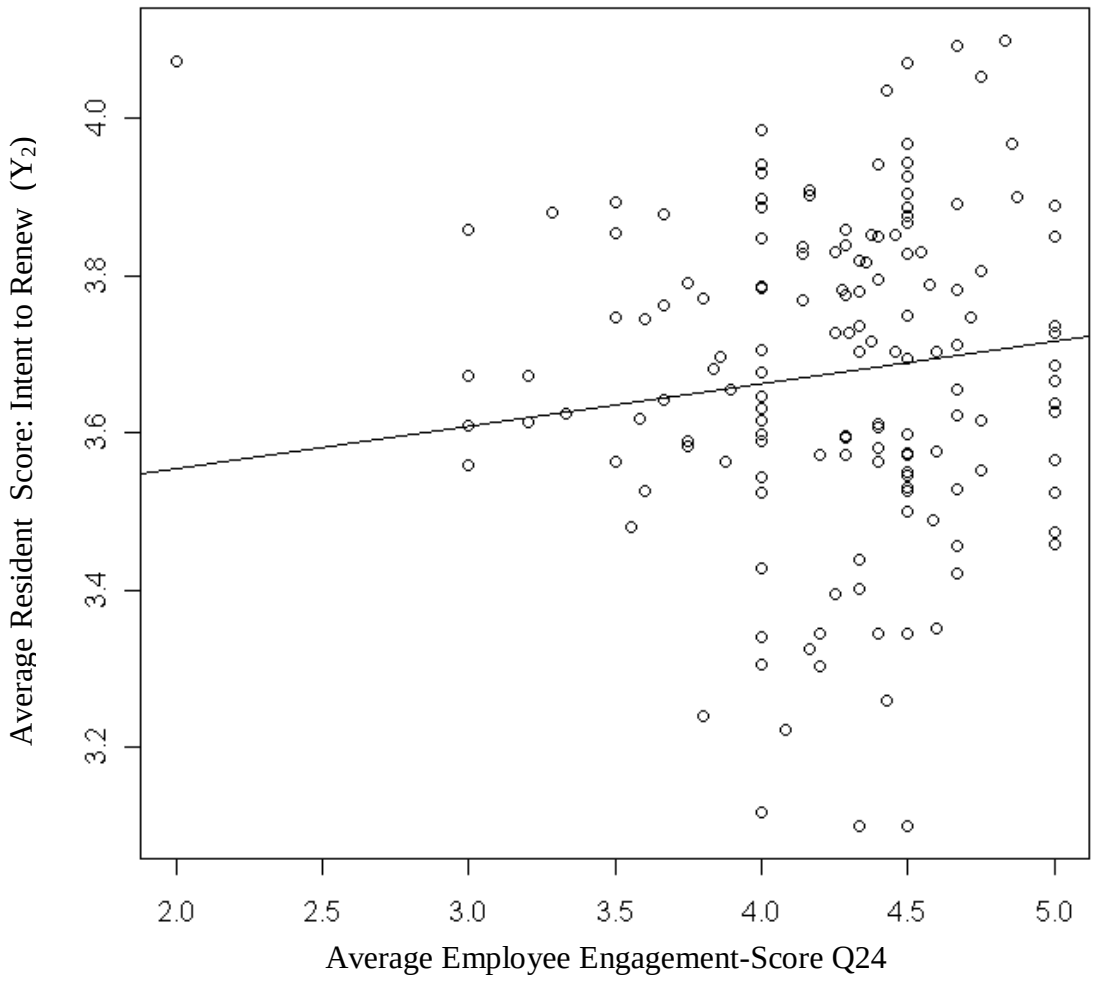
Average Resident Satisfaction-Score (Y_1) versus
Average Employee Engagement-Score
(Q43 – My Immediate Supervisor Recognizes My Extra Efforts.)



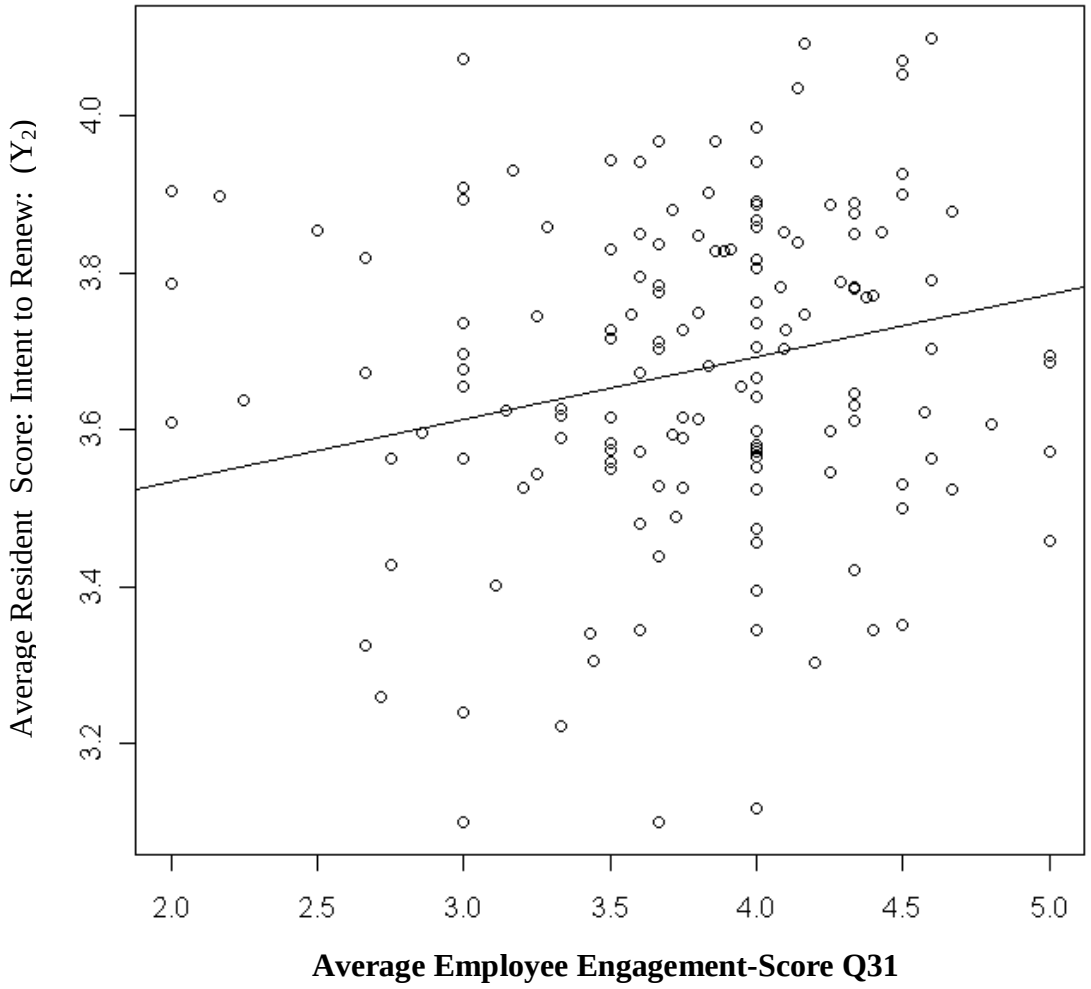
Average Resident Satisfaction-Score (Y_1) versus
Average Employee Engagement-Score
(Q54 – My Immediate Supervisor Assists Me in Identifying
My Training or Personal Development Needs.)



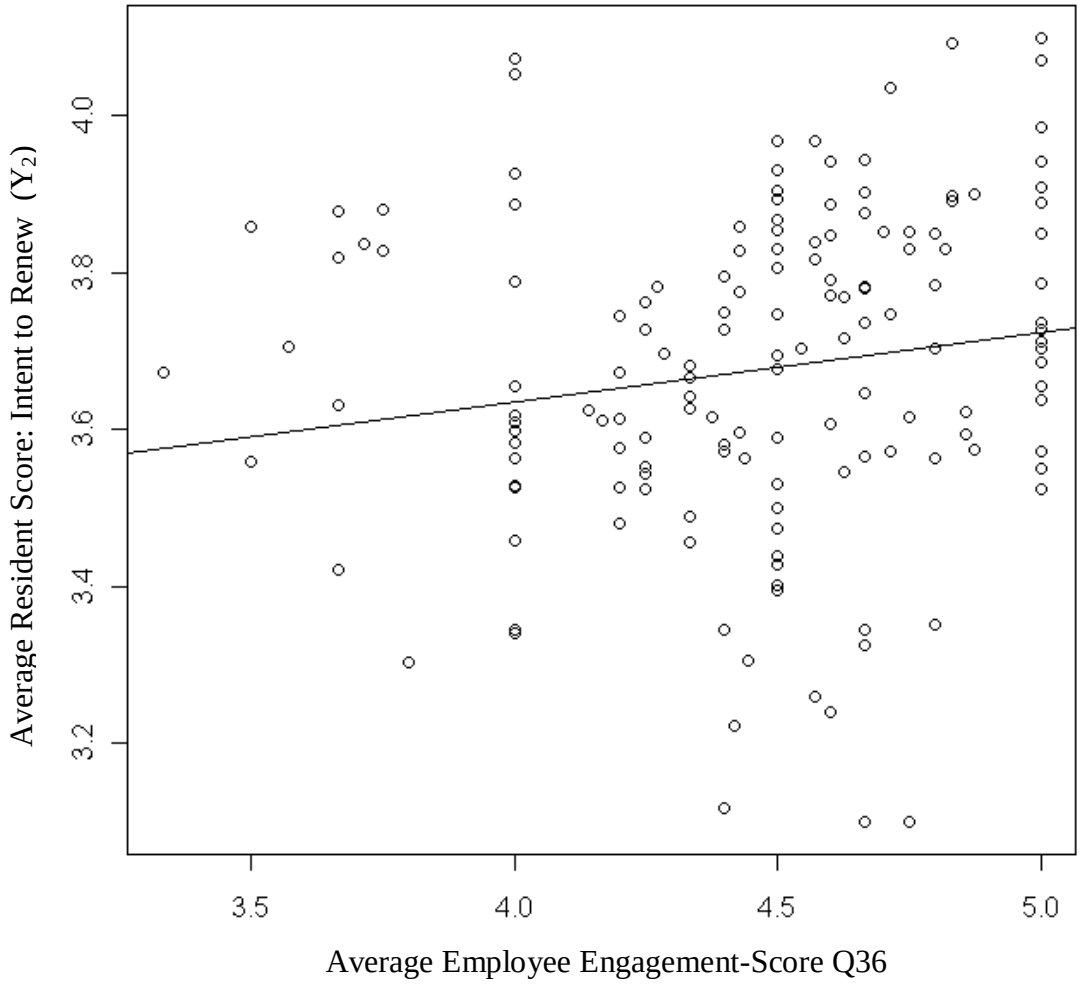
Average Resident Score: Intent to Renew (Y_2) versus Average Employee Engagement-Score (Q8 – I would Recommend this Community to Someone Seeking an Apartment Home.)



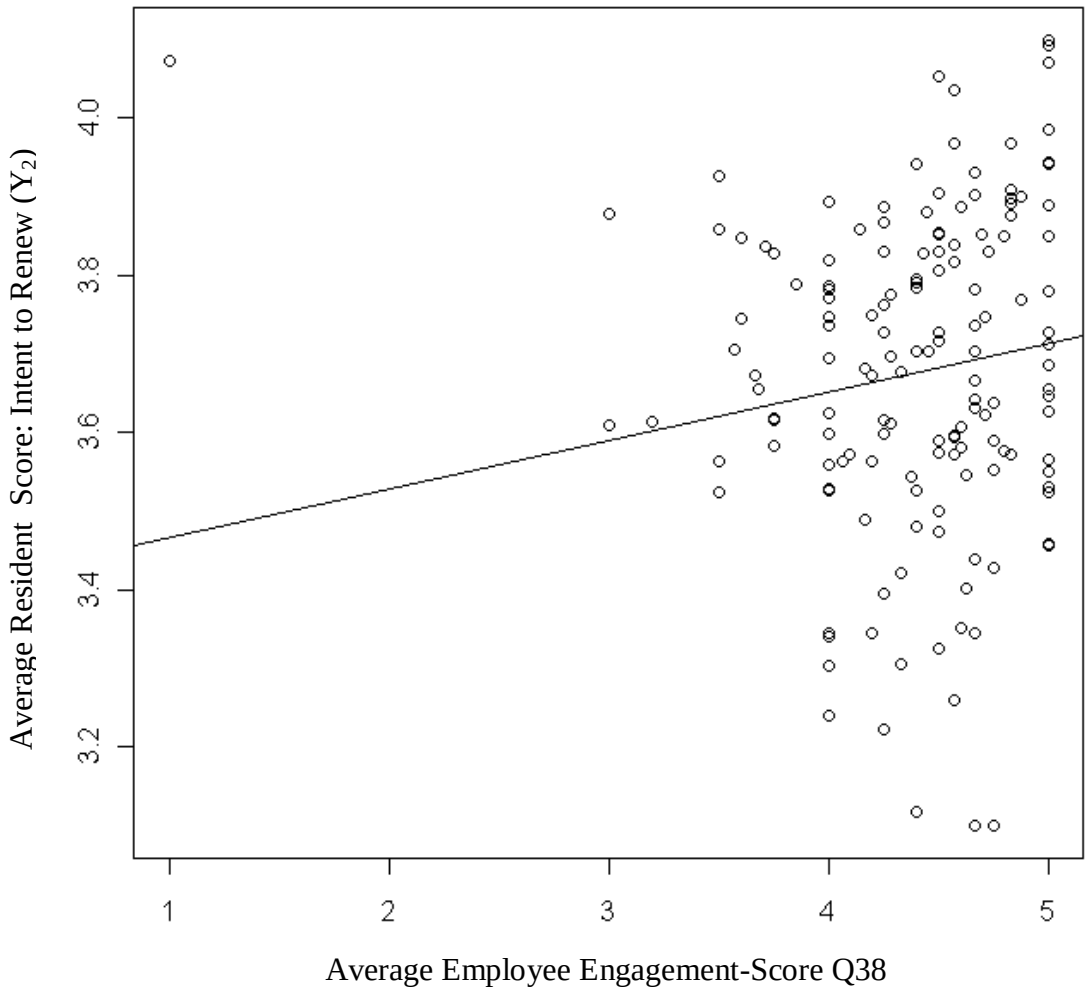
Average Resident Score: Intent to Renew (Y_2) versus Average Employee Engagement-Score (Q24 – I Feel Like an Integral Part of the Team.)



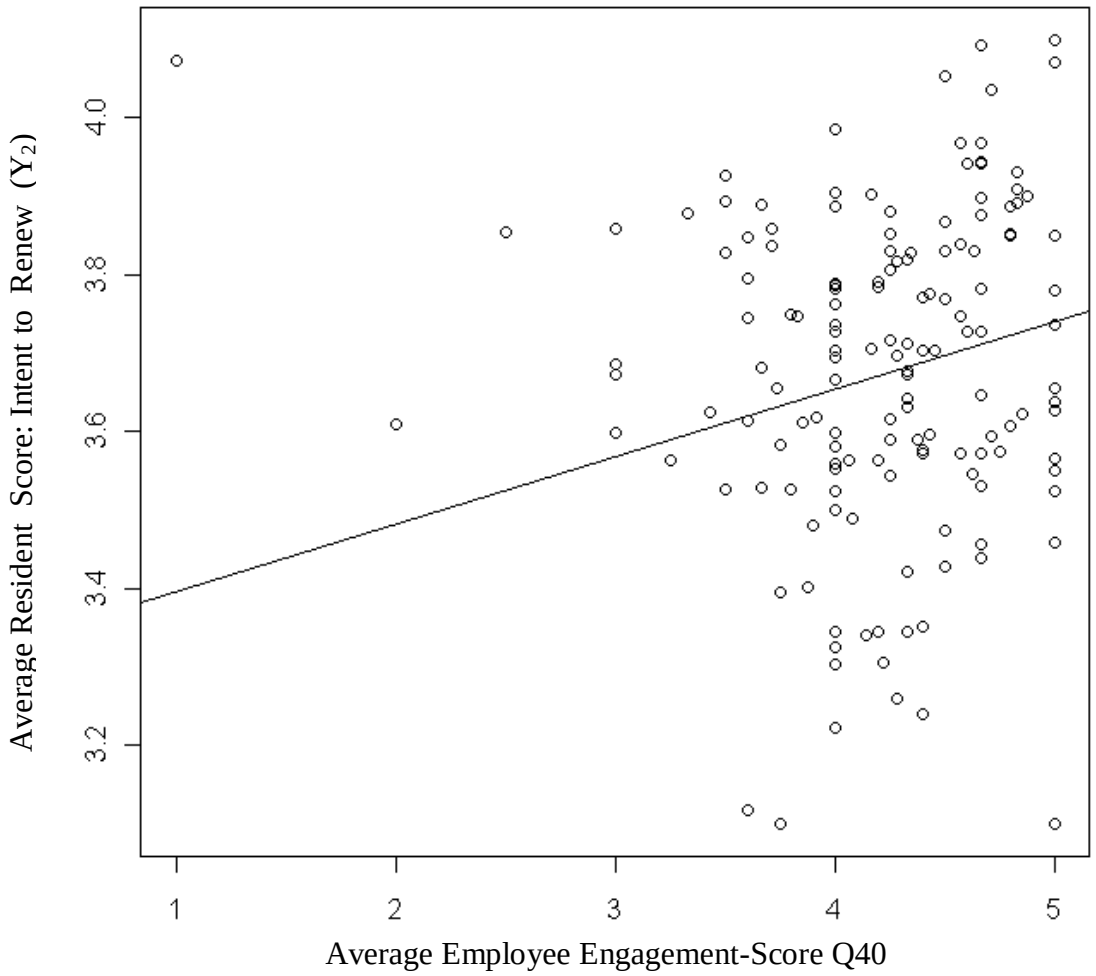
Average Resident Score: Intent to Renew (Y2) versus
Average Employee Engagement-Score
(Q31 – Ancillary Services (Water Billing, Phone, CATV, Gas.)



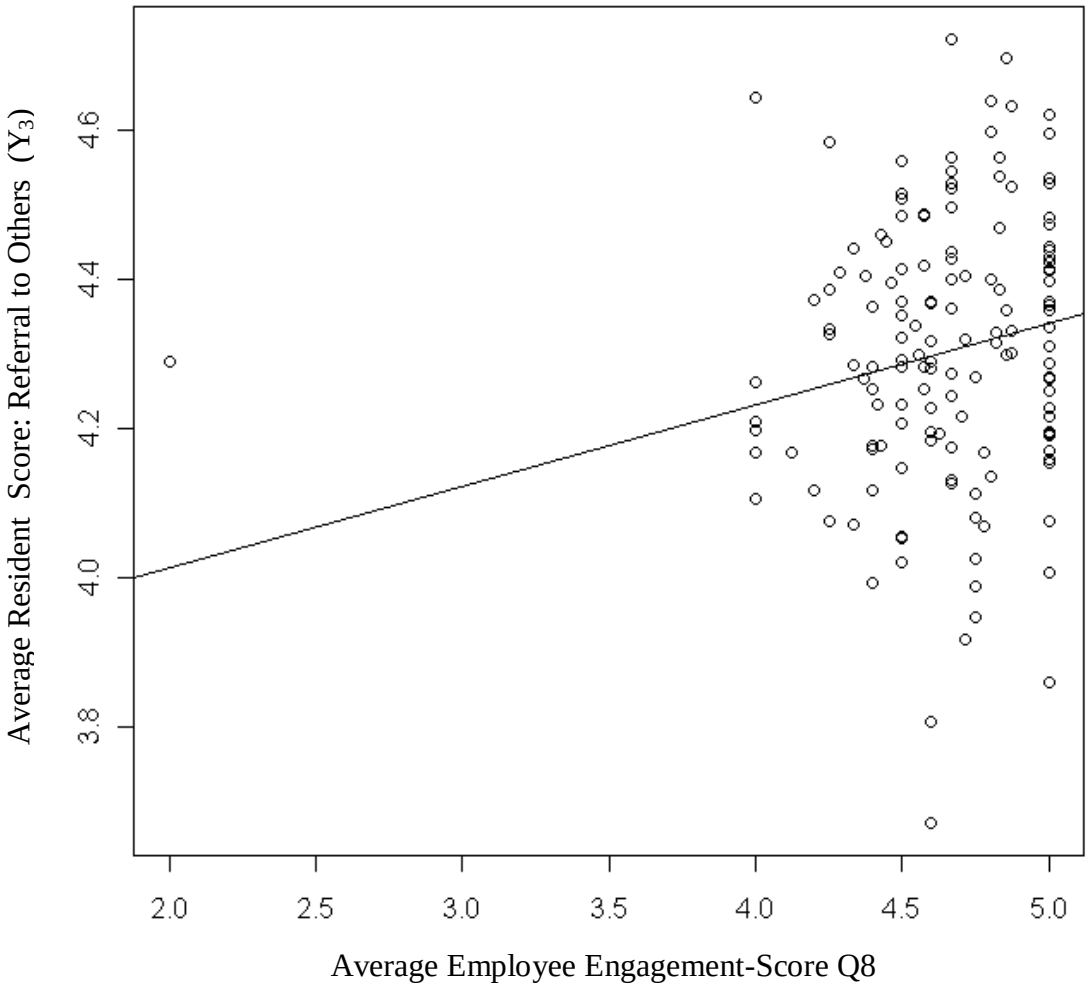
Average Resident Score: Intent to Renew (Y_2) versus
Average Employee Engagement-Score
(Q36 – I understand What My Immediate Supervisor Expects of Me.)



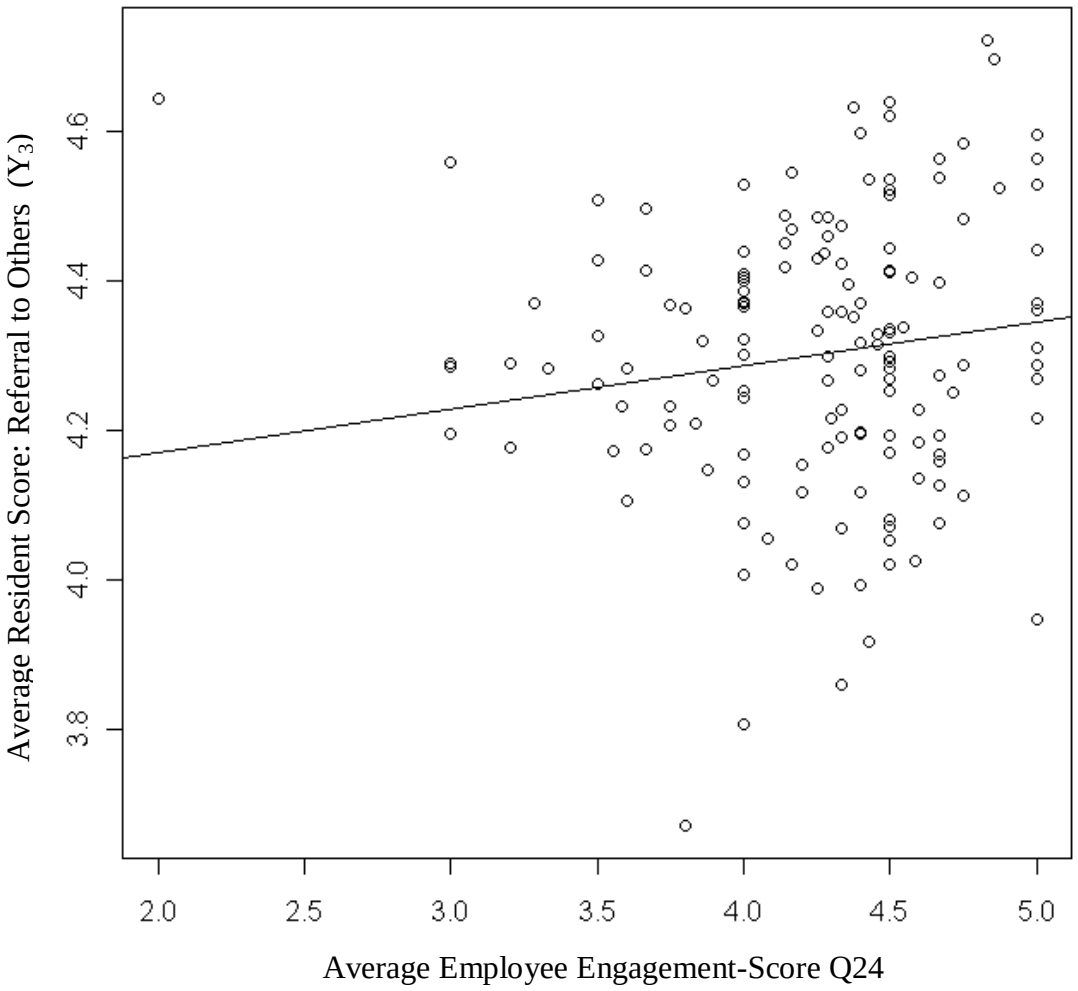
Average Resident Score: Intent to Renew (Y_2) versus Average Employee Engagement-Score (Q38 – My Immediate Supervisor Trusts Me.)



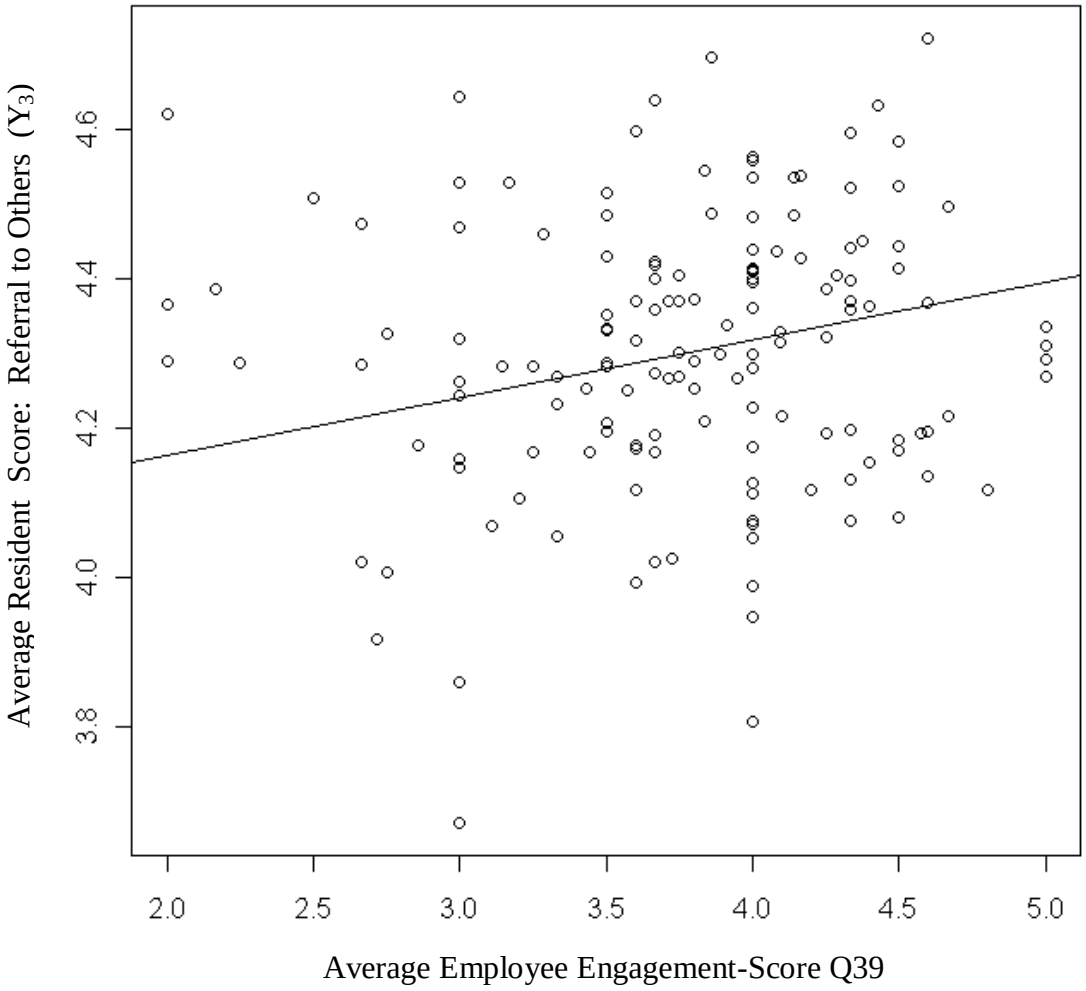
Average Resident Score: Intent to Renew (Y_2) versus
Average Employee Engagement-Score
(Q40 – I am Treated with Fairness by My Immediate Supervisor.)



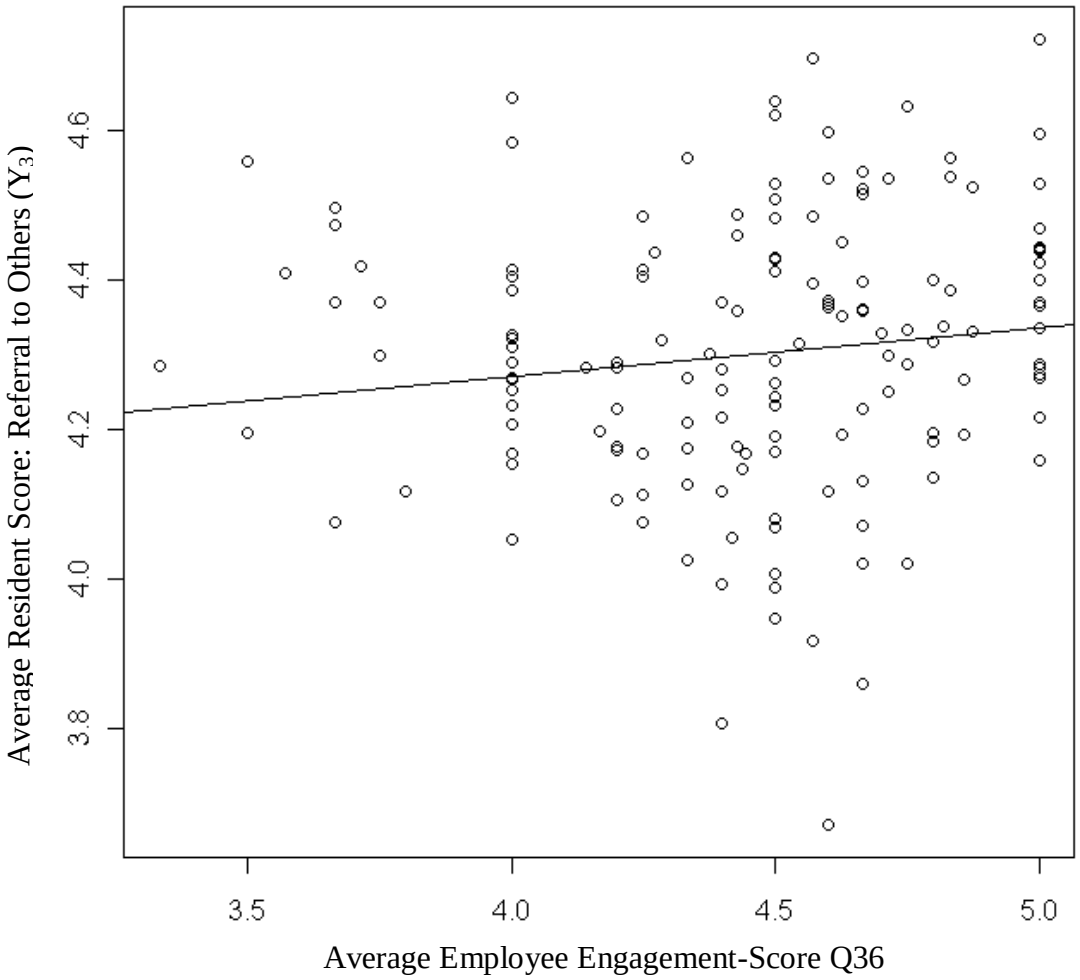
Average Resident Score: Referral to Others (Y_3) versus Average Employee Engagement-Score (Q8 – I Would Recommend this Community to Someone Seeking an Apartment Home.)



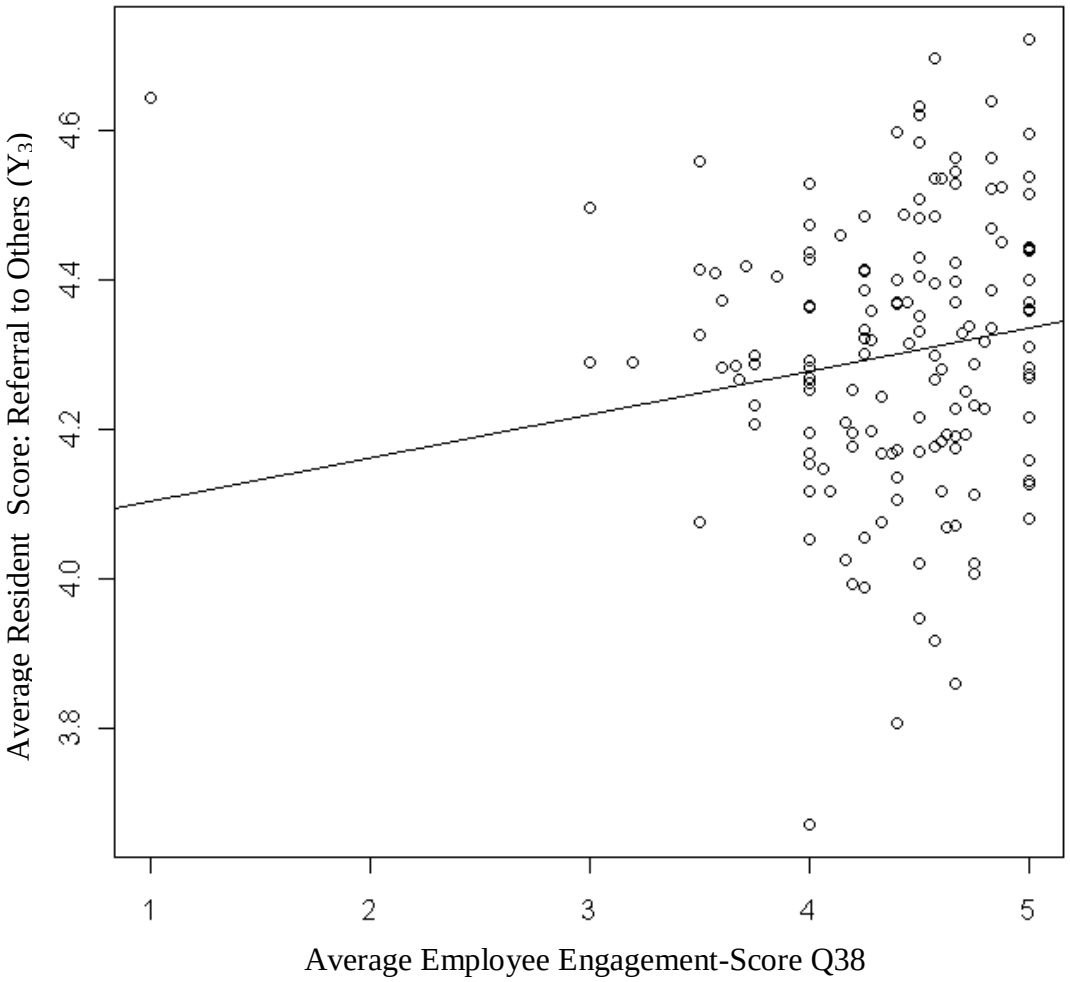
Average Resident Score: Referral to Others (Y_3) versus Average Employee Engagement-Score (Q24 – I Feel like an Integral Part of the Team.)



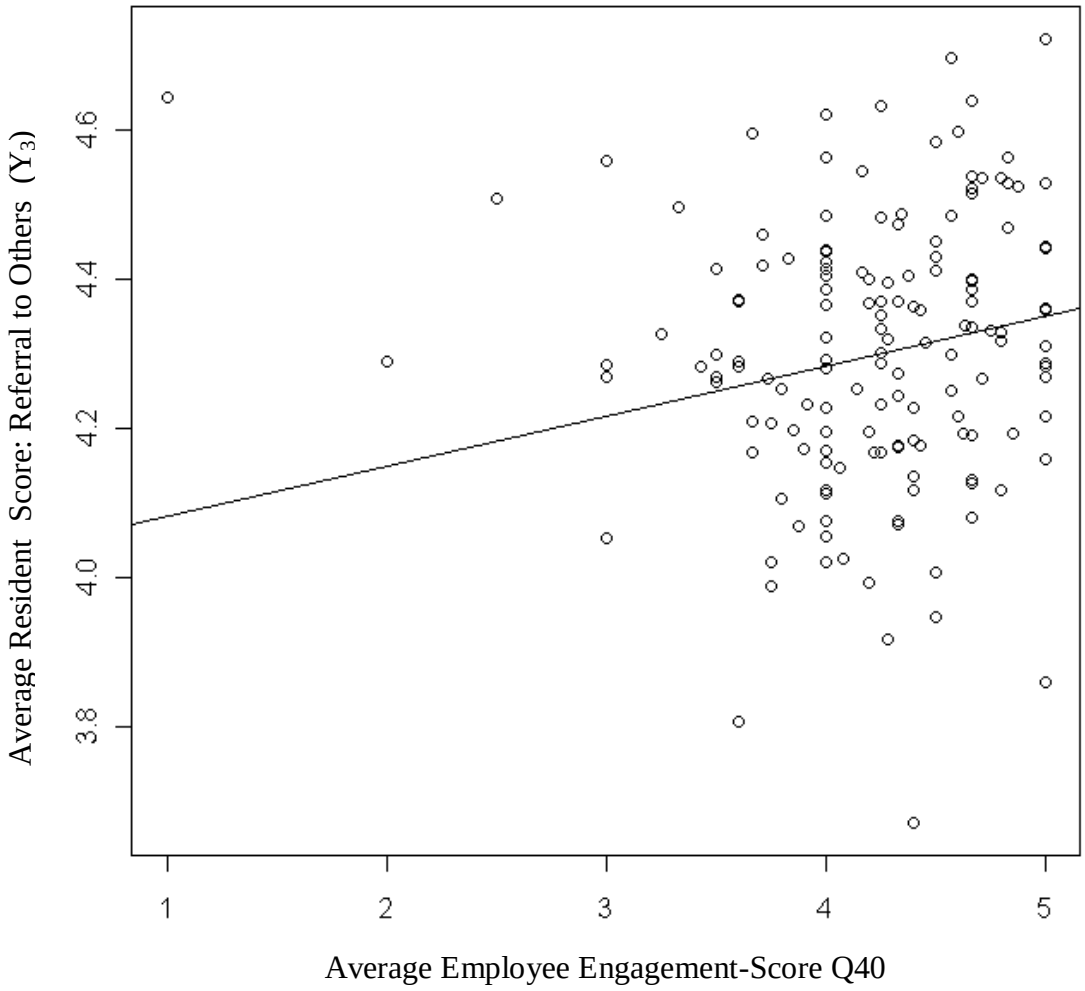
Average Resident Score: Referral to Others (Y_3) versus Average Employee Engagement-Score (Q39- Ancillary Services (Water Billing, Phone, CATV, Gas.)



Average Resident Score: Referral to Others (Y_3) versus
Average Employee Engagement-Score
(Q36 – I Understand what My Immediate Supervisor Expects of Me.)



Average Resident Score: Referral to Others (Y_3) versus Average Employee Engagement-Score (Q38 – My Immediate Supervisor Trusts Me.)



Average Resident Score: Referral to Others (Y_3) versus
Average Employee Engagement-Score
(Q40 – I am Treated with Fairness by my Immediate Supervisor.)

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