

AN ASSESSMENT OF JOHN DEERE DEALERSHIP SERVICE PERSONNEL
NEEDS AND SERVICE MANAGERS' PERCEPTIONS OF THE JOHN DEERE AG
TECH PROGRAM

by

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B.S., Pittsburg State University, 1996
M.S., Pittsburg State University, 2000

AN ABSTRACT OF A DISSERTATION

submitted in partial fulfillment of the requirements for the degree

DOCTOR OF PHILOSOPHY

Department of Secondary Education
College of Education

KANSAS STATE UNIVERSITY
Manhattan, Kansas

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Abstract

John Deere Corporation sponsors 16 schools within the United States that are designed to educate students to become future agricultural equipment technicians. At the time of this study, the schools' enrollments were at a less-than desirable level, 80% capacity. However, the company was receiving feedback that dealerships needed technicians. The need to determine the disparity between the need for technicians and the level of enrollment led to the pursuit of this study.

The researcher sampled 306 John Deere agricultural service managers across the continental United States to determine: (a) if the dealerships truly needed technicians, (b) the methods dealerships were using for locating technicians, and (c) the service managers' perceptions of the John Deere (JD) Ag Tech program. The study also analyzed the relationships between the service managers' perceptions of the JD Ag Tech program and five independent variables: (a) number of technicians employed at John Deere dealerships, (b) number of stores dealer-organizations own, (c) distance between John Deere dealerships and the closest JD Ag Tech school, (d) number of JD Ag Tech students John Deere dealerships have sponsored, and (e) service managers' age.

The results of the study indicated that John Deere service managers did plan to hire technicians over the next 12 months as well as over the next three years. However, it was also determined that 60% of the service managers were only somewhat knowledgeable or unfamiliar with the JD Ag Tech Program. For the service managers that had experienced sponsoring JD Ag Tech students, those service managers were satisfied with the JD Ag Tech graduates.

The researcher's recommendations focused upon two areas. The first was to improve the marketing of the JD Ag Tech program to insure that all John Deere service managers become familiar with the program. The second recommendation was to focus on improving the "student" component of the partnership, by recruiting the students earlier in their high school careers, and having the partners work together to target high caliber students.

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Approved by:

Major Professor
Steven R. Harbstreet

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Chapter 1

Introduction

Today the agricultural industry faces the challenge of providing farm equipment that performs to customers' expectations. Customers depend upon the equipment to provide quality service with minimum downtime during the operational season. A key to equipment performing at optimum levels is having properly serviced equipment, which requires hiring competent qualified technicians, who are in short supply. This study investigated the John Deere dealerships' need for technicians, what the dealers were doing to meet those needs, and the service managers' perceptions of the corporately sponsored John Deere (JD) Ag Tech program that is used to address the need for qualified technicians.

Background

The United States economy is greatly impacted by the Agricultural industry. According to the U.S. Department of Agriculture web site, "The United States is now the world's largest agricultural exporter. The value of agricultural exports equals nearly one-fourth of farm cash receipts, about twice the level of the overall U.S. economy, and 1 out of 3 acres are planted for export" (*Frequently Asked Questions*, n.d), totaling \$61,383,000,000 of agricultural commodities exported in 2004 (*Foreign Agricultural Trade*, n.d). Farming also impacts individual citizens with every trip made to the grocery store. The U.S. Department of Agriculture Economic Research Services stated, "In 2004, U.S. retail food prices increased at their fastest rate since 1990" with a 3.4 percent increase (*Briefing room*, n.d).

Ag Equipment Impact

Many factors, one of which is farm equipment, affect retail food prices. Farmers pay substantial prices for their farm equipment. When they pay for agricultural machinery, farmers associate price with quality leading them to expect that the equipment will perform at the highest level at all times. Because of the time sensitive nature of the agriculture industry, if a tractor fails then the farmer does not have the luxury of waiting a week for a qualified dealer to make the repair. A machine-breakdown during planting or harvest season is especially costly, because the farmer loses the ability to maximize yield (Wehrspann, 2003, p. 26). Dr. Hanna, an Iowa State University agricultural economist, estimated that a farmer using a 12-row planter for an eight-hour day, could lose \$1,400 for a single breakdown-day (Wehrspann, 2003, p. 26). Those costs will be passed on to the consumers' price for food.

Equipment Sophistication

The level of sophistication in today's equipment has increased rapidly, adding complexity to equipment repairs and the technician's job. For example, today's agricultural equipment is frequently controlled by a system of computers. These computers share system data over a high-speed data network known as a controller area network. As an example of further sophistication at the technological level, many manufacturers have also integrated global positioning satellite (GPS) systems into the equipment. John Deere's GPS product line is called Ag Management Solutions (AMS). The journal *Appropriate Technology* highlighted a portion of John Deere's AMS capacities, "Based on the use of satellite positioning, adapted by John Deere as its StarFire system, electronics can provide steering assistance to help improve timeliness,

productivity and efficiency” (“John Deere’s system,” 2003, p. 50). On the other hand, operators who do not choose to use sophisticated equipment and who manually drive the tractor are less productive and efficient because: (a) they must rely on their own sight during different levels of visibility, (b) their driving is influenced by varying levels of attentiveness dependent upon how tired they might be, and (c) while trying to drive and maintain a straight heading, they also must watch the machine’s monitors in order to achieve the machine’s peak performance and maintain the machine’s service.

Changing Technology

Change itself is another factor impacting the technical sophistication needed by today’s technician. The United States Department of Labor classifies job responsibilities and describes training related to many occupations. The Department’s *Occupational Outlook Handbook* “Heavy Vehicle and Mobile Equipment Service Technicians and Mechanics” stated, “constant change in equipment technology makes it necessary for technicians to be flexible and have the capacity to learn new skills quickly” for the occupation (United States Department of Labor, n.d, Training, other Qualifications, and Advancement section, ¶ 1). Whether or not the new equipment changes are sophisticated, the technician must learn those changes in technology. One example of a non-sophisticated change is a manufacturer adding a fuse to an electrical circuit. If the technician failed to learn about this change, it might delay the repair.

Dealerships Need Skilled Technicians

Farm equipment dealers must be able to find competent technicians who can maintain these sophisticated machines. One factor that affects an agricultural dealership’s ability to hire a technician is competition with other industries that need to

hire technicians. This competition was identified in the United States Department of Labor Bureau of Labor Statistics' *Occupational Outlook Handbook*. The handbook stated that heavy vehicle and mobile equipment service technician employers struggle to find technicians "because many young people with mechanic training and experience opt to take jobs as automotive service technicians, diesel service technicians, or industrial machinery repairer – jobs that offer more openings and a wider variety of locations in which to work". (United States Department of Labor, n.d, Job Outlook section, ¶ 2). The handbook also indicated that an "Increasing number of heavy duty and mobile equipment service technicians will be required to support growth in the construction industry, equipment dealers, and rental and leasing companies" (United States Department of Labor, n.d, Job Outlook section, ¶ 3).

Sean Kilcarr reported that one of those competing industries, the trucking industry, was heading into dire straits. Kilcarr (2005) stated, "The growing shortage of technicians serving the trucking industry is not a problem that's going from bad to worse – it's a problem that's going from bad to right off the cliff" (p. 21). Thus, companies like John Deere must manage to attract and retain specialists in an era of increasing technological sophistication and competition from not only their own but other industry as well.

Needs for the Near Future

Sophisticated equipment and competing industries are not the only factors affecting agricultural equipment dealerships' need for technicians. A changing workforce also impacts the dealership's ability to recruit and retain skilled technicians. John Deere estimates that more than 25% of the dealership technicians are presently 47

years of age or older, meaning that dealerships will be required to replace more than a fourth of their technicians over the next two decades. Attrition of technicians will also occur when technicians leave John Deere dealerships and accept jobs with competing brands of agricultural dealerships or other industrial fields, such as construction, trucking, or automotive technology. John Deere also projects that as an average, every dealer is short one technician (T.E. Hughes personal communication, April 15, 2005). Caterpillar, the largest U.S.-based construction equipment manufacturer, selling and servicing AGCO farm equipment projects that from 2004 to 2008 they will need 27,000 to 45,000 technicians globally, due to growth in market share, attrition of service personnel, and a decrease in the available labor pool (chart provided by S. L. Hitch, April 1, 2005).

Herman, Olivio, and Gioia (2003) in *Impending Crisis Too Many Jobs Too Few People*, warned U.S. companies of an upcoming labor shortage. The authors indicated that the United States was going to have a great need for all types of skilled workers, including equipment technicians. The authors stated that two trends — “available jobs” and “civilian labor force” — were moving in opposite directions, which will cause the U.S. job market to have a deficit of 10,033,000 jobs to fill, with no skilled applicants to apply for the jobs by the year 2010 (p. 49). The authors further explained their prediction:

The profile of the American workforce will change as the wave of Boomers ages. The reduced numbers of Generation Xers will again present a serious challenge to organizational executives with stakeholders to serve. Younger folks, looking out for themselves, will move from job to job, seeking training and other opportunities. Job tenure will decrease. Workers will once again find themselves

in the driver's seat, in a position to "choose" their employers. (Herman et al., 2003, p. 35)

Dealers Desire to Meet Customer's Expectations

Setting aside future shortages of skilled labor, dealers today must meet customers' immediate expectations or risk losing their business. In order to maintain and expand their business dealers must provide their customers the best quality equipment and service. To meet this service requirement it is crucial for technicians to diagnose complex systems proficiently, giving customers a high level of satisfaction. A tractor sitting inoperative in the field costs the farmer precious time and money, a situation that is highly unsatisfactory. Customers who pay hundreds of thousands of dollars for late model tractors demand that dealers resolve problems quickly or risk losing business. For this reason original equipment manufacturers (OEMs) also desire that dealerships have skilled technicians.

Corporations Desire Quality Dealership Service

Corporate manufacturers have the responsibility of assisting their dealer organization to meet their customer service needs, or the OEMs also risk losing the same customer base and or market share. John Deere is currently the premier agriculture OEM headquartered in the United States (*Thompson Gale, n.d.*). A 1996 *Agri Marketing* article quoted John Deere President of Worldwide Agricultural Equipment Division, Bernie Hardiek, indicating that one of the reasons they became "the market leader and the best-recognized brand in the ag equipment business" was "by providing customers . . . the best customer service with the most professional dealers" ("As always, p. 54).

Another agriculture-OEM executive agreed with the need for dealers who respond to customer demand for quality equipment and superior service. Senior vice president and general manager Randy Hoffman led the AGCO's worldwide Challenger Division. AGCO was listed as one of the top four agriculture OEMs headquartered in the United States (*Thompson Gale, n.d.*). Hoffman was quoted in the November/December 2004 issue of *Agri Marketing* as stating, "a good dealer network is essential to the success of any brand in today's competitive marketplace" ("Challenger: A Winning", p. 62). Hoffman further stated, "it will be increasingly clear that well-capitalized, well-trained and technology-savvy dealers who know how to take care of customers and minimize downtime will be in demand" (p. 62).

Corporate Response to Dealer Technician Needs

Two U.S.-based off-highway OEMs have developed a corporately sponsored technician education program that provide dealers with skilled technicians. Caterpillar, the top U.S. construction equipment manufacturer, and John Deere, the top U.S. agricultural equipment manufacturer, have invested vast amounts of money in their community college OEM programs. The Caterpillar ThinkBIG program and the JD Ag Tech program educate students about the company's product. These two programs are the only two offered by U.S.-based off-highway OEMs. These two programs partner with community colleges to educate students primarily on their company's equipment. Students who complete a standard general education core and a technical core earn an associates degree. In October 2006 John Deere sponsored 16 JD Ag Tech schools (*John Deere power up, n.d.*) and Caterpillar sponsored 11 ThinkBIG schools (*Caterpillar, n.d.*)

located in the United States. Appendix A provides a list of the JD Ag Tech schools located in the United States.

Community Colleges Develop Tomorrow's Workforce

Not only do dealerships and corporations have a vested interest in hiring qualified technicians, but community colleges share this interest because they can supply the industry with skilled technicians. However, today's budgets constraints have hindered colleges' ability to teach current technology. The American Council on Education (2005) stated in *Bridging Troubled Waters*, "The prevailing belief among many higher education leaders is that these are hard financial times from which few colleges and universities remain unscathed, regardless of mission or control" (p. 5). Hagedorn pointed out that diminishing funds in higher education hurt vocational programs the most. Hagedorn (1999) explained that even though all types of college programs were struggling with decreased funding while trying to maintain or make improvements, "the problem is especially acute in the fastest growing segment of higher education – namely community college vocational programs" (p. 91).

As a result of the decrease in higher education funding and the rise of equipment costs, college programs find themselves dependent upon outside sources for funding. Some sources are state and federal grants, local businesses, and corporate manufacturers. Colleges that are unable to secure help from these sources will be unable to educate their students with current and future technology. This will increase the problem of dealerships not finding skilled technicians who can service sophisticated agricultural equipment.

A partnership between community colleges and OEMs is one choice that corporations and colleges can make to help alleviate the problem. Benoit (1995) stated that “the reasons many colleges are moving toward these types of training agreements include overcoming financial barriers in upgrading equipment, enhancing instructor skills, and offsetting enrollment declines in programs that are viewed as obsolete or in need of improvement” (p. 1).

Each participant brings something to the partnership. One philosophy that the participants follow is that each of the organizations can produce something better if they collaborate than if they attempt to handle the problem on their own. Many benefits purportedly will result from a well-functioning partnership. Dr. David Devier (1999) listed three benefits, “corporations and dealers acquire skilled workers, the college provides much needed training, and the students gain employment in well-paid, high-skilled jobs” (p. 21).

Partnerships also add credibility to the institution and program, and help in recruiting new students. Devier (1999) explained when companies like General Motors, John Deere and Caterpillar partner with colleges, the campuses gain credibility and exposure that will greatly enhance a college’s ability to recruit new students (p. 20). Pugh (1998) stated, “The image of the institution can be impacted in a positive manner as linkages with business and industry credential the community college in the eyes of those who might have otherwise not been interested or observant” (p. 18). Benoit (1995) indicated that partnerships enable campuses to “draw others to the school” and increase “student recruitment and retention” (p. 74-75).

The existing body of knowledge relating to college-industry partnerships is abundant. Many qualitative studies have detailed success factors and other important attributes associated within the partnerships. However, no study has attempted to investigate the needs of a company's dealership organization, nor determined how the dealers are trying to meet those needs. Neither has a study sampled an entire dealership organization to determine perceptions of an OEM/college educational partnership.

John Deere has invested tremendous amounts of time, money and energy in their JD Ag Tech program. Although the company corporately sponsors 16 schools in the United States, they still receive input that the dealers need technicians. Considering all the reasons why the agriculture industry needs technicians, we can ask: why are JD Ag Tech schools only 80% filled (personal communication with Tom Hughes, March 2005)?

Just as a football coach can list many items that can cause a team to fail, so, too, can a college program director, an instructor and/or corporate manager. Likewise, unless John Deere dealers are willing to participate in the JD Ag Tech program by sponsoring students and offering careers for the program graduates, they will not meet customer demand for skilled technicians to service sophisticated agricultural equipment.

John Deere will not start a new JD Ag Tech program unless the local dealerships support the school. Therefore, if the JD Ag Tech programs are to succeed, it is paramount to determine the needs of dealers, discover the avenues dealers are using to recruit service personnel, and learn perceptions dealers have of the current JD Ag Tech program. This study will provide Deere & Company an estimate of the current service personnel needs and service manager perceptions of the JD Ag Tech program.

Problem Statement

The problem may be stated in the form of three questions: (1) what are the perceived service personnel needs for John Deere dealerships?; (2) how are the dealers meeting those needs?; and, (3) what are the John Deere service managers' perceptions of the JD Ag Tech program?

Purpose of the Study

This study will add to the body of knowledge by investigating the needs of John Deere's dealership organization. The study will determine the perceived needs for service personnel, determine what the dealership organization is doing to recruit service personnel, and determine the service manager's perceptions of the corporately sponsored education program. The knowledge gained from this study will also allow the researcher to make recommendations to the three partners: John Deere dealerships, John Deere Corporation, and the JD Ag Tech Schools.

Research Questions

1. What are the John Deere dealership service technician needs as perceived by JD dealer service managers?
2. What are the methods John Deere service managers use to identify potential service technicians?
3. What are the relationships between John Deere service managers' perceptions of the JD Ag Tech program and the: (a) number of technicians employed at John Deere dealerships; (b) number of stores dealer-organizations own; (c) distances between John Deere dealerships and the closest JD Ag Tech school; (d) number of JD Ag Tech students John Deere dealerships have sponsored; and, (e) service managers' age?

4. Among the dealerships that have sponsored Ag Tech students, what are the service managers' perceptions of the JD Ag Tech program?
5. Which of the following variables will best predict or explain the service managers' perceptions of the JD Ag Tech program: (a) number of technicians employed at the dealerships, (b) number of stores the dealer-organizations own, (c) distances between the dealerships and the closest JD Ag Tech school, (d) number of JD Ag Tech students the dealerships have sponsored, and (e) service managers' age?

Significance of the Study

The findings will allow Deere & Company to determine (a) if the dealers need technicians, (b) what actions dealers are performing to recruit service personnel, and (c) what service manager perceptions are toward the JD Ag Tech program. John Deere will then be able to choose the appropriate methods (relevant to the research findings) to demonstrate their commitment to dealers in helping them meet their service personnel needs. JD Ag Tech colleges will be able to utilize the findings of this study to demonstrate to the dealer organization that they plan to help dealers meet their personnel needs.

Limitations of the Study

1. Results are based upon perceptions. The everyday actions and responses of dealers trying to meet their own needs might differ from their perceptions reported in the questionnaire.
2. Results are only generalizable to JD Ag Dealers in the continental United States.

Assumptions

1. Dealer service managers will respond truthfully to the study.
2. The proper person in the dealerships (service managers) will be the person completing the questionnaire.
3. The service managers will understand the questionnaire and will not manipulate an invalid meaning into the questionnaire's questions.
4. The instrument measures the constructs of the study.

Definitions of Terms

AMS – Ag Management Solutions, the Global Position Satellite product line that John Deere offers their customers.

Dealer Principal – The store general manger in charge of managing the entire store including sales, parts and service.

GPS – Global Positioning Satellite systems, which are integrated into vehicle systems to aid in mapping and improving navigation or aid in guiding a vehicle.

JD Ag Tech Program – John Deere's program that partners with community colleges to offer students an associate's degree in John Deere Agricultural Machinery repair.

Linkage – “A reciprocal relationship between two-year institutions and business, that operates within the framework of the needs and demands of the business and educational services of the institution” (Ator-James, 1993, p. 9 summarized Rajasekhara, 1988).

OEM – Original Equipment Manufacturer. Example: John Deere, Case New Holland, Caterpillar, Ford Motor Company, and General Motors.

Partnership – “a mutually beneficial formalized agreement between the institution and an external business/industry partner designed to achieve mutual education and manpower goals” (Benoit, 1995, p. 1).

Product Service Technician – “A dealer employee educated, trained, tested, and regularly updated to perform assigned diagnostic and correctional duties on, primarily, products constituting the principal marketing mission of the dealer business. Concurrently, the individual is also expected to perform similar duties on other manufacturer’s products that may be traded in or otherwise appear in the dealer’s service shop for repair” (Briant, 1996, p. 15).

Technician Training – “includes an introduction to the theories behind a technological area; the application of theories, principles, and processes in job settings; and hands on practice of skills and knowledge. The training is usually sequential and industry-specific in nature and often includes general studies” (Benoit, 1995, p. 9).

Chapter 2

Review of Literature

Advances in technology have heavily impacted the agricultural industry, and farm equipment is no exception. One challenge of using advanced technology is supporting and servicing high-tech equipment. Not too long ago dealers were able to hire a person with little or no technical education and through on-the-job training develop that person into a productive technician. However today, agricultural technicians need some type of technical education if the dealers want to service high-tech machinery. Given this need, farm equipment dealers, OEMs, and community colleges all have a vested interest in developing a workforce capable of servicing this equipment.

The remainder of this chapter reviews the literature relating to advanced agricultural equipment, dealerships' need for technicians, corporations' desires and assistance for developing competent technicians, the need for partnerships, types of partnerships, factors relating to partnerships, and the lack of published research regarding dealer service personnel needs and dealership perceptions of OEM educational partnerships.

High Tech Agricultural Equipment

John Schueller (2000) observed that the agriculture equipment world began seeing electronic automation in the last third of the 20th century. Schueller explained that the introduction of planter monitors placed the agricultural machinery industry in a new electronic era (Automation of the field section, ¶ 8). The planter monitors alerted the farmer when the seed hoppers ran out of seed and or when the planter's row-units became plugged and were no longer placing seeds in the furrow. This electronic innovation

relieved the farmer of periodically stopping the tractor and manually checking the seed hoppers and planter row-units. With the introduction of this technology, technicians were tasked with troubleshooting and repairing the electronic sensory and electronic monitors.

Today's electronics have continued to advance. Computers within agricultural equipment now communicate with one another over a high-speed data network known as a controller area network. Agricultural OEMs use those data buses to integrate global positioning satellite (GPS) systems into the machinery's control systems. GPS systems have enabled the manufacturers to design machine guidance systems that offer great benefit, for example, when operating in poor field-visibility conditions, the GPS guided tractor will maintain an accurate heading without swerving off course. This improvement helps the environment by reducing fuel consumption and fertilizer application, as well as provide, a more even application of fertilizer. In addition, when the tractor's computers are performing the task of driving, the operator becomes less fatigued ("John Deere's system," 2003, p. 50).

In addition to electronics and GPS systems, agricultural transmissions have advanced as well. Agricultural OEMs now sell tractors with continuously variable transmissions, which are also known as infinitely variable transmissions or stepless transmissions. Wenzel (2004) mentioned that those transmissions incorporate the advantages of electronic controls and constant mesh transmissions (p. 6). The transmission computer and engine computer work together by varying engine RPM and transmission gear ratios in order to optimize fuel efficiency while the tractor maintains the necessary engine torque required to pull the implement. Plus, the operator no longer feels the tractor lunging forward during harsh shifts, which reduces operator fatigue.

The United States Department of Labor's *Occupational Outlook Handbook* also noted that change itself impacts the technician's future ability to repair equipment (United States Department of Labor, n.d, Training, other Qualifications, and Advancement section, ¶ 1). According to the handbook, technicians must be able to adapt to the rapidly changing technology by being able to learn new skills, which are required to maintain the changing technology.

Dealers Desire to Meet Customer's Expectations

All of the technologies from yesterday, today and the future affect the growing challenge of hiring skilled technicians to diagnose and repair the machinery. Dealers who are unable to provide the necessary services to support these advanced machines risk losing customers and/or lack the ability to gain new customers (McMahon, 2000, p. 29).

Corporations Desire Quality Dealership Service

Agricultural OEMs are equally concerned that dealers provide the necessary service for their products or they too will lose customers and a share of the market. Corporate executives of OEMs have declared that quality dealerships are an absolute must for a corporate success. For example, Bernie Hardiek, John Deere President of Worldwide Agricultural Equipment Division, is quoted in a 1996 *Agri Marketing* article stating that one reason John Deere became "the market leader and the best-recognized brand in the ag equipment business" was "by providing customers . . . the best customer service with the most professional dealers" ("As always," p. 54). Randy Hoffman, senior vice president and general manager of AGCO's worldwide Challenger Division, also maintained that a good dealer organization is vital for an agricultural equipment manufacturer ("Challenger: A Winning", 2004, p. 62). Hoffman affirmed that

manufacturers need capable dealerships that can resolve customer technical problems in a timely manner (p. 62).

Corporate Assistance for Equipping Dealer Product Support Needs

Corporations utilize many different sources to assist dealers in supporting their products. Some of these sources include parts manuals, service manuals, technician training, yearly update seminars, and traveling company service representative. Two U.S.-based equipment manufacturers have developed a corporate sponsored technician education program.

Caterpillar and John Deere both sponsor their own technician education program, which enables their dealers to sponsor students in a program that meets the company's educational objectives. The Caterpillar ThinkBIG program and the John Deere Ag Tech program operate similarly by partnering with community colleges to educate students primarily on their company's equipment. Students can earn an associate's degree by completing a standard general education core and a technical core. As of October 2006 John Deere sponsored 16 JD Ag Tech schools (*John Deere power up*, n.d.) and Caterpillar sponsored 11 ThinkBIG schools (*Caterpillar*, n.d.) that were located in the United States. Appendix A provides a list of the JD Ag Tech schools located in the United States.

The Need for Technicians

The Historical Needs

The U.S. automotive industry, truck industry, construction equipment industry and farm equipment industry have all shared a common problem that has magnified over the past decade: the need to recruit and retain qualified technicians. One article indicated

that the technician shortage increased in the mid 1990's (Fahey, 2004). Simone (1996) wrote in reference to their Top Tech program—a diesel equipment technician program—that there were more jobs than qualified technicians (p. 5). Stewart (1997) affirmed that a lack of technicians was common across all U.S. industries (p. 28). Alexander (1997) provided agreement from a General Motors automotive dealership perspective, “The bottom line is we have a great need for trained technicians. We need them as quickly as we can get them. We can't get them fast enough” (p. 158-159). The following sources all indicated that the on-highway truck industry and construction equipment industry needs technicians: Birkland (1993), Deierlein (1996), Deierlein (1999), (“Fewer technicians,” 1996), Seigel (1997), and Stewart (1997).

Similarities between Automotive and Other OEM Industries

One might ask: why consider comparing the agricultural technician needs with construction industry, truck industry, and automotive industry? In addition to the technician shortages, the industries have many commonalities relating to how they manufacture and support their products. The industries all: (a) manufacture products in the U.S. and overseas; (b) sell their products primarily through a dealership organization; (c) are heavily dependent upon their dealerships to provide product support and service; (d) manufacture a product that is propelled by an internal combustion engine, cooled and heated with similar heating and air conditioning systems; (e) use on-board electronic processors to control their product; (f) offer GPS systems as an option to their customers; and (g) compete with one another for hiring mechanically-minded employees to work in their service departments. Although the culture and customers of the industries may differ, the product support for the industries is quite similar. In addition, the industries

desire to learn from each other, looking for the key to finding and employing qualified technicians. Even though no clear solution has been found, the industries will continue to investigate to see what the other industries have learned in an attempt to fix the problem.

Present Need for Technicians

Much has been reported in the 1990s about the technician shortage; authors continue to declare the same problem in this new millennium. Gilroy (2004) quoted several truck OEM executives who were very concerned about their dealerships' shortage of technicians (p. 26). Kilcarr (2005) stated "The growing shortage of technicians serving the trucking industry is not a problem that's going from bad to worse – it's a problem that's going from bad to right off the cliff" (p. 21). Sutton (2003) wrote that industry's present technician shortage was critical and that it required all industry personnel to take a positive step to turn the problem around (p. 7). Fahey (2004) explained that private technical institutions, like Universal Technical Institute, would profit from the current need for technicians and that the institute would produce 7,000 service technicians for 2004 (p. 78).

Needs for Technicians in the Future

Projected needs

While history and current demands illustrate that a technician shortage exists across a wide range of industries; the question needs to be asked: will the projected shortage continue in the future? As previously mentioned in chapter 1, John Deere estimated they need to replace more than a fourth of their technicians over the next two decades due to their age alone. Caterpillar as well projected that from 2004 to 2008 they

will need 27,000 to 45,000 technicians globally (chart provided by Steve Hitch, April 1, 2005).

Changing labor force

Besides OEM estimates, additional trends can impact the future technician shortage. Herman, Olivio, and Gioia (2003) indicated that the entire U.S. industry will have a deficit of 10,033,000 U.S. jobs to fill, with no skilled applicants to apply for the jobs by the year 2010 (p. 49). The authors made this prediction based on the changes occurring in today's workforce. Today's generation of workers is smaller than yesterday's generation. Today's workers are more likely to jump from job to job focusing on short-term career advancements, meaning that time spent with one company will be reduced. Employees in today's workforce are able to pick from a list of available jobs and do not demonstrate the kind of company loyalty seen in previous generations (Herman et al., 2003, p. 35).

Competing with other industries

Considering "Generation Xers'" lack of loyalty to their employers, dealerships will not only be competing against the same brand of dealers, but also with other brands and dealers from other industries. Stewart (1997) indicated that a survey, conducted by the Associated Equipment Distributors, found that dealers recruited their employees from their competitors more than they recruited from high schools or technical schools (p. 29). OEMs want to eliminate the cycle of technicians hopping from dealer to dealer. Instead, OEMs are encouraging their dealerships, along with the vocational programs, to become proactive and recruit future technicians while they are still in high school. Stewart (1997) stated:

The daily quest for people who can learn to work on heavy equipment has made evangelists of the training directors at some equipment dealerships. They spend more time in high schools and tech schools prospecting for qualified applicants than training them. The best hope for bringing more-qualified people into the heavy-equipment field is to lend a hand. (p. 29)

Strategies for Recruiting Technicians

Along with the reported concern that dealerships need technicians, is the need for determining the best methods for locating those technicians. Numerous authors have reported strategies for hiring technicians, as well as highly skilled employees in other technical fields. Some have stated that employers need to improve their recruiting practices. Herman, Olivo, and Gioia (2003) stated when companies target employees with the specific skills that aligned with the critical needs of the company, they would be able to hire employees that would excel on the job and would remain working for the company (p. 39). Birkland (2006) reported that employers need to change techniques, to quit offering jobs, and instead offer technicians careers where they had a clear understanding of the multiple career opportunities within the company (p. 28-32). Roberts (2006b) summarized Mel Kleiman, a recruiting consultant who presented *Effective Employee Recruitment and Retentions Strategies*, stating that companies have a much better chance of locating “qualified technicians” when they were “constantly and systematically looking” for those technicians (p. 11).

Other authors stated that recruiting technicians from today’s younger generation required new techniques. Roberts (2006a) stated the new generation of candidates was an “instant gratification” and instant access type of generation (p. 11). Although many

managers might be tempted to locate technicians through a newspaper's classified advertising section, the author reported that the technique was outdated, because today's generation does not read printed newspapers. Roberts further stated that today's young people obtained information through wireless technology by using a laptop or a cell phone to access the World Wide Web (p. 11).

Stewart (1997) stated that training directors, at heavy equipment dealerships, need to begin spending less time training and begin (a) spending more time networking with high schools and technical schools, and (b) building relationships in order to find "more-qualified employees"(p. 29). Stewart also reported the recommendations of Gregory Pool, CEO of Gregory Poole Caterpillar dealership group, who stated that dealerships must quit relying solely upon the community colleges to perform all of the recruitment, because it has not worked, and that the colleges could not "adequately describe and promote our industries for us" (p. 31).

Community Colleges Develop Tomorrow's Workforce

Community colleges traditionally have been a source for companies looking to hire skilled employees. However, two trends have negatively affected a college's ability to effectively develop skilled personnel. Those two trends are a shortfall in education funds, and advances in technology. In *Bridging Troubled Waters* (2005) the American Council on Education reported that colleges were receiving smaller percentages of state funding and therefore were struggling financially (p. 5). While most colleges try to maintain an even keel or, despite the challenge, make improvements, as Hagedorn wrote in 1999, college vocational programs face the greatest challenge (p. 91).

One reason that decreased educational funding impacts vocational programs the most is advances in technology. As previously mentioned new technology is rapidly changing. It is difficult for a college to procure one new tractor, much less an assortment of tractors configured with the various different options that are available at the local dealer. Plus, the service tools and equipment used to diagnose and repair the tractors also change over time, which adds costs to the colleges.

As a result of the shortfall in educational funds and the rise in technology, partnerships have become a viable solution to this challenge. This solution was endorsed by Buettner, Morrison, and Wasicek (2002) who concluded that when partners unite they can acquire resources that were previously unobtainable (p. 7), and OEMs do have the capability of loaning service tools and new equipment or donating prototypes to colleges. In exchange, colleges can offer the partnership: time, facilities, and expertise for developing a skilled workforce.

History and Background to Partnerships

Spangler (2002) stated, “effective and successful partnerships are the catalyst to raise a college’s level of interdependence and connection with business and the community” (p. 80). Kantor, Kipp and Zeis (1996) maintained that as colleges move into the new century it is becoming common practice to partner with industries (1996, p. 10). Although partnerships have existed in some form for many years, according to Benoit (1995) partnerships “are now growing rapidly in number and variety” (p. 1). The National Association of Partners in Education (2001) stated in *Partnerships 2000: A Decade of Growth and Change*, “69% of districts nationwide engage in partnership

activities, compared to 51% in 1990” (p. 15). Among the public school partnerships, 76% of the districts partnered with small corporations (p. 18).

Briant (1996) indicated that college campuses began seeing an increase in corporate partnerships in the early 1980’s (p. 21). There is an abundance of literature pertaining to partnerships. More than a decade ago Miller (1992) found twenty doctoral dissertations that focused upon partnerships (p. 11). Miller concluded that college and industry partnerships had “become a relatively positive means of assisting in the improvement of a myriad of social, economic, educational, and other conditions that have affected society”(p. 305). Another publication that exhibited the popularity of partnerships among colleges and industry was the monograph *Common Ground: Exemplary Community College and Corporate Partnerships* (Johnson, 1996). Jerry Jasinowski, President of the National Association of Manufacturers (NAM), wrote the Foreword stating:

A growing number of manufacturers – both large and small – are turning to their local community colleges for help. Often, in cooperation with local employers’ groups, community colleges have responded with vigor, designing customized workforce development programs and highly focused course work for a range of employee needs. The following ‘success stories’ speak for themselves, telling the tale of a growing partnership between higher education and the business community. (1996, p. 7)

Types of College Partnerships

Partnerships between Colleges and Public Schools

Some partnerships occur between community colleges and public schools, such as K-12 schools. Andersen-Smith (1993) and McCabe (1995) studied secondary schools and partnerships, using Barbara Intriligator's Interagency Arrangement Model (IAM). Both studies focused heavily upon partnering businesses with K-12 schools. The Intriligator Interagency Arrangement Model used seven components: interagency objectives, interagency policies, interagency structure, personnel roles, resource allocation, power and influence, and interagency relationships, to determine where the components fell on a continuum between cooperation and collaboration (McCabe, 1995, p. 4).

Andersen-Smith's study (McCabe, 1995) determined that the Interagency Arrangement Model could not be used to study voluntary educational partnerships (p. 8). As a result, McCabe (1995) modified four components: personnel roles, resource allocation, power and influence (p. 8), to determine if the modified model could be used to study voluntary educational partnerships (p. 154-156). The results of the McCabe study suggested that the modified model could be used to study voluntary educational partnerships (p. 157).

Nasworthy's (1988) investigated partnerships between businesses and public schools for "at risk students" (p. 12). Nasworthy found three factors that hindered a partnership's ability to become fully integrated into a school system: (a) "lack of ownership by school personnel . . . and . . . staff," (b) "failure of school personnel to

understand the motivation of business partners,” and (c) “differences in corporate and educational organization schedules and operating procedures” (p. 115).

Colleges/Industry Partnerships for Continuing Education

Colleges and universities also partner with industry to provide continuing education of current employees. Smith (1999) and Grubb (1999) examined partnership relationships between higher education institutions and corporations. The studies focused upon the continuing education aspect of partnerships rather than the two-year associate degree partnership programs.

Smith’s (1999) investigated partnerships from the educational institution’s perspective. Smith found that partnerships existed through all levels of higher education and within numerous academic disciplines. However, Smith stated that there was little financial information available regarding tuition, fees, discounts for partnerships and the formulation of policies. Smith reported the following as success factors for partnerships: “good working relationships, quality customer service and flexibility in delivery of product, interactive faculty, and maintenance of good communications and administrative support from both institutions and corporations” (p.87). Smith (1999) stated the following areas cause problems within partnerships: “attitudes toward training programs, inflexibility, poor communications, and limited resources, poor planning and lack of administrative support” (p. 87). Smith concluded that partnerships have “a positive effect on institutions of high education.”

Grubb’s (1999) investigated partnerships from the industry’s perspective. Grubb reported, “the three strongest partnerships were the two global and international corporations” (p. 92). Grubb stated that more partnerships with more institutions were

anticipated to occur in the future (p. 94). Grubb, similar to Smith, found that financial arrangement information was difficult to attain due to it being unavailable or because the corporations were unwilling to provide the information (p. 93). According to Grubb, the “most significant success factor” was that “people ‘work smarter’ by being involved in these educational endeavors” (p. 94). The significant problem factor was “employee time and/or work load” (p. 94).

Colleges/Industry Partnerships to Retrain the Workforce

Partnerships for retraining the workforce are similar to partnerships for continuing education. Partnerships that retrain the work force often target training for “high growth fields” (Larose, 2004). Retraining the workforce frequently involved training persons that were changing jobs who will use entirely different skills and experiences. Some example areas for retraining were “biotechnology, health care and information technology” (Larose, 2004). Often the literature does not note the differences between partnerships focused on continuing the education of employees versus those retraining a person for a new job.

Colleges/Industry Partnerships to Provide Education

This study investigated partnerships between community colleges and industry to provide an education. Often, the programs of study are designed to educate students about one company’s product. In the past, the graduates would have been called mechanics. Today the term *product service technician* is a more common description of the graduate’s first job. Briant (1996) gave the following definition of a product service technician:

A dealer employee educated, trained, tested, and regularly updated to perform assigned diagnostic and correctional duties on, primarily, products constituting the principal marketing mission of the dealer business. Concurrently, the individual is also expected to perform similar duties on other manufacturer's products that may be traded in or otherwise appear in the dealer's service shop for repair. (p. 15)

Community colleges and technical schools can offer a certificate or diploma for completion of the coursework, but an associate's degree seems to be the most common choice of technicians. Some names of product service technician programs available in the U.S. today are the Toyota T-TEN program, General Motors ASEP, Ford ASSET, Nissan PROCAP, John Deere Ag Tech, and Caterpillar ThinkBIG (Benoit, 1995, p. 23; Briant, 1996, p. 11).

These partnerships typically consist of the OEM offering to loan products (generally tractors) and to provide expertise to the college. Dealerships are called upon to offer students an opportunity to work during their internship and permanent employment upon graduation.

The First Technician Educational Partnership

Jack Jonker, executive director of Delta Corporate Services at Delta College, indicated that in 1979 Delta College and General Motors introduced the first corporate-college partnership in the nation (1996, p. 25). Two purposes for the program included teaching the new technology of electronically-controlled engines and increasing "customer satisfaction" (1996, p. 25). ASEP evolved into a model that would be emulated by other automotive manufacturers. Jonker affirmed, "Dealer reaction to the

program was so overwhelmingly positive that consideration for expanding the model geographically began within six months” (1996, p. 25). Spencer (1988) and (Alexander) 1997 wrote that GM recognized that the automobiles were becoming increasingly more complex and the industry needed a new paradigm to fill the service personnel needs within the GM dealerships (Spencer, 1988, p. 3-4) (Alexander, 1997, p. 80-82). Many other studies have investigated partnerships, and many of those studies listed advantages of partnerships.

Benefits of Partnerships

Partnerships between colleges and industries offer a wide array of benefits. Madison Area Technical College president Dr. Beverly Simone (1996) mentioned that students (a) get trained in the latest technologies on late model equipment that colleges otherwise could not afford, (b) receive monetary support from industry via employment and tuition reimbursement, and (c) receive a possible job offer upon graduation (p. 10). Jackman and Mahoney (1982) also reported the student benefit of gaining experience with new technologies (p. 43).

Simone (1996) observed that partnerships allow employers the opportunity to work with prospective employees on a trial basis. Employers and corporations benefit by being able to (a) become involved in curriculum development and revision, and (b) awarded the opportunity to hire candidates educated in the company’s specific area of technology (p. 8-9). Benoit’s (1995) study also listed the advantage of getting “qualified entry-level technicians” (p. 75), and those dealerships “gain tax advantages” (p. 74).

Pugh’s (1998) study mentioned that partnerships can improve a college’s image. Pugh asserted that the exposure reached some persons who might not have been attentive

if it were not for the partnership (p. 18). Benoit (1995) contended that colleges were utilizing partnerships in order to update equipment, which previously would have been impossible due to finances. In addition, the partnerships enable instructors to improve their technical skills, and programs can turn around struggling programs by increasing enrollments (p. 1).

Credibility is also listed as an advantage for colleges (Benoit, 1995, p. 70; Brown, 2004, p. 75; Miller, 1992, p. 152). A faculty member stated in Benoit's study that partnerships, "draw others to the school . . . increased student recruitment and retention, and improved job placement rates . . . and an improved community image" (p. 74-75). Brown (2004) mentioned that his respondents "believed that Arkansas schools' active involvement in economic development endeavors enhance the image and credibility of the institutions" (p. 92).

Corporations also have much to gain from partnerships. A faculty member in Benoit's (1995) study stated that companies respond positively to the publicity gained from the partnership including the ability to mention that they hire graduates. Other benefits listed in Benoit's (1995) study include enhanced image and product exposure along with improved sales and customer satisfaction (p. 75). And, to their fiscal advantage, companies can also write off the training expenditures (p. 74).

Negatives of College and Industry Partnerships

With positive attributes then also come negative attributes. One negative attribute is the perception that taxpayers subsidize training for industry when they support higher education. However, taxpayers might not truly understand the economic reward that comes with the investment. For example, with the Johnson County Community College

and Burlington Northern Railroad partnership, even though the \$2.9 million training facility was financed with Johnson County revenue bonds, the college received lease payments from Burlington Northern Railroad. The lease payments paid off the bonds in ten years after which the agreement required the property be signed over to the college (Radakovich, Lindsay, & Osborn, 1996, p. 41-42). Thus, when the benefit of educating students is factored in, the positive outweighs the negative. The authors' reported that the community forgot that the property would be handed over to the college and the college would have the opportunity to receive additional rent in the future. The authors stated "For its part, BN gets the sense at times of dealing with a college that always has its hand out" (p. 46). The authors' estimated an economic benefit to the community of \$40 million for 1994 alone (p. 44).

Another challenge of partnerships is trying to make everyone happy, and this area of difficulty is philosophical. Pugh (1998) and Spencer (1988) mentioned that two philosophies explain why community colleges exist. Pugh explained that the first philosophy is to provide students with a liberal arts-oriented education, and the other philosophy is that colleges provide students with an occupation-oriented education (p. 4). Spencer (1988) stated:

Essentialist and pragmatic values are constantly in conflict in all of education
The essentialist is concerned lest students be deprived of their cultural birthright by giving disproportionate attention to the practical aspects of day-to-day living. Essentialists often perceive training for vocation as a betrayal of the values of 'liberal arts' and view cooperative programs as means by which students and educational institutions are exploited by business and industry. (p. 27)

Puckett's (1994, p. 1-2, and 35) study cited authors Borquist (1986), Jacobs (1989), and Tierney (1991) to view both sides of debate. Miller (1992, p. 164-166) also reported both philosophies and referenced the following studies: Ament (1987); Cohen and Brawer (1982); Garland (1985); Jackman and Hahoney (1982); Krueger (1978); McQuigg (1990); Pincas (1985); Powell (1984); and, Powers, D. R., Powers, M.F., Betz, and Aslanian (1988); Pratzner (1983); Katsinas and Lacey (1989).

Faculty compensation for their time and effort is another area of concern. Although the majority of the faculty respondents in Benoit's study believed that everyone involved in a partnership could benefit – that they believe in the phrase “win-win situation,” – a few (14%) believed that the instructors were those who were least likely to benefit from the partnership in terms of the time they invested and the lack of compensation for the time invested (Benoit, 1995, p. 71, 75). Miller (1992) reported numerous studies that found faculty retention and faculty compensation as a partnership problem area (p. 174). Benoit concluded that college administrators could help their partnership by finding unconventional funding to reimburse faculty for the months they were normally off contract, but were actually working on partnership activities (p. 100).

Benoit (1995) listed a small portion (14%) of the faculty respondents perceived the corporations had the most to lose due to their financial investment. Nineteen percent of the faculty respondents perceived the student as the person with the most risk due to the possibility that industry could not offer jobs to the graduates. It is worth noting that Benoit did not list any responses pertaining to faculty concerned about dealership risks nor the college as a whole at risk (Benoit, 1995, p. 72).

College administrators often mentioned another negative attribute of partnerships – the demands of industry. As one respondent indicated in Benoit’s (1995) study, companies have interfered by trying to run the college program. When companies disregard those boundaries it causes ethical and legal concerns for the colleges (p. 85). A different respondent mentioned that industry tries to make the decisions for the college, thus becoming a manipulative partner (p. 85). The long-term effects can be detrimental to the school without a confident and progressive community college staff (p. 88-89). Benoit reported that it is necessary for colleges to achieve the industries’ objectives as established in the partnership; however, the college must be a physical entity and cannot be complacent (p. 99).

Along with the financial benefits that colleges receive in partnerships comes risks, especially when economic conditions begin to falter. In Brown’s (2004) study of partnerships between Arkansas colleges and industry, respondents indicated that during a declining economy, companies no longer had the time nor the money for training. As colleges form partnerships with industry, they gain financial support enabling them to provide contemporary programs. However, if the economy begins to plummet, then colleges have much to lose (p. 81).

Many of the negative perceptions of partnerships are based upon long standing myths. Radakovich, Lindsay, and Osborn (1996) listed three myths of college and industry partnerships. Radakovich et al. (1996) detailed the Johnson County Community College and Burlington Northern Railroad partnership, which “was recognized by AACC as one of the nation’s best, and in April 1995, Secretary of Labor Robert Reich referred to the partnership as a model cooperative program between education and industry” (p. 41

& 46). One of the most widespread myths was that corporate partners had an abundant amount of resources that could be made available to support any college partnership initiative with no concern about the initiative's cost (p. 46). Another myth was that a never-ending amount of grant funding was ready to assist partnerships, especially if the partnership guaranteed additional jobs (p. 46). The last myth was that everyone favored improving the college by involving themselves in partnerships or everyone was excited to improve industry by collaborating with academia (p. 46).

Success Factors of Partnerships

In addition to the published benefits and drawbacks of partnerships, a host of success factors can be found as well. The following studies mentioned factors that led to successful partnerships: Alexander (1997), Ator-James (1994), Benoit (1995), Briant (1996), Brown (2004), Grubb (1999), Kantor, Kipp, and Zeis (1996), McCabe (1995), Miller (1992), Nasworthy (1988, p. 96), Niechayev (1992), Savarese (2002), Smith (1999), Smith and Dowling (2001), and Spangler (2002). Common factors, which lead to success, are provided below.

Some studies stressed the need for a person to fulfill the champion role within the partnership. Kantor, Kipp, & Zeis (1996), in reference to the Central Piedmont Community College and Okuma America partnership, stated that each group had a "champion" who was responsible for turning the "vision" into a reality (p. 13). Alexander's study revealed what a respondent said about the well-documented Greenville Tech president, "Dr. Barton has always supported the ASEP program . . . He contacted GM and got the attention of the corporate-college relations people. His motto is *make it*

happen [italics added]" (1997, p. 110). Smith and Dowling (2001) also acknowledged "the existence of a training *champion*" within businesses (p. 149).

Kantor, et al. mentioned ongoing communication as an important component for the successful Okuma partnership (1996, p. 13). Ator-James (1993, p. 71) and Smith (1999, p. 87) both indicated that good communication skills were present in successful college and industry partnerships. Ator-James summarized her results by reporting that three out of four community college presidents state that the ability to communicate freely among participants was a necessity (p. 173). All seven of Ator-James' business liaisons indicated that open communication was an important success factor (p. 139).

Briant (1996), Brown (2004), Miller (1992) and Nasworthy (1988) also supported the need for good communication within successful partnerships. Briant (1996) asserted that partnerships could be built when colleges and industry communicated and appreciated each other's needs (p. 5). Brown (2004) frequently listed communication as a success factor in partnerships. Brown wrote that partnerships required concise communications with everyone understanding their purposes (p. 59). Miller (1992) reported, "ineffective communications were detrimental to collaboration" (p. 215). Nasworthy (1988) stated that communication was a key factor in her study (p. 100) and described one of the three factors that aided partnership success was establishing avenues for making recommendations and instituting ways for completing those recommendations (p. 96). As Savarese (2002) wrote concerning his study on Microsoft partnerships and Working Connections and community colleges, "all four groups college administration, college faculty, students and business suggested an improvement in communication" (p. 109). In addition to partners communicating well with one another, Miller's (1992)

integrative partnership study found that the programs themselves must be properly marketed; otherwise the lack of marketing would become a barrier to the success of the partnership (p. 217).

Commitment can be an asset for successful partnerships or become a hindrance for unsuccessful partnerships. Benoit's (1995) study acknowledged that "conflict of commitments" could be a potential problem (p. 37). A respondent in Alexander's (1997) study maintained that it was essential to have the administration's commitment and that their commitment was exuberant (p. 111).

Ator-James (1993) stated, "a commitment to change, and the willingness to adapt" as well as "flexibility" were necessary components within a successful college and industry partnership (p. 71). Nasworthy (1988) completed a dissertation on educational partnerships that focused on the change process itself (p. 110).

Quality was another necessary factor that must be present in college and industry partnerships according to Ator-James (1993, p. 71, 73, 107). Ator-James reported that all four sampled college presidents, all four sampled college liaisons, and all seven of the business liaisons, deemed that successful partnerships required providing a quality product to industry utilizing a knowledgeable and experienced staff (p. 138-139).

Briant's (1996) study of the product service technician partnerships among Ford, General Motors, and John Deere, indicated that the college respondents and corporation respondents all specified that colleges bear the responsibility for the program's quality including the development of an actual system designed to maintain the program's quality (p. 111). From this, colleges clearly know that the quality of the partnership rests upon the college's shoulders.

Flexibility was another factor that was frequently mentioned in studies on college partnerships. Miller (1992) mentioned that higher education was often regarded as too rigid and inflexible to meet industry's demands (p. 208 & 253). Kantor et al. mentioned flexibility was a key component for the successful Okuma partnership (1996, p. 13). Ator-James (1993 p. 73, 107, 138, 139) and Alexander (1997, p. 100) listed this success factor, along with Spangler (2002) in her article titled "Concluding Observations of Successful Partnerships" (p. 77-80). Smith (1999) also listed flexibility as a success factor within educational industry partnerships (p. 87).

Like any success factor, the identified attribute can become a hindrance if the college and/or business allow it to fall by the wayside. Benoit (1995) mentioned that flexibility (p. 37) could be a problem for colleges. The successful colleges and universities must be flexible. As, Benoit affirmed, "Even in dealing with progressive corporations and partnership programs, many administrators and college systems remained inflexible in their accommodation of partnership program needs" (p. 99). Brown (2004) also mentioned the need for colleges to be flexible (p. 60-61).

Trust was an additional factor that aided the success of college and industry partnerships. Spangler (2002) stated that partnerships must have partners that trust each other if the program was going to succeed (p. 79). An Ohio automotive-manufacturer-representative explained that trust was one of the most important but difficult tasks to develop, and also one that takes little effort to destroy (Ator-James, 1993, p. 108).

Colleges must also have an accurate account of the company's needs. Ator-James' (1993) study listed the factor of determining the needs of the company as a success factor (p. 83, 89). One of the company respondents indicated that colleges must

improve in recognizing industry's needs and satisfying them as well (Ator-James, 1993, p. 89). Another company respondent mentioned that they would remain in the partnership as long as the school met their needs (Ator-James, 1993, p. 90). Ator-James also stated that the seven business-liaison-respondents all agreed that it was beneficial for the college liaison to be able to comprehend industry' needs (p. 139).

Briant (1996), as well, confirmed that meeting the company's needs was vital (p. 5). Briant's study focused on three national product service technician education programs: General Motors, Ford and John Deere. Briant concluded, "Of particular importance was the agreement that needs analysis was absolutely essential for both groups" (p. 108 & 114).

Brown (2004) reported that failed assessment of needs was a reason for partnership failure (p. 59). His study consistently stated that understanding the needs of industry was a necessity for successful partnerships (p. 62). Spangler (2002) indicated that being able to pinpoint the partnership needs was crucial for success (p. 79). Miller's (1992) integrative review of partnerships listed numerous studies that state needs assessment is vital to the success of partnerships (p. 199).

Ator-James (1993) described a successful partnership that used evaluation as a tool to improve the program and help ensure the program was successful (p. 84-86). Two factors Brown (2004) mentioned for measuring partnerships' effectiveness were the "repeat" and "referral" factors (p. 83). Corporations will repeat and refer businesses and industry to colleges that meet their needs. Nasworthy's (1988) recommendations for partnerships were to "Improve the evaluation process, use evaluations for planning

program improvements, and report evaluation results widely” (p. 119). Miller (1992) also reported that evaluation was essential for a successful partnership (p. 157).

Colleges and businesses can be known for adding new programs and responsibilities on to groups and individuals, while providing little to help those responsible for the programs. The partnership could benefit greatly if the college would staff programs with a person who was solely responsible for the program (Ator-James, 1993, p. 89, 107). The progressive colleges add a person to fulfill this role, and some develop entire new departments, such as the department of “Corporate Services” found at Delta College in East Central Michigan as reported by Jonker (1996, p. 24-29). Ator-James (1993) also mentioned that an Ohio Technical college implemented a “Business and Industry Services Division” (p. 92). Nasworthy (1988) stated two of the programs in her study had industry liaisons that spent a minimum of fifty percent of their time managing the program (p. 97).

Additional Partnership Factors

Three additional factors that partnerships should consider are the challenge of finding qualified instructors, the necessity of advisory committees, and the geographic locations of the partners. Benoit (1995) explained that colleges could have difficulty locating competent faculty and also struggle in responding to industry’s demands (p. 38). Finding the right faculty member could make the difference between a successful program and a poor program. Miller (1992) reported multiple studies, which enunciated that partnerships fail when campuses lose faculty due to “raiding” industries and corporations (p. 175). Smith (1999) indicated that programs need the freedom to recruit

faculty from outside the academic environment who could bring needed expertise to the program (p. 65).

Advisory committees are a standard component for college and industry partnerships. Sometimes programs can take their purpose for granted. Alexander's (1997) study shared advice from Mr. Barton, president of South Carolina's Greenville Technical College. He indicated that the committee should not exist to simply exist, but that it should advise the school and that the school should act on that advice. This notion is a shift from the normal operating procedures, where colleges find themselves simply telling the committee members about the current activities at the school (p. 130-131).

Miller (1992) reported authors Anthony-Gonzalez (1982) and Johnson (1987) both found that geography could negatively influence a partnership program. Miller stated, "The further the partners were away from each other, the more difficult it has been for the partnership to succeed" (p. 218).

Influences on Training and Education

Many attributes have been listed that exist within successful partnerships, some of which have negative impact. Studies are also available that provide demographic variables that affect training or education within an organization.

Smith & Dowling (2001) referenced multiple studies that indicate the size of a company greatly impacts the commitment of training within organizations (p. 150). Larger companies were more likely to invest more resources in training than were smaller firms. Miller (1992, p. 218-219) reported that smaller companies were less likely to succeed in a partnership, because smaller companies do not have large enough problems,

which are required to gain the partnership's attention, citing Gold and Charner (1986) and Peters and Fufeld (1983).

Ator-James (1993) indicated that industry partnerships among colleges were more likely to occur with medium-sized to large businesses than smaller businesses (p. 142). A community college president explained in Ator-James' (1993) study that bigger firms had the capital to fund training and were better prepared for prescribing the education needed for their company (p. 61). The middle-sized companies had less capital and were less capable of determining the training they needed. Ator-James also reported that the smallest firms lacked the funds and time for developing training (p. 61). The small companies also lacked the number of employees required to fill a training class.

The size of the manufacturer also influenced a company's commitment to educating service technicians. According to *Business & Company Resource Center*, the top two agriculture and construction equipment manufacturers located in the United States were Deere and Company and Caterpillar (*Thompson Gale*, n.d). Caterpillar reported their annual sales of \$30,251,000,000 for 2004. Deere & Company reported annual sales of \$19,986,100,000 for 2004. These were the only two equipment manufacturers headquartered in the U.S. that sponsored an exclusive two-year technician education program, known as the JD Ag Tech program and Caterpillar ThinkBIG program. The Gale Group provided the database to college libraries: <http://www.galegroup.com/>. APAC Inc. was listed as number two in annual sales for construction manufacturing listed by the Business & Company Resource center. However this company does not produce construction or agricultural machinery. APAC Inc. is a transportation construction company.

Briant (1996) and Puckett (1994) both stated that the size of an organization influenced the participants' responses. Briant (1996, p. 109) indicated that smaller colleges on average placed higher importance ratings on factors and elements related to college business partnerships. Puckett (1994) reported that North Carolina academic leaders and company leaders, working in large organizations, rated components used in the initiation and implementation of partnerships, higher than leaders from smaller organizations. (p. 106). Briant stated these variances must be considered by the partnership's representatives when developing new programs (p. 109-110).

Previous Research

The available literature contained numerous studies on partnerships between colleges and industry. Many of the existing partnership studies used qualitative methodology for investigating premier programs. Spencer's (1988) doctoral dissertation at Ohio State University investigated the philosophical and implementation "issues" that occurred within college and business partnerships. Spencer's study of the General Motors ASEP program indicated that in 1988, GM had sponsored 38 ASEP programs and had plans to add more (Spencer, 1988, p. 4). The study however stated little about the need for dealership support. The study focused primarily on the initial start-up of the college partnership dyad in regards to implementation challenges and philosophical issues relating to industry-sponsored associate degrees.

Alexander's (1997) doctoral dissertation at the University of Texas at Austin looked at three successful college partnership programs at South Carolina's Greenville Technical College (GTC). GTC is well known for its success in corporately-sponsored partnerships. The GTC and its president have been often cited for their success in many

different publications (Alexander, 1997, p. 16-19). Alexander investigated critical successful factors found in three GTC partnerships, and categorized them into Kanter's (1994) eight partnership characteristics: importance, interdependence, investment, information, integration, institutionalization, and integrity (p. 106-107). The three stakeholder groups -- GTC, corporate, and local -- all reported critical success factors that were common to four Kanter-characteristics: interdependence, investment, information and integration (p. 183). (See chapter 1 - Definitions of Terms).

Pugh's (1998) dissertation examined the perceptions of Virginia industry managers and Virginia academic leaders rating 29 "components" related to the initiation and implementation of college business partnerships (p. 98). Pugh paralleled Puckett's (1994) study of North Carolina businesses and community colleges (Pugh, 1998, p. 11). Both studies found that: (a) business and college leaders agreed that the studies' 29 partnership components were important for implementing and initiating partnerships (Puckett, p. 103-104; Pugh, p. 99), (b) the level of management influenced a managers' perception rating on the 29 partnership components (Puckett, p. 107; Pugh, p.103); and (c) the number of years experience working with partnerships also affected perceptions (Puckett, p. 110; Pugh, p. 105). Pugh reported that communication was "the most important component in initiating and implementing partnerships between community colleges and business and industry in Virginia" (p. 100), while Puckett reported needs assessment was the most important in his North Carolina study (p. 104). Pugh found in his Virginia study that "the development of an informal verbal agreement between the parties is very important to the initial and implementation on the partnership" (p. 101), however Puckett's North Carolina respondents did not perceive the need for a "formal

written agreement” (p. 111), due to this component receiving a moderate importance rating, which yielded the overall lowest rating of the 29 components.

Benoit’s (1995) dissertation investigated the faculty’s perceptions of college partnerships. He wrote that 44% (n = 19) of his respondents believed that instructors were the critical component in successful educational partnerships (p. 51). Benoit also reported that the majority of studies pertained to “secondary and postsecondary institutions, community services agencies, educational consortia, and 2+2’ programs” (p. 2). He stated that although some of the studies did include community college technical programs, the majority of studies did not (p. 2). Benoit found that: (a) when faculty were supported by their administrators that the faculty were more likely to have positive attitudes and were in favor of partnerships; (b) some administrators desired partnerships only because of increased publicity; (c) partnership programs were more fruitful when administrators found additional funding to support faculty work that occurred outside the normal nine month contract; (d) when administrators protected their partnership-faculty and also met industry’s needs, then those partnerships were considered to be more successful; and (e) the industry received the best product when colleges were flexible in the facilitation of the program (p. 100-101).

Summary

This chapter established the need for technicians a decade ago, as well as now, and made the case for needing skilled technicians in the future. The chapter also acknowledged the lack of quantitative research related to dealership needs and dealership perceptions of OEM educational programs. The chapter also pointed out that a wide range of industries have a vested interest in providing skilled technicians to dealerships.

It will be useful for John Deere and JD Ag Tech colleges to determine what service managers' perceived needs are, the methods dealers are using to meet their needs, and what the service manager perceptions are of the JD Ag Tech program.

Corporations and Colleges Value Partnerships

This study implied that corporations value partnerships; otherwise, they would not be continuously investing in the partnership. The literature illustrated that progressive colleges are highly responsive to the *wants and needs* of industry (Benoit, 1995, p. 74; Alexander, 1997, pg. 86-87, 109-112).

Previous Research Recommendations

Briant's (1996) study of product service technicians recommended that industry sponsor research by providing data, finances, and equipment to researchers so they can more effectively investigate partnership programs (p. 113). Briant also recommended future studies relating to product service technicians to examine students' effectiveness at work, the ratio of students who continue to work for the company, and dealership managers' opinions of the program (p. 115).

Savarese (2002) recommended future research in a quantitative style study to focus upon the corporate partners while limiting the study to one "region" (p. 121). This study added to the body of knowledge by studying the John Deere Agricultural dealership organization within the continental United States. Savarese stated, "More students and local business partners who share an interest in a national corporate effort in a partnership could offer additional insight into the mutual benefits and exchanges that partnerships produce" (p. 121). This study focused upon the local business partners: the John Deere

dealership service managers. These managers shared an interest in the national corporate efforts of the JD Ag Tech program.

Ator-James (1993) recommended utilizing her findings and following up with a quantitative study to sample a broad array of businesses and colleges (p. 150). As previously mentioned this study sampled the entire the John Deere Agricultural dealership organization within the continental U.S. to determine both the dealer service manager perceptions of college programs and what dealerships need in terms of service personnel.

Alexander mentioned that further research should be completed in the area of college partnerships with industry (1997, p. 195-196). Alexander gave examples of OEMs in triad partnerships with community colleges including: General Motors, Toyota, Ford Chrysler, John Deere, and Caterpillar (1997, p 199-200). All those corporations shared the common need of providing skilled technicians to their dealership organization; however, this study was limited to John Deere.

Alexander elaborated on “Individual Excellence” one of Kanter’s eight characteristics found in successful partnerships. The notion was that every participant must have some mutual strength that will enhance the partnership, while avoiding the temptation of compensating for deficient partners (p. 192). In other words, the college, the corporation and the dealership organization all must bring their mutual strengths of individual excellence to the partnership. This study purported that much can be gained by focusing attention upon the dealership organization.

Lack of Research in Dealer Needs and Dealer Perceptions of Programs

The researcher of this study was unable to find a single study that clearly focused on investigating the dealerships' perceptions of partnerships. The existing studies also failed to focus on quantifying the type of needs dealers had in terms of technicians and to ask dealers how they were attempting to meet their personnel needs.

Just as a football coach can list many reasons that can cause a team to lose, so, too, can a program director, an instructor and/or industry manager list many variables that can cause a college/corporate partnership to fail. However, this study asserted that unless the industry (dealers) was willing to participate by sponsoring students in the programs and offering careers for the program graduates, everything else was futile. The bottom line is that John Deere will not start a new Ag Tech program unless the local dealerships will support the school. Therefore, if the JD Ag Tech programs were to succeed, it is paramount to determine the needs of dealers, discover the avenues dealers were using to meet those needs, and learn what perceptions service managers had of the JD Ag Tech program. Colleges will continue to be crunched for funds and desire to participate in the corporate and college partnerships. This study gave corporations and community colleges the ability to make more informed decisions by learning more about John Deere dealers.

Benoit (1995) asked faculty members "Who benefits from the partnership programs at your institution? The corporation or business? The college? The student? How? If more than one group benefits, who benefits the most? The least?" (p. 69). The faculty responded that everyone benefits. Benoit listed one quote that agreed with Alexander's concept that all three partners contribute equally. The faculty member

stated, “The partnership is like a three-legged stool; all participants have equal responsibility and benefit” (p. 69). Just as a three-legged stool requires each leg to contribute equally for the stool to meet its purpose, this study contended that the dealership organization should be the leg of focus for this investigation. This leg is the most dispersed and has the largest quantity of stakeholders located through out the United States. By focusing on the dealership organization, the biggest gains can be made in future improvements of the partnership when Deere & Company partnered with community colleges:

1. Obtain a description of the John Deere dealership service personnel needs.
2. Gain an understanding how the dealers were attempting to currently meet those needs.
3. Learn what the service manager perceptions were towards the JD Ag Tech program.

Chapter 3

Methodology

This chapter describes the methodology used in the study. These methods (a) investigated John Deere dealerships service technician needs; (b) determined the actions dealers took to locate and hire technicians; and, (c) determined service manager perceptions of the John Deere (JD) Ag Tech program. The chapter contains the following sections: (a) research design, (b) research questions, (c) dependent and independent variables, (d) hypotheses, (e) population and sample, (f) procedures, (g) controls, (h) data collection, and (i) data analysis.

Research Design

The research design consists of two components: a descriptive component; and, a correlation component. Both the descriptive and correlation elements found in this study are non-experimental. This study investigated the relationship of dealership perceptions of the JD Ag Tech program, with five specific characteristics detailed later in this chapter. The descriptive element describes dealership demographic data and service manager perceptions. A questionnaire collected the data.

Research Questions

1. What are the John Deere dealership service technician needs as perceived by JD dealer service managers?
2. What are the methods John Deere service managers use to identify potential service technicians?

3. What are the relationships between the service managers' perceptions of the JD Ag Tech program and the: (a) number of technicians employed at the dealerships, (b) number of stores the dealer-organizations own, (c) distances between the dealerships and the closest JD Ag Tech school, (d) number of JD Ag Tech students the dealerships have sponsored, and (e) service managers' age?
4. Among the dealerships that have sponsored Ag Tech students, what are the service managers' perceptions of the John Deere Ag Tech program?
5. Which of the following variables will best predict or explain the service managers' perceptions of the JD Ag Tech program: (a) number of technicians employed at the dealerships, (b) number of stores the dealer-organizations own, (c) distances between the dealerships and the closest JD Ag Tech school, (d) number of JD Ag Tech students the dealerships have sponsored, and (e) service managers' age?

Dependent and Independent Variables

The dependent variable in this study was the John Deere service managers' perceptions of the JD Ag Tech program. The independent variables consisted of (a) the number of technicians John Deere dealerships employ, (b) the number of stores the dealership organization owns, (c) the distances between the John Deere dealerships and the closest JD Ag Tech School, (d) the number of JD Ag Tech students JD dealerships have sponsored, and (e) the age of the John Deere service managers.

The first two independent variables related to the size of the dealership. Larger dealerships require more service technicians, and larger dealer-companies own multiple store locations. As stated in chapter 2, the size of a company was a characteristic that

influenced companies' decisions towards training and education (Smith & Dowling, 2001; Ator-James, 1993).

The third independent variable, distance to a JD Ag Tech school, was chosen after viewing a map of the JD Ag Tech school locations. The researcher found that the majority of the JD Ag Tech schools were located in the central part of the United States, and only one school was located in the western part of the United States (see Appendix A for a listing of the JD Ag Tech schools and their locations). Geography was also reported in chapter 2 as a factor that could negatively affect a partnership program.

The fourth independent variable -- number of JD Ag Tech students dealers sponsor -- was one of the most important variables of this study. If John Deere dealers do not sponsor JD Ag Tech students, then the JD Ag Tech program would ultimately fail because students must have a sponsoring dealership in order to be admitted into the program.

The last independent variable -- service manager's age -- was a basic demographic variable used to determine whether it related to the service managers' perceptions of the JD Ag Tech program.

Hypotheses

The following hypotheses were used to guide the study.

Null Hypothesis 1: There is no statistically significant relationship between the number of technicians JD dealerships employ and service managers' perceptions of the John Deere Ag Tech program.

Research Hypothesis 1: There is a statistically significant positive relationship between the number of technicians JD dealerships employ and service managers' perceptions of the John Deere Ag Tech program.

Null Hypothesis 2: There is no statistically significant relationship between the number of stores a dealer owns and service managers' perceptions of the John Deere Ag Tech program.

Research Hypothesis 2: There is a statistically significant positive relationship between the number of stores a dealer owns and service managers' perceptions of the John Deere Ag Tech program.

Null Hypothesis 3: There is no statistically significant relationship between the distances of John Deere dealerships from the closest JD Ag Tech School and John Deere service managers' perceptions of the JD Ag Tech program.

Research Hypothesis 3: There is a statistically significant negative relationship between, the distances of John Deere dealerships from the closest JD Ag Tech School, and John Deere service managers' perceptions of the JD Ag Tech program.

Null Hypothesis 4: There is no statistically significant relationship between the number of JD Ag Tech students JD dealerships have sponsored and service managers' perceptions of the JD Ag Tech program.

Research Hypothesis 4: There is a statistically significant positive relationship between the number of JD Ag Tech students JD dealerships have sponsored and service managers' perceptions of the JD Ag Tech program.

Null Hypothesis 5: There is no statistically significant relationship between service managers' ages and service managers' perceptions of the John Deere Ag Tech program.

Research Hypothesis 5: There is a statistically significant relationship between service managers' ages and service managers' perceptions of the John Deere Ag Tech program.

Population and Sample

John Deere requested that the researcher not publish the specific number of John Deere dealerships used in this study. Deere & Company provided the researcher the population frame. The frame contained more than 1400 John Deere dealerships located in the continental United States. The researcher used the number 1500 for the total population size. The dealerships located in the population frame had a John Deere Ag-contract allowing them to sell John Deere Agriculture Equipment. The sample of dealers was selected from the population frame. Krejcie and Morgan (1970) provided sample sizes for various populations and indicated that a sample size of 306 is needed to be representative for a population size of 1500.

The sample was proportionately stratified using the six John Deere Agricultural sales branches: Atlanta, Columbus, Dallas, Kansas City, Minneapolis, and Reno. The percentage of John Deere Agricultural dealerships located in each of the six sales branches was first calculated. This percentage was multiplied by the sample size of 306 to determine the random-number of dealerships to be sampled from each of the six sales branches.

Microsoft Excel was used to generate a list of random numbers for each of the six sales branches. The numbers generated ranged from one to the total number of dealerships located within each of the sales branches. Those numbers were placed in order from the smallest to the largest. The generated numbers were rounded to the nearest whole number. When the rounding process generated a duplicate number, the next highest number replaced the duplicate number.

The population frame was first sorted by sales branches. A second sort was performed placing the dealerships in alphabetical order using the dealership store's name. A third sort was made using the name of the city where the store was located. This last sort was necessary because many dealerships had the same name due to one company owning multiple store locations. The random numbers generated for each sales branch were used to select the sample of dealers in the order they were placed within each branch. If a dealership that had already participated in an interview, focus group or pilot study was selected, then the next available dealership listed in the sorted population, was selected.

Procedures

Instrument Development

The study used a questionnaire to obtain data from John Deere dealer service managers. The instrument was constructed to determine (a) if John Deere dealers needed technicians; (b) the methods dealers used to locate employable technicians; and, (c) the service managers' perceptions of the JD Ag Tech program.

Two John Deere College Partnership Managers and the researcher began developing the questionnaire during the spring semester of 2005. The researcher used the

problem statement and research questions to guide the development of the questionnaire. The John Deere managers assisted in identifying the appropriate content and wording used in the questionnaire. The researcher made multiple revisions to the questionnaire while communicating with the John Deere managers via email and telephone.

Meeting with John Deere Corporate Managers

In addition, the researcher made a trip to the John Deere North American Agricultural Marketing Center in Lenexa, Kansas, on May 31, 2005, to meet with the two college partnership managers and their direct supervisor, two dealer development managers, and the John Deere Agricultural market research analyst responsible for surveying customers.

During this meeting the questionnaire was further evaluated. One recommendation was to request that participants respond based upon one store location, which was later specified to be the location that received the questionnaire. Additionally, Question 4 was thought wordy and unclear. The question was revised making it more concise. The focus of the question was to determine the service department's greatest area of need. The Deere managers indicated that they needed a "baseline of the types of technicians needed within the service departments." The question asked the respondents to check all that apply, and the Deere managers suggested revising the question so that the respondents could pick the top three areas where they need the most help, instead of just checking all that apply. It was also recommended that the answer-choices be alphabetized. In addition, the John Deere managers asked for a question that would allow the service departments to report their areas of technical strength, which became Question 5.

The time-line of five years previously used in Parts 1 and 2 of the questionnaire was changed to three years. This change allowed service managers to reflect over the past three years instead of five years. Three years was also recommended because technology changes rapidly, causing needs to change rapidly.

Question 14 asked where the service managers found their technicians; the Deere managers recommended adding “Agriculture/Commercial & Consumer/Construction & Forestry” in parentheses next to the answer choice “number of technicians hired from other John Deere Dealers.”

Questions 8 through 13 were previously covered by just two questions. The Deere managers recommended changing, “Have your newly hired technicians completed any *formal education*” [italics added] to “any formal *technician program*” [italics added], because it was unclear whether the question asked for technical school graduates or for technicians who attended technical training.

Another area of concern that came to light was the questionnaire’s order. The questionnaire asked where the service managers found their technicians -- Question 14 -- before Questions 10 through 13, which asked service managers if they hired technicians from technical schools. The questionnaire’s format was revised by adding Question 8. This question allowed the service managers to skip Questions 9 through 17 if they had not hired any technicians in the last three years. Plus, two answer categories (a) number of technicians hired from JD Ag Tech schools; and, (b) number of technicians hired from Non-JD Ag Tech Schools, were removed from the question that is now Question 14, and incorporated into Questions 10 and 13. This format change provided a better systematic sequence than the previous questionnaire.

The John Deere market research analyst recommended reversing the perception rating scales found in part 3 of the questionnaire, so that a rating of “5” would equal “strongly agree.” The analyst also recommended changing the perception question format from multiple numbers of questions to fewer numbers of questions that contained multiple questions listed by a letter, which reduced the overall total number of questions. Although Dillman (2000, p. 116) found no evidence for making this change, the revision was later implemented after conferring with the Dissertation Committee.

The researcher also asked the John Deere managers for more attributes that could be used for measuring the overall perception of the John Deere Ag Tech program in Question 19. Previously, only four attributes were used in Question 19: (a) financial benefit, (b) school location, (c) JD Ag Tech schools, and (d) graduates. The additional two attributes recommended by John Deere managers were (e) funding and (f) JD Ag Tech should continue to rely on community colleges for facilitating the program.

Questions 22 through 25 could also be improved according to the Deere managers; previously, the 23 items found in Questions 22 through 25, were grouped into four large encompassing questions. Though the researcher was attempting to have the respondents rate each of the four partners as a whole, the Deere managers pointed out that the questions were unclear and they were not sure what the questions targeted. The Deere managers recommended changing those four questions into one single question with four separate parts with one for each partner, lettered “a” through “d.” To improve the clarity of the questions, the following statement preceded those four questions: “The next four questions ask for your perceptions regarding the contributions each of the four

partners bring to the JD Ag Tech partnership.” However, as explained later in this chapter, those questions required several more revisions.

The researcher also asked the John Deere managers to choose between two questions designed to have service managers rate the overall internship experience, which is required in the JD Ag Tech program. The managers chose the first question, Number 26.

The questionnaire contained two additional questions for service managers to rate. One question asked if John Deere should take more ownership in developing the curriculum in the JD Ag Tech program. The other question asked the service managers to rate the JD Ag Tech program against other OEM programs, like the Caterpillar ThinkBIG program and the Ford ASSET program. Both questions seemed too difficult for service managers to answer due to the potential lack of knowledge service managers would have in both subject areas, so the questions were removed from the questionnaire.

The Deere managers recommended moving a question from part 4 of the questionnaire to become Question 18. This question’s new location appeared to fit the sequence of questions better. Question 18 also provided a good lead into Question 19, which made it more comfortable for those service managers with no JD Ag Tech knowledge to answer question 19 (Dillman, 2000, p. 87).

The Deere managers recommended deleting a question that asked service managers to choose the name of their John Deere company sales branch. This question was omitted because the information was provided to the researcher beforehand so the sample could be stratified. Therefore, the question became redundant and was not needed.

The Deere research analyst recommended revising the order of the answer choices on Question 30 by placing the smallest population first and the largest last.

The Deere managers were asked if the answer choices for Questions 31 through 33 were appropriate. The Deere managers did not want to bias the answer choices; therefore, they would not provide any recommendations to the answer-choices found in Questions 31 through 33.

The survey instrument also contained two questions at the end of the questionnaire that were very important to John Deere. The questions asked the service managers “How many JD Ag Tech students have you sponsored in the past 10 years?” and “How many of those JD students continue to work for the dealership organization?” However, the questions seemed redundant and out of place. It was determined that the questions could be incorporated into Question 10 and only required adding one additional question, which became Question 11. According to the John Deere managers, Question 11 – “How many of those JD Ag Tech graduates remain at the dealership?” -- was one of the most important questions in the questionnaire.

Dissertation Committee

The researcher revised the questionnaire based upon the suggestions provided by the John Deere corporate managers and then met with the Dissertation Committee on August 26, 2005. The Dissertation Committee utilized their research experience to provide additional recommendations. The Committee members made recommendations in order to ensure that the questionnaire used the appropriate and relevant measurement methods.

The Committee recommended having the participants rank the three areas on Questions 4 and 5 instead of simply choosing the dealership's top three areas. This change provided more precision when measuring the service departments' needs and weaknesses.

Concerning Questions 8 through 13, the Committee recommended a separate question asking for technicians hired from a JD Ag Tech school, which became Question 10, and a separate question that asked for technicians hired from Non-JD Ag Tech schools, which became Question 13. The prior questionnaire did not differentiate between the two types of programs, and only asked the respondents to list and rate the colleges they used to hire new technicians. The Committee's recommendation was validated during the pilot group study when the researcher found that one dealership had hired a student from a community college that contained a JD Ag Tech program; however, the graduate came from a Non-JD Ag Tech program. Without separating those questions, if a service manager had listed hiring a technician from a college that contained both programs, then the researcher could have incorrectly assumed that the recruited technician was hired from the JD Ag Tech program.

The Dissertation Committee suggested changing Questions 22 through 25 so that the participants could rate each of the four partners' attributes individually, instead of trying to measure them with single multiple-barreled questions, which also coincided with Dillman (2000, p. 73).

The Committee also recommended revising Question 26 from “. . . *is good and needs little improvement*” [italics added] to “. . . *has worked well for us*” [italics added].

The Committee also suggested that one question be split into two parts, which created Questions 32 and 33.

Service Manager Interviews

The questionnaire was revised as recommended by the Dissertation Committee. The researcher then met with four John Deere agricultural equipment dealership service managers and interviewed them individually on October 11, 2005, and October 13, 2005. The researcher brought three items to each interview: (a) the pre-notice letter, (b) the questionnaire packet, and (c) the follow-up thank you/reminder post card. After the service managers read the items, the researcher asked them if: (a) any of the question used the wrong terminology, (b) anything needed to be omitted or added, and (c) any question was offensive. The researcher also asked the service managers if there were questions that were not likely to be answered.

The first recommendation was to use the service managers' actual names when addressing the envelopes and the letters, rather than just listing "service manager" on the mailings. The pre-notice letter had a redundancy and the managers recommended changing the first phrase "you ahead of time" to "in advance."

Another goal was to see if any problems occurred when the questionnaire packet was opened. The questionnaire packet consisted of a cover letter, the questionnaire, a return envelope and a \$2 bill as incentive. The researcher did find that the \$2 bill remained hidden when the packet was opened and when the documents were unfolded. Dillman (2000) provided recommendations on how to fold the questionnaire and place the cover letter, and place the \$2 bill (p. 174-175). However, this questionnaire was produced using a paper size of 8.5 inches by 11 inches that was folded in the middle.

Dillman's folding recommendations were for questionnaires made using legal-sized paper thus affecting the folding directions. The researcher used a large holiday card type envelope, measuring 5.75 inches by 8.75 inches, which eliminated the need to fold the questionnaire, and avoided creasing the questionnaire, helping reduce the tendency of the pages sticking together, which could cause the respondents to accidentally skip a page. However, during the interviews the researcher watched the service managers open the packet and found that the incentive remained hidden when the participants opened the questionnaire packet. Dillman (2000) explained that it is important for the respondent to immediately see the incentive when the packets are opened; otherwise, the incentive loses its effectiveness (p. 174).

Concerning the questionnaire, managers recommended eliminating the phrase "if the dealership needs technicians," because it could cast some judgment. The service managers stated that most dealerships need technicians.

The interviews with the four service managers also found that Questions 22 through 25 needed additional clarification. A service manager suggested improving the statement leading into Questions 22 through 25 by not only saying that there are four partners in the JD Ag Tech program, but by listing the partners as well: dealers, colleges, John Deere Corporation, and students. The researcher also chose to emphasize the names of each partner by underlining the partner names in each of the stems of the Questions 22 through 25: "dealers" in Question 22, "schools" in Question 23, "Deere and Company" in Question 24, and "students" in Question 25. The researcher gave a Pittsburg State University pen and the \$2 incentive to the service managers as a way of thanking them for their time.

Focus Group

The questionnaire was revised based upon the interviews conducted with the four individual service managers. The researcher next met with a focus group of nine John Deere service managers on October 25, 2005. Eight of the service managers managed the service departments for John Deere agricultural equipment dealerships and one managed the service department for a John Deere construction equipment dealership. The service managers' dealerships were located in the following states: Idaho, Iowa, Kansas, and Utah. Two of the service managers previously participated in the individual interviews with the researcher.

The researcher brought a pre-notice letter, questionnaire packet, and follow-up/thank you post card to the focus group. The researcher gave the service managers a Pittsburg State University pen with the \$2 bill incentive located in the questionnaire packet.

The researcher distributed the pre-notice letter and requested feedback. The participants had no additional feedback to give. The researcher then asked, "Would you open this letter?" and "Would you complete the questionnaire?" and "How can the researcher increase the odds of receiving a completed questionnaire?" One participant suggested mailing the questionnaire to the dealer owner so that the dealer owner could give the questionnaire to the service manager to complete. The participant indicated that the questionnaire would then be placed on a higher priority.

The researcher asked the group whether the questionnaire should be mailed to the service manager or the dealer owner. The group was indecisive. Some service managers said they would complete the questionnaire and some said they would complete it if the

dealer owner asked them to complete it. The researcher then asked if the dealer owner would read the pre-notice letter. The group indicated that the dealer owner would be just as likely to discard the pre-notice letter and/or questionnaire as a service manager would be to throw away the pre-notice letter/questionnaire.

The researcher advised the group that John Deere would communicate to the dealerships that a study would be conducted soon, and would urge the dealership organization to participate. A service manager then provided a suggestion identical to one received during the initial service manager interviews for content validity. The focus group participant stated that service managers read communications every day in John Deere's online communication system called "Pathways" under a heading called "What's New." John Deere service managers visit this site every day to obtain vital information relating to the John Deere dealership service departments.

For the focus group, the researcher changed the way the questionnaire packet was assembled. The self-addressed and stamped return-envelope was folded and placed inside the questionnaire. The cover letter was folded once in the middle, like the 5.5-inch by 8-inch booklet questionnaire. The questionnaire was placed inside the cover letter. The \$2 was folded and placed on top of the questionnaire, so that when the assembled packet was removed, the \$2 bill was highly visible. During the focus group the researcher found that the participants easily found the \$2 bill incentive, along with the cover letter, questionnaire and return envelope. The time it took for the service managers to read the cover letter and complete the questionnaire ranged from 11 to 18 minutes.

Participants had much to discuss about Questions 4 and 5. First, they indicated that a harvesting technician needed electrical, hydraulic and Service Advisor expertise

and that the same held true for a tractor technician. They also indicated they wanted everything. The researcher explained that the questionnaire asked them to answer the question based on needs and not desires. The focus group agreed with the suggestion to place the terms *electrical*, *hydraulic*, and *Service Advisor* into one single category called “Basic Technician” and to list electricity, hydraulics and Service Advisor in parentheses beside the “Basic Technician” category. Question 4 was reworded to emphasize needs and not wants. The words *NEEDs* and *wants* were underlined to emphasize the words.

The group also indicated that Questions 4 and 5 would be easier to answer if each category was provided a rating scale similar to Question 19. Dillman (2000) acknowledged that ranking-type questions are more difficult to answer than rating scale type questions (p. 236). Dillman also stated that although the two types of questions can yield similar information, the answers really are different. Dillman suggested that an interviewer first ask the respondents to rate the items then rank the items, making the ranking process easier.

The researcher chose to leave the question the same, asking respondents to rank their top three choices, and kept the questionnaire length to a minimum. Ranking the top three choices was still easier than requiring the respondents to rank the entire list of categories. Ranking also provided the answers that John Deere requested. The company wanted to know the precise areas of need and not the service departments’ dream sheet or “wants.” The question format was more difficult than rating type questions, but it forced the service managers to clarify their areas of greatest need.

One respondent initially tried to answer Question 10 for a non-JD Ag Tech school, which should be answered in Question 13. However, the respondent read further

and understood that Question 10 was for JD Ag Tech only. The researcher mentioned that Question 10 could be reworded for clarity. For Question 10 the researcher chose to emphasize JD Ag Tech by underlining the words *JD Ag Tech*. The researcher also underlined the word *non*-JD Ag Tech in Question 13.

The focus group mentioned that soft skills were very important and that the questionnaire did not list soft skills, such as “respect for the customer” or “communicates well with people.” The researcher asked the focus group if it would be appropriate to add this type of category to Question 25 and the focus group was not sure, but thought that Question 25 might be a possible area to list soft skills. The researcher chose to add two soft-skill-attributes to Question 25d “respecting the customer” and 25e “communicating with the customer.”

A Cronbach Alpha reliability coefficient was computed for the focus group responses to Questions 19a through 19e. An acceptable coefficient of .759 was obtained (Litwin, 1995, p. 31).

Pilot Study

The questionnaire was revised as recommended by the focus group. Next a pilot study consisting of 24 service managers was conducted. The pilot group was used to check for content validity. Miller, Linder and Torres (2005) indicated that content validity is often assessed using a “panel of experts.” The authors further stated “a field test could also be conducted with a population similar to the proposed population to help with content validity” (p. 11-12). The 24 pilot group questionnaires were mailed November 11, 2005. Eighteen completed questionnaires were returned within 17 days.

Another questionnaire was returned 34 days later; however, all of the data had been computed using the first 18 questionnaires.

In addition to checking content validity, the pilot study was used (a) to check the instrument for reliability; (b) to look for any other unforeseen problems; and (c) to seek a third and final input from service managers concerning their comments regarding the questionnaire.

Mr. Ken Buell, manager of college partnerships for John Deere, provided the researcher with a list of 24 John Deere agricultural equipment dealerships located throughout the United States that he believed would be willing to participate in this pilot group study. The pilot group of service managers were located in the following states: Colorado, Iowa, Kansas, Minnesota, Missouri, Montana, Nebraska, New York, Ohio, Oklahoma, Texas, West Virginia, and Wisconsin. Mr. Bryan Dorsey, the John Deere market research analyst, provided the researcher the contact information for all of the John Deere North American agricultural dealerships. Mr. Tom Hughes, manager of college partnerships for John Deere, further assisted by providing the researcher with the names of the service managers for the pilot group locations.

The researcher called all 24 service managers asking if they would be willing to participate in the study by completing a questionnaire; all 24 agreed to participate. During the phone conversation the researcher explained that a questionnaire packet would soon be mailed to the service manager's attention. The telephone calls revealed that four of the questionnaires would have been mailed to the wrong address. Four service managers stated the questionnaire must be mailed to a post office box instead of using the dealership's street address. In addition, one of the service managers had

relocated to a different company store location. As a result of this pilot group finding, the researcher determined that it would be necessary to call each of the 306 randomly sampled dealerships to be used in the main data collection process. The phone call would obtain a correct mailing address and obtain the service manager's name for that store's location.

During the phone conversations the researcher asked the pilot group members to write comments on the questionnaire if: (a) the questions were confusing; (b) something could be improved; or, (c) some of the questions needed additional answer categories. One service manager included a typed letter with his questionnaire. The service manager explained that the JD Ag Tech program had been instrumental over the last seven years in recruiting new technicians. The service manager indicated that they had invested considerable time and money in sponsoring Ag Tech students. He stated that their nine stores had sponsored 17 to 20 JD Ag Tech students.

The service manager also commented on Questions 22 through 25. He wrote, "What are you asking? Are you asking if it is too hard on any of the 4 partners?" The researcher called the service manager to discuss the questions. The researcher explained that the questions were designed to obtain the direction of service manager opinions. As a result of the phone conversation:

1. A sentence was added to the paragraph that introduces questions 22 through 25. The sentence states, "'1' would mean that you strongly believe the partner does not contribute their share, and a '5' would mean that you strongly believe that the partner does contribute their share to the JD Ag Tech partnership."

2. The researcher changed the respondent's answers from negative responses to positive responses as directed by the service manager.
3. The researcher removed the word "more" from questions 22, 23, 24, and 25, so that the questions now read, "contribute their share to the JD Ag Tech program."

The service manager's letter also stated, "Question 15 other than Ag Tech or other tech school training I do not keep up with technician's college background." However, the question was not removed because the John Deere corporate managers requested this information.

The last comments the service manager communicated was that graduates do not need the general education courses that are required in the program and that he "would like to see some kind of a 1-year technical only program for these older and more educated students." The researcher further investigated the questionnaire to see how the manager responded to Question 17, which also addressed this concern. The respondent's first preference for technician level of education was "Post secondary/college, with an associate's degree" while the second choice was "Post secondary/college, with a diploma or certificate," and the third choice was "post secondary/college, but no diploma or certificate." The researcher interpreted the response to mean that the respondent is satisfied that JD Ag Tech programs have Associates degree program, but wished for fewer general education classes, and would like to see a shorter program for older students who have already received some education.

Pilot Group Questionnaire Revisions

Printing errors were found during the pilot study. The examples given in Questions 10 and 13 were incomplete. The “rating values” were not circled and the “number of technicians” was not listed in the questions’ blanks. Only one error was found as a possible result of those mistakes. One service manager listed the same school multiple times in Question 10. In addition to completing the examples, the researcher added the word “each” to the last statement of Question 10, “list the number of technicians you have hired from *each* [italics added] of the JD Ag Tech schools” and Question 13, “list the number technicians you have hired from *each* [italics added] of the non-JD Ag Tech schools.”

The researcher also added the word “equipment” to Question 6’s answer category “contacted an agricultural equipment dealer.” A comma was removed from an answer category found in Questions 15 and 16. The phrase “John Deere Ag Tech” was changed to “JD Ag Tech” in Question 19f to remain consistent with the other answer categories.

Another error that occurred was that Question 20 did not list the numeral “20” in front of the question, and Question 21 was mislabeled with the number “20.”

One unexpected finding was that one of the respondents did not answer Pages 3 and 4. The questionnaire pages might have been stuck together.

Question 14 required two revisions. Four service managers added a “farm” category; therefore, the category “number of technicians hired from a farm” was added. The second revision was the result of a service manager checking the blanks instead of writing in the number of technicians. The following words were added and underlined: “*list the number* of technicians” [italics added] in place of the old statement “list how

many.” Question 15 also had a respondent check a blank instead of writing in a number. Question 15 was revised by emphasizing the words *for example* by underlining them and changing their font.

Questions 16 and 17 had two service managers check answers instead of ranking their responses. The respondents only checked one answer. The single checked answer was treated as the number one response. An attempt to improve the question was made by emphasizing the word *rank* by underlining it and changing its font.

A Cronbach Alpha reliability coefficient was computed for the pilot group responses to Questions 19a through 19e. An acceptable coefficient of .800 was obtained (Litwin, 1995, p. 31).

The researcher made no revisions to Question 18 and Questions 26 through 30. Concerning Question 31, the last two categories “\$76 to \$80 per hour” and “\$81 or more per hour,” were not chosen by any of the pilot group respondents. The pilot dealerships were located across a broad number of states and some were located in large metropolitan cities. Therefore, the researcher chose to change the last two categories of Question 31 to a single category that stated “\$76 or more per hour.”

Analysis of Question 32 found that all of the respondents except one chose either the second category “\$7 to \$9.99 per hour,” or the third category “\$10 to \$12.99 per hour.” The last category, “Or, check here if you would not hire an untrained technician” was chosen by one of the pilot respondents. The researcher chose to revise all of the categories to seek a broader variation of results for Question 32 in the main sample. The categories previously had a \$3 range and were revised to a \$2 range: (a) “\$6.99 or less per hour,” (b) “\$7 to \$8.99 per hour,” (c) “\$9 to \$10.99 per hour,” (d) “\$11 to \$12.99 per

hour,” (e) “\$13 to \$14.99 per hour,” (f) “\$15 or more per hour” and (g) “Or, check here if you would not hire an untrained technician.” In addition, the highest category was eliminated from Question 32.

Question 33 was revised to implement the \$2 range categories, which matched the changes made to Question 32. However, Question 33 did contain one higher category than Question 33, “\$15 to \$16.99 per hour,” because five of the pilot respondents had chosen “\$13 to 15.99 per hour” and two of the pilot respondents had chosen “\$16 to \$18.99 per hour.”

Primary Data Collection

The researcher revised the questionnaire based upon the findings obtained from the pilot study. The sample of dealers was called during the month of December, 2005, to obtain correct mailing addresses and service managers’ names.

The researcher requested that John Deere post an announcement in their on-line communication system called Pathways in the “What’s New” section. The announcement is listed below:

John Deere has requested Pittsburg State University to conduct a research study.

The research study is investigating dealerships’ needs for technicians; methods

dealerships are using to locate technicians; and, service managers’ perceptions of

the John Deere Ag Tech program. In a few days a sample of John Deere

agricultural service managers will receive the questionnaire and we want to

strongly encourage you (service manager, dealer principle and the person

responsible for recruiting and hiring) to complete the questionnaire and return it in

the self-addressed stamped envelope. The findings/successes and best practices will be tabulated and communicated with dealers to benefit all.

Questionnaire

The questionnaire, located in Appendix D, consisted of four parts: (a) part 1 was designed to assess personnel needs for the service department; (b) part 2 investigated the methods John Deere dealerships were using to locate technicians; (c) part 3 investigated service managers' perceptions of the JD Ag Tech program; and, (d) part 4 obtained dealership demographic information.

The data generated from Questions 19a through 19f were combined into a single summative score resulting in a summative score for each service manager's overall perception of the John Deere Ag Tech program. Fishbein and Ajzen (1975) explained that "most of the commonly accepted attitude-measurement procedures arrive at a single number designed to index this general evaluation or feeling of favorableness or unfavorableness toward the object in question" (p. 11). The researcher followed Fishbein and Ajzen's (1975) methods for developing a Likert type Summated Rating scale (p. 71-73). The overall summative rating assessed dealer service managers' perceptions of the JD Ag Tech program.

Gathering the demographic data enabled the researcher to develop the five independent variables that were used for answering Hypotheses 1 through 5. The five dealer demographic variables: (1) number of technicians the dealers employ; (2) number of stores the dealership-company's owns; (3) distance from the dealerships to the closest JD Ag Tech School; (4) number of JD Ag Tech students the dealerships had sponsored;

and, (5) service managers' age, were correlated with the service managers' perceptions of the JD Ag Tech program.

Controls

All studies have potential areas of concern that can harm the study's findings if they are ignored. The following control areas will be explained to ensure the quality of the study's findings: (a) frame error, (b) selection error, (c) measurement error, and (d) non-response error.

Frame Error

Frame error occurs when a researcher draws a sample from a population frame that was not representative of the targeted population. One of the biggest causes for frame error is using outdated lists (Miller, Lindner, Torres, 2005, p. 9). Frame error was not a concern for this study because the John Deere's Dealership Development group provided the researcher with the latest and most representative list of John Deere Agricultural dealerships located in the continental U. S.

Selection Error

According to Miller, Lidner, and Torres (2005) selection error can occur "if certain elements in the frame have a greater chance of being selected for the sample than others" (p. 10). This error was minimized by randomly selecting the respondents using the stratified-sampling technique described earlier in this chapter.

Measurement Error – Validity and Reliability

Measurement error can occur as a result of ignoring validity concerns and reliability concerns. Validity ensures the questionnaire was valid in that it measured what

it was supposed to measure. The criteria used for ensuring validity are face validity, content validity, criterion validity, construct validity, and reliability.

Face validity

The pilot group of service managers judged the questionnaire for face validity. This step ensured that the questionnaire appeared to measure what it was supposed to measure from a participant's point of view. Miller, Lindner, and Torres (2005) explained that the "field test" would "provide evidence that it looks the same to people like those who will be in the study" (p. 12).

Content validity

A panel of experts was asked if the questionnaire had content validity. The panel of experts consisted of (a) persons located within the sample frame; (b) persons from the corporate sector; (c) a research specialist familiar with survey instrument design; and, (d) the author of this study. The researcher met individually with each of the panel members and asked them if the instrument-measures were representative of the correct content. They all agreed that the questionnaire measured what it was supposed to be measuring.

Criterion validity

Another area of validity that needed to be addressed was criterion validity, which is comprised of predictive validity and concurrent validity. The study's questionnaire was not designed to predict, but instead to describe and determine relationships; therefore, predictive validity was not a concern. Litwin (1995) stated, "Concurrent validity requires that the survey instrument in question be judged against some other method that is acknowledged as a 'gold standard' for assessing the same variable" (p. 37). Because the researcher was unable to find a published study that measured

dealership perceptions of an OEM-sponsored education program, a coefficient could not be measured to assess criterion validity, and only future studies can be used to measure criterion validity.

Construct validity

According to Miller, Lindner, and Torres (2005) “Construct validity answers the question ‘What does the instrument really measure?’” (p. 11). Litwin (1995) indicated that construct validity “Is often determined only after years of experience with a survey instrument” (p. 43). The researcher performed three tasks to help build the instrument’s construct validity: (a) interviewed four service managers, (b) conducted a focus group, and (c) performed a pilot study.

Reliability

Leedy and Ormrod (2001) defined internal consistency as “the extent to which all the items within a single instrument yield similar results” (p. 99). The Cronbach alpha test was calculated to check the questionnaire’s internal consistency using SPSS. Two hundred seventy-four respondents answered all of the JD Ag Tech perception Questions 19a through 19f resulting in a 0.797 coefficient. Litwin (1995) indicated that reliability correlation coefficients of “0.70 or more are generally accepted as representing good reliability” (p. 31).

Non-response error

Non-response error was another area that had to be considered. According to Dillman (2000) non-response error “occurs when a significant number of people in the survey sample do not respond to the questionnaire and have different characteristics from those who do respond, when these characteristics are important to the study” (p. 10). The

researcher called the service managers who did not return the survey and asked them to answer the questionnaire over the phone, or to complete the questionnaire away from the phone and return it to the researcher.

A comparison was made to determine if there were any differences between the non-respondents and the respondents (Miller & Smith, 1983, p. 48). A two-tailed Mann-Whitney *U* test was performed on each of the service manager perception Questions 19a through 19f utilizing a .05 alpha level testing for significant differences. The Mann-Whitney *U* test results are detailed in chapter 4.

Data Collection

On January 6, 2006, John Deere posted the announcement within the on-line communications system called “Pathways” to notify dealerships that this study was being performed and to request dealerships to participate. The researcher followed Dillman’s (2000) advice of making multiple contacts in order to increase the participant response rates.

A pre-notice letter was mailed January 4, 2006, requesting that the sampled service managers respond to the questionnaire (Dillman, 2000, p. 156-58). The questionnaire was mailed January 9, 2006 (p. 158). A follow up “thank you/reminder” post card was mailed to the dealerships January 14, 2006, to thank those service managers who had already completed the survey and to give a friendly reminder to the service managers who had not completed the questionnaire (p. 178-179). Four weeks after the pre-notice letter was mailed on February 1, 2006, a letter, along with a replacement questionnaire, was mailed to the non-respondent dealerships. Dillman suggested that the fourth mailing should contain a short cover letter notifying the non-

respondents “that their questionnaire has not been received and appeals for its return” (p. 178). The last attempt to contact non-respondents was made eight weeks after the pre-notice letter was sent. This contact consisted of a phone call to the dealership requesting that the service manager respond to the questions over the telephone (p. 178).

Data Analysis

The purpose of the study was to determine the perceived needs for John Deere service technicians, to determine what John Deere dealerships were doing to recruit technicians, and to determine the John Deere service managers’ perceptions of the JD Ag Tech program. Three sets of analyses were utilized for presenting the data: (a) descriptive statistics analysis, (b) correlation analysis, and (c) multiple regression analysis. The statistical software SPSS was used to analyze the data.

Descriptive Analysis

Descriptive statistics were used to present the data obtained from all four parts of questionnaire. Part 1 of the questionnaire contained five questions. The mode was chosen as the measure of central tendency for Questions 1 through 3 because the variables were humans. Data generated by Questions 4 and 5 were ordinal data. Frequencies and percentages were used to present the central measure of tendency.

Part 2 of the questionnaire contained twelve questions. Data generated by Questions 6, 8, 9, and 12 were nominal; therefore, frequencies and percents were used to represent the findings for those questions. Data obtained from Questions 7, 16, and 17 were ordinal data and frequencies and percentages were also used to present the central measure of tendency.

The data obtained from Questions 10 and 13 were placed into two groups: JD Ag Tech Schools; and, non-JD Ag tech schools. An overall mean score and standard deviation was generated for each group to describe how satisfied the sample of service managers was with JD Ag Tech schools, and how satisfied the sample of service managers was with non-JD Ag Tech schools.

Questions 11, 14, and 15 provide ratio type answers; therefore, the mean was used to present the measure of central tendency, and the standard deviation was used to measure the dispersion.

Part 3 of the questionnaire contained Likert-type questions that asked service managers for their perceptions of the JD Ag Tech program, with the exception of Questions 18 and 20. Means were used to describe the results for the Likert-type questions and frequencies and percents were used to describe the results of Questions 18 and 20.

Part 4 of the questionnaire contained demographic data. Means and standard deviations were used to describe the data in Questions 27, 28, 29, 34, 36, and 37b. Frequencies and percents were used to describe data for Questions 30, 31, 32, 33, 35, and 37a.

Correlation Analysis

The correlation portion of the study investigated five relationships. The study examined the relationship between the dependent variable, service manager perceptions of the JD Ag Tech program, and five demographic characteristics, which were described earlier in the instrumentation section of this chapter.

A summative score was developed using data from the perception questions found in part 3 of the questionnaire. The summative scale was developed using a variation of Kerlinger's (1973) example: strongly agree "5," agree "4," undecided "3," disagree "2," and strongly disagree "1" (p. 497). A perception score was assigned to every responding service manager following the summative scaling technique that was previously explained in the instrument portion of this chapter.

The summative perception score indicated the extent to which service managers had positive or negative perceptions of the JD Ag Tech program. The researcher chose to treat the summative score for each service manager as interval data. This choice allowed the provision for performing multiple regression analysis. Although some researchers rigidly have stipulated that a summated rating scale can only be classified as ordinal, other authors have disagreed. Gardner (1975), for example, stated:

The summated scale category obviously includes a larger proportion of all the instruments used in educational and psychological research. The category occupies an intermediate position on the ordinal/interval continuum (p. 53).

Kerlinger (1973) as well stated "it is probable that most psychological and educational scales approximate interval equality fairly well" (p. 440).

The five demographic characteristics come from Questions 10, 27, 28, 29, and 30 located in the questionnaire. The five-dealership demographic characteristics produced ratio type data. The "Pearson r" test for correlation was performed within SPSS to measure the five relationships found in Hypotheses 1 through 5 using a .05 alpha level for statistical significance.

The correlation conventions provided by Davis (1971) were used to describe the measures of association (p. 49). Coefficients .70 or higher were considered very strong association. Coefficients .50 to .69 were considered substantial association. Coefficients .30 to .49 had moderate association. Coefficients .10 to .29 had low association. Coefficients .01 to .09 had negligible association.

Multiple Regression Analysis

The correlation analysis determined which relationships between the dependent variable and independent variables were statistically significant. Multiple regression analyses were performed to determine: (a) which independent variable or combination of independent variables could best explain the variance in the dependent variable; and, (b) which independent variable could best predict the service managers' perceptions of the JD Ag Tech program.

A simultaneous multiple regression was performed by entering the dependent variable, along with the five independent variables, into the model simultaneously. This analysis determined how much of the dependent variable's variance -- service managers' perceptions of the JD Ag Tech program -- could be explained by the five independent variables.

In addition to analyzing the entire group of independent variables simultaneously, the study sought to determine which combination of independent variables, known as *predictors* in predictive research (Pedhazur, 1997, p. 198), would best predict the criterion "service managers' perceptions of the JD Ag Tech program." The backward elimination variable-selection model was used for this regression analysis (Norusis, 2000, p. 470-471).

Summary

This chapter provided a description of the study's problem statement and purpose of the study, which were guided by the five research questions and hypotheses. The population consisted of service managers working in John Deere Agricultural equipment dealerships located throughout the continental United States. The researcher developed the questionnaire, which was mailed to the stratified sample. Multiple contacts were made following the recommendations of Dillman (2000). The researcher also called each of the 306 sampled-dealerships to verify their correct mailing addresses and to request the service managers' names. The instrument was validated through the process of interviewing four service managers, conducting a focus group, and performing a pilot study. The instruments reliability was measured using the Cronbach alpha reliability test.

Chapter 4

Findings

Introduction

This study investigated the needs of the John Deere Agricultural equipment dealership-organization. The purpose was to determine (a) the perceived needs for service personnel, (b) what the dealership organization was doing to recruit service personnel, and (c) the service managers' perceptions of the corporately sponsored education program. The study consisted of two components: a descriptive component and a correlation component. This chapter describes the response rate and presents the findings of the study, which were guided by five research questions.

Response Rate

The population consisted of John Deere agricultural service managers located in the continental United States. The stratified random sample size was 306. The first 256 questionnaires were received from January 13, 2006, to February 17, 2006, and were classified as "early respondents." Two of the questionnaires were returned blank. One of those questionnaires indicated that the store had lost its contract to sell John Deere Agricultural equipment. The other blank questionnaire did not explain why they chose not to participate. The 254 respondents equaled 83% of the total sample.

Non-response Error

The researcher began calling the remaining 50 non-respondents on March 4th, 2006, and reached the last non-respondent on March 10th, 2006. Six of the non-respondents answered the questionnaire by phone and 19 returned the questionnaire by

mail totaling 8.17% of the sample group. These 25 questionnaires were received from March 6, 2006, to April 5, 2006, and were classified as *late respondents*.

A comparison was made between the early and late respondents to control for non-response error (Miller & Smith, 1983, p. 48). A two-tailed Mann-Whitney *U* test was performed on each of the service manager perception Questions, 19a through 19f, utilizing a .05 alpha level, to test for significant differences.

The only significant difference was found in Question 19b. This question asked the service managers for their perceptions relating to the locations of the 16 JD Ag Tech schools. The significant difference found in Question 19b was logical, because dealership locations varied across the United States, and only 16 JD Ag Tech schools were available to those dealerships. No other statistically significant differences were found between the early and late respondents on the remaining Questions: 19a, 19c, 19d, 19e, and 19f (see Table 1). For the purpose for comparing early respondents and late respondents, Question 19b was eliminated.

As a result of those findings, the early and late respondents were treated the same and grouped together (Miller & Smith, 1983, p. 48). The 279 completed questionnaires equaled 91% of the total sample group. Also, this study can be generalized to the total population, because of the sampling technique employed in the study.

Table 1

Mann Whitney U – Differences between Early and Late Respondents

	Mann-Whitney U	Z	Asymp. Sig. (2-tailed)
#19a. I believe there is a financial benefit to the dealership for hiring JD Ag Tech graduates	2702.00	-1.297	.194
#19b. I believe the locations of the 16 JD Ag Tech schools enable our dealership to hire JD Ag Tech technicians	2375.50	-2.179	.029*
#19c. I believe JD Ag Tech schools do a better job of educating students than other technical schools	3102.00	-.099	.921
#19d. I would rather hire a JD Ag Tech student than other technical school students	2927.00	-.547	.584
#19e. John Deere should continue funding the JD Ag Tech program	2711.50	-1.219	.223
#19f. John Deere should continue to rely upon community college for facilitating the JD Ag Tech program	3072.00	-.223	.824

* p < .05

Descriptive Component

This study contained a descriptive component and a correlation component. The descriptive component was guided by Research Question 1 and Research Question 2.

Research Question 1 – Dealership Service Department Needs

Part 1 of the questionnaire was designed to answer Research Question 1, “What are the John Deere dealership service technician needs as perceived by JD dealer service managers?” The first three questions asked the respondents to list the number of technicians they had hired in the last 12 months, how many they planned to hire over the

next year, and how many they planned to hire over the next three years. The question format required the respondents to write in their responses (see Table 2).

Table 2
Modal Number of Technicians Needed

	N	Mode
#1. How many technicians did you hire over the last 12 months?	261	1
#2. How many technicians do you expect to hire in the next 12 months?	260	1
#3. How many technicians do you need to hire over the next 3 years?	242	2

John Deere service managers reported hiring one technician over the past 12 months. The service managers planned to hire technicians in the future as well, their plans averaged one technician within the next 12 months, and two technicians over the next three years.

Areas of Technical Need and Areas of Technical Strength

The last two questions found in part 1, Questions 4 and 5, asked participants to rank the top three areas of need for the service departments and to rank their service departments' top three areas of technical strengths.

The total number of respondents used for Question 4 was 266. Thirteen responses were unusable due to respondents skipping the question or not answering the question correctly.

Overwhelmingly, the greatest need reported was for basic technicians, as three out of four respondents affirmed the premise that motivated this study (see Table 3). Besides

voicing their need for basic assistance, nearly half of the respondents specified a need for tractor repair technicians. Approximately one-third selected “combine harvesting” and “AMS/GPS” as areas of technical need.

Interestingly, 7 of the 266 respondents indicated that they had no need by checking the second-to-last category labeled “Check here if your service department has no specific area(s) of need.”

The last category listed in Question 4 allowed the respondents to write in other areas of need. Sprayers were mentioned by three respondents, while the following areas of need were reported once: “cotton,” “advanced electrical,” “advanced hydraulics,” and “CWP,” which stands for Commercial Work-site Products, such as gators, mini-excavators, and skid-steers.

In addition to determining the most common areas of technical need, Question 4 asked the respondent to *rank* their top three areas of technical need, instead of simply choosing the top three. An inverted sum was computed to determine which areas of technical need received the highest rankings. The ranking of “1” was converted to “3”, “2” remained the same at “2” and “3” was converted to “1.”

For example, see Table 3, where “basic technician” received 130 rankings of “1” totaling a score of 390. Basic technician received 32 rankings of “2” totaling a score of 64 and 38 rankings of number “3” for a score of 38. Those three scores added together equal an inverted score of 492.

The second highest inverted sum was “tractors” with a score of 240. The third and fourth highest inverted sums were “AMS/GPS” and “combine harvesting equipment” with sums 163 and 162. Although those two areas were previously the fourth and third

most common technical areas of need at 33.08% and 30.45%, both areas practically tied for the third highest technical area of need when their inverted sum was considered.

Table 3

Rank Sums for Top Three Areas of Technical Need (n = 266)

	Rankings			Total n	Total %	Inverted Sum
	1	2	3			
Basic technician (electrical, hydraulics, & Service Advisor)	130	32	38	200	75.19	492
Tractors	31	46	55	132	49.62	240
Combine harvesting equipment	14	46	28	88	33.08	162
AMS/GPS	30	22	29	81	30.45	163
Lawn and outdoor power equipment	14	23	28	65	24.44	116
Field service	16	19	29	64	24.06	115
Hay & forage equipment	6	19	21	46	17.29	77
Engines & fuel systems	1	20	20	41	15.41	63
Air conditioning systems	1	8	11	20	7.52	30
Planting & seeding equipment	1	2	16	19	7.14	23
Tillage equipment	1	0	0	1	.38	1

Technical Areas of Strength

Question 5 asked the respondents to rank their top three areas of technical strength. The total number of questionnaires used for the analysis of Question 5 was 260. Nineteen questionnaires were unusable due to respondents skipping the question or not answering the question correctly.

Nearly three-fourths of the respondents selected “Tractors” as one of the top-three areas of technical strength within their dealership (see Table 4). “Basic Technician” was the second most common area of technical strength, with more than half of the respondents choosing this area, and “Combine harvesting” was clearly the third most common area of technical strength reported by the service managers.

The inverted sum was computed for Question 5 in the same fashion as Question 4. The top three areas of technical strength remained the same, with “Tractors” receiving the highest inverted score of 416, “Basic Technician” the second highest score of 293, and “Combine harvesting” receiving a score of 225. The fourth, fifth, and sixth place areas of technical strengths competed more closely, causing their rank order to change. “Field Service” received the fourth highest inverted score of 130, “Engines & fuel systems” received the fifth highest inverted score of 128, and “Lawn and outdoor power equipment” received the sixth highest inverted score of 123.

*Table 4**Rank Sums for Top Three Areas of Technical Strength (n = 260)*

	Rankings			Total n	Total %	Inverted Sum
	1	2	3			
Tractors	87	52	51	190	73.08	416
Basic technician (electrical, hydraulics, & Service Advisor)	63	32	40	135	51.92	293
Combine harvesting equipment	30	51	33	114	43.85	225
Engines & fuel systems	15	27	29	71	27.31	128
Lawn and outdoor power equipment	18	20	29	67	25.77	123
Field service	23	22	17	62	23.85	130
Air conditioning systems	12	20	18	50	19.23	94
Hay & forage equipment	5	23	19	47	18.08	80
AMS/GPS	3	5	17	25	9.62	36
Planting & seeding equipment	1	1	10	12	4.62	15
Tillage equipment	0	1	1	2	0.77	3

Research Question 2 – Methods for Finding Service Personnel

Part 2 of the questionnaire contained Questions 6 through 17. These questions were designed to answer Research Question 2, “What are the methods John Deere dealership service managers use to identify potential service technicians?” Question 6 asked the respondents to choose the methods that they had used in the past three years to locate technicians. Two hundred seventy-one questionnaires were used for analyzing Question 6. Eight questionnaires were unusable due to missing data.

The two most common methods reported for locating technicians were “asked current employees,” with nearly three out of every four respondents choosing that category and “advertised in a newspaper, magazine or journal,” with two out of every three respondents selecting that method. Approximately half of the respondents chose “contacted a technical school” as a method for finding technicians (see Table 5).

Question 6’s last category provided a blank for service managers to list a separate method for locating technicians. Although the respondents could have checked categories like “contacted a high school,” “contacted a technical school,” or “contacted a college;” seven respondents chose to individually list responses related to schools. Three of the seven stated that they hired JD Ag Tech Students. Two indicated that a high school actually contacted their dealership, and one said that they made it a point to personally observe high school students. Another respondent said they hired two technicians that they sponsored at a local school. Other respondents listed the following methods for locating technicians: customer referral, contact tool salesman, used small town “word of mouth” and rehired a worker that came back to the dealership.

Table 5

Frequencies and Percentages for Methods used in Finding Service Personnel (n = 271)

	Total n	Total %
Asked current employees	201	74.17
Placed advertisement in newspaper, magazine or journal	183	67.53
Contacted a technical school	125	46.13
Asked customers	119	43.91
Hired a walk-in candidate right off the street	110	40.59
Asked friends, relatives and neighbors	98	36.16
Asked John Deere company personnel	84	31.00
Posted job on internet website	76	28.04
Contacted a high school	72	26.57
Posted position at job employment agency	58	21.40
Contacted a college	37	13.65
Contacted an organization (FFA, 4-H, Skills USA, etc.)	36	13.28
Contacted other types of dealers like automotive or construction	36	13.28
Contacted an agriculture equipment dealer	33	12.18
Or, has not hired any service personnel in the past three years	12	4.43

While Question 6 asked the participants if they used any of the specified methods for locating service over the past three years, Question 7 asked the participants to rank the top three methods that they believed were the most effective for locating service personnel by placing a “1” in their most preferred method, “2” in the second preferred, and a “3” in their third highest preference. The total number of questionnaires used for Question 7 was 267. Twelve questionnaires were unusable due to respondents skipping the question or not answering the question correctly.

Approximately half of the respondents selected “asked current employees” and “placed advertisement in newspaper, magazine or journal” as one of their three most effective methods for locating service personnel (see Table 6). The third most effective method for locating technicians was “contacted a technical school,” chosen by 45.32% of the respondents. Those top three methods not only received the most votes, but they also received the highest inverted sum scores, with 274, 287, and 266 respectively.

The respondents were also allowed to list a different method for Question 7. Three respondents listed the JD Ag Tech program as their most effective method for locating technicians, while another stated “sponsor” as their most effective method. Others indicated that they “target possible employees and go after them,” and “know people in our business.” One respondent reported not finding an effective way.

Table 6

Rank Sums for Most Effective Method for Locating Technicians

	Rankings			Total n	Total %	Inverted Sum
	1	2	3			
Asked current employees	52	38	42	132	49.44	274
Placed advertisement in newspaper, magazine or journal	59	38	34	131	49.06	287
Contacted a technical school	53	39	29	121	45.32	266
Asked customers	14	23	14	51	19.10	102
Hired a walk-in candidate right off the street	8	9	32	49	18.35	74
Asked friends, relatives and neighbors	11	17	16	44	16.48	83
Contacted a high school	6	18	13	37	13.86	67
Posted job on internet website	11	12	13	36	13.48	70
Asked John Deere company personnel	5	15	11	31	11.61	56
Posted position at job employment agency	6	12	11	29	10.86	53
Contacted a college	7	9	5	21	7.87	44
Contacted an organization (FFA, 4- H, Skills USA, etc.)	6	5	9	22	8.24	37
Contacted an agriculture dealer	4	8	8	20	7.49	36
Contacted other types of dealers like automotive or construction	3	6	11	20	7.49	32
Have not hired any service personnel in the past three years				12	4.49	

Questions 8 and 9 were navigational questions used to allow the respondents to skip forward to the next questions based upon the technicians they hired over the past three years. Nine questionnaires were unusable for Question 8 due to missing data. Two hundred sixty-nine respondents answered Question 8. Twenty-five indicated that they had not hired a technician in the past three years and proceeded to Question 18; the other 245 respondents indicated that they had hired a technician in the past three years and proceeded to answer Question 9.

Question 9 asked the respondents if they hired a technician from a JD Ag Tech school. Among the 245 respondents, 155 had not hired a JD Ag Tech student in the past three years and proceeded to Question 12. However, 88 reported that they had hired a JD Ag Tech graduate in the past three years, and moved forward to Question 10.

Question 10 asked the respondents, who hired JD Ag Tech students over the past three years, for: (a) the names of the JD Ag Tech schools, (b) a rating of how satisfied they were with the JD Ag Tech schools, and (c) the number of students they had hired from the JD Ag Tech schools.

The locations of the JD Ag Tech schools that service managers used to find service technicians are presented in Table 7. Some respondents listed more than one JD Ag Tech school.

Eighty-five of the respondents rated their satisfaction level with the JD Ag Tech program and, on average, they were satisfied with a mean of 3.07 and a standard deviation of 0.823 (on a 4.0 Likert type scale). Eighty-eight respondents reported hiring a total of 138 technicians from those JD Ag Tech locations.

Table 7

Frequencies of JD Ag Tech Locations Service Managers Used to Hire Technicians

	Frequency
Milford, NE	14
Calmar, IA	10
Wahpeton, ND	10
Corsicana, TX	7
Mattoon, IL	7
Garden City, KS	6
Walla Walla, WA	6
Cobleskill, NY	5
Ft. Scott, KS	5
Senatobia, MS	5
Beebe, AR	4
Madison, WI	2
Toledo, OH	4
Vicennes, IN	4
Thomasville, GA	2
Jamestown, NC	1

Question 11 asked the respondents, “Considering the JD Ag Tech students you have hired as listed above, how many still remain employed at your dealership?” The 88 respondents reported that 93 technicians continued to work for the dealership.

Question 12 was a navigational question that allowed respondents to skip over Question 13 based upon whether or not they hired technicians from non-JD Ag Tech schools. Two hundred forty-two respondents answered the question. Eighty-seven of those respondents had hired technicians in the last three years from schools other than the

JD Ag Tech schools. The remaining 155 respondents indicated that they had not and proceeded to Question 14.

For the service managers who hired students from non-JD Ag Tech schools, Question 13 asked them for: (a) the names of the schools, (b) a rating of how satisfied they were with the schools and (c) the number of students they had hired from the schools. The 87 respondents provided 67 names of non-JD Ag Tech schools where they hired technicians. See Table 26 in Appendix E for a listing of the schools and how many service managers reported using those schools for hiring technicians.

In addition, a high school name was listed, and two individual student names were listed in the questionnaire responses; but, the researcher chose not to publish the names for privacy reasons. One school name was listed but unreadable, and three other respondents answered that they hired technicians from non-JD Ag Tech schools, but did not specify the name of the schools.

A total of 229 technicians were hired from schools other than JD Ag Tech over the past three years. Overall, the service managers were close to satisfied with the non-JD Ag Tech schools yielding a mean of 2.7927 and a standard deviation 0.871 (on a 4.0 Likert type scale).

The 138 technicians hired from JD Ag Tech schools plus 229 hired from non-JD Ag Tech schools equaled a total of 367 technicians that entered the John Deere service department directly from a technical school.

Concerning the technicians that dealerships hired over the past three years, Questions 10 through 13 obtained (a) the names of technical schools, (b) level of satisfaction with the schools, and (c) the numbers of technicians hired from the schools.

Question 14 asked the respondents for the number of technicians they hired from places other than schools. Although 245 respondents reported hiring a technician in the past three years, 253 respondents answered Question 14. Those additional eight responses were attributed to respondents accidentally skipping the previous page due to the questionnaires pages being stuck together. Because Question 14 included the phrase “over the past 3 years” the eight respondents were included in the analysis. The results of Question 14 are in Table 8.

Table 8

Descriptive Statistics for Technicians Hired from Locations Other than Schools over the Past Three Years (n = 253)

	Sum	Mode	Mean	Std. Deviation
Number of technicians hired from other John Deere dealers (Agriculture/Commercial & Consumer/Construction & Forestry)	127	0	0.50	1.002
Number of technicians hired from a farm	118	0	0.47	0.743
Number of technicians hired from agricultural dealerships other than John Deere	93	0	0.37	0.704
Number of technicians hired straight out of high school	64	0	0.25	0.570
Number of technicians hired from an automotive dealership	60	0	0.24	0.511
Number of technicians hired from a semi-truck dealership	48	0	0.19	0.458
Number of technicians hired from a construction equipment dealership	37	0	0.15	0.425
Number of technicians hired out of the military	25	0	0.10	0.381

Clearly the top three locations dealerships used to hire technicians over the past three years, other than technical schools, were John Deere dealerships, the farm, and dealerships other than John Deere. From these three locations, dealerships reported hiring a total of 338 technicians. This sum was similar to the number of technicians hired from technical schools reported for Questions 10 and 13, which was 367.

Respondents were able to list additional locations that they used for hiring technicians. See Table 9 for the results of locations written in the last category of Question 14.

Table 9

Number of Other Locations Where Dealerships Hired Technicians

	Sum
Truck driver	6
"Walkins" off street	4
Construction worker, not a construction dealership	3
Manufacturing plant production and/or maintenance	3
Aviation Technician or Aviation Industry	2
Electrician, Electrical contracting company	2
Fertilizer Co-op or fertilizer company	2
JD Ag Tech program	2
Lawn & garden shop or dealer	2
Machine Shop	2
ATV dealership	1
College graduate with an Ag background	1
Field service man for paving company	1
Golf course, 2-landscape/snow moving co.	1
High school candidates attending Ag Tech program	1
Injection pump repair shop	1
Manure hauling contractor	1
Shop equipment repair service	1
Worked for us and quit then came back	1
Worked on "turn around job"	1

Questions, 10, 13, and 14 determined where dealerships found their technicians. Question 15 sought the education level of the technicians hired over the past three years. Two hundred fifty-three respondents answered Question 15 (see Table 10).

Table 10

Number of Technicians' Highest Achieved Education Level Prior to Starting Employment at the Dealership (n = 253)

	Sum	Sub-totals	Level of Education
No high school diploma, and no GED	18		
Has a GED, but did not graduate from a high school	16	34	High School Dropouts
High school diploma, but no technical education	195		
High school diploma with technical school	173	368	High School Graduates
Technical college, but no certificate/diploma	27		
Technical college certificate/diploma	117		
Technical college associate's degree	87		
Non-technical college	13		
Technical four-year bachelor's degree	2		
Non-technical four-year bachelor's degree	8	254	More than a high school education
More than a four-year bachelor's degree	0		

Question 15 obtained the education level of the technicians the dealerships hired over the past three years. Question 16 asked the service managers for their preferences of the length of time students should spend in school prior to starting full-time employment at the dealership. Service managers were asked to rank their top three choices by placing a “1” in the top selection, “2” in the next, and a “3” in their third preference. Two hundred fifty-one respondents answered Question 16 (see Table 11).

Table 11

Rank Sums of Preferred Length of Schooling Prior to Starting Full-Time Technician Employment (n = 251)

	Rankings			Total n	Total %	Inverted Sum
	1	2	3			
19 to 24 months post secondary (college)	125	26	19	170	67.73	446
7 to 12 months post secondary (college)	20	66	61	147	58.57	253
high school graduate	41	12	67	120	47.81	214
13 to 18 months post secondary (college)	26	58	28	112	44.62	222
1 to 6 months post secondary (college)	5	29	15	49	19.52	88
25 to 30 months post secondary (college)	16	19	12	47	18.73	98
31 to 36 months post secondary (college)	6	11	11	28	11.16	51
4-year bachelor's degree	9	5	5	19	7.57	42
Less than high school	1	1	7	9	3.59	12
More than a bachelor's degree			1	1	0.40	1

Two-thirds of the respondents selected “19 to 24 months post secondary” as one of their three most preferred “lengths of schooling students should attend” prior to starting full-time employment at the dealership. This category not only received the majority of rankings with 170, but nearly half of the respondents, 125, ranked it as their first preference. The categories that received the fewest votes were “4-year bachelor’s degree,” “less than high school,” and “more than a bachelor’s degree.”

Respondents indicated their preferences for the “length of time” technicians should spend in school in Question 16. Question 17 asked the service managers’ for their preferences concerning the “highest level of education” technicians should complete prior to starting full-time employment at the dealership. Two hundred fifty-two respondents answered Question 17 (see Table 12).

The respondents’ preferred level of education was “Post secondary/college, with a diploma or certificate,” which received the most rankings with 191. This category also received the most first place rankings, the most second place rankings, and the highest inverted sum. The second and third preferred levels of education were “high school diploma” and “post secondary/college, with an associate’s degree.” The least preferred levels of education were “a bachelor’s degree,” “a GED” and “no high school diploma.”

Table 12

Rank Sums of Preferred Level of Education Prior to Starting Full-time Technician Employment (n =252)

	Rankings			Total n	Total %	Inverted Sum
	1	2	3			
Post secondary/college, with a diploma or certificate	96	70	25	191	75.79	453
High school technical school	55	52	60	167	66.27	329
Post secondary/college, with an associate's degree	66	33	17	116	46.03	281
Post secondary/college, but no diploma or certificate	7	46	53	106	42.06	166
High school diploma, but no technical education	13	29	50	92	36.51	147
Post secondary/college, with a bachelor's degree	12	4	10	26	10.32	54
GED, but did not graduate high school	0	2	18	20	7.94	22
No high school diploma	0	0	0	0	0	0

The remaining Questions, 18 through 37, were located in part 3 and part 4 of the questionnaire. These questions were designed to answer Research Questions 3, 4 and 5.

Research Question 3 - Relationships between the Service Managers Perceptions' of the JD Ag Tech Program and Five Independent Variables

Research Question 3 asked, “What are the relationships between the service managers’ perceptions of the JD Ag Tech program and the: (a) number of technicians employed at the dealerships, (b) number of stores the dealer-organizations own, (c) distances between the dealerships and the closest JD Ag Tech school, (d) number of JD Ag Tech students the dealerships have sponsored, and (e) service managers’ age?” Data received from Questions 10, 19, 27, 28, 29 and 36 were used for computing the correlations.

Question 18 was designed to provide a good lead into Question 19, and to make it more comfortable for those service managers with no JD Ag Tech knowledge to answer Question 19 (Dillman, 2000, p. 87). Two hundred seventy-eight respondents answered Question 18 (see Table 13).

Table 13
Number of Service Managers’ Self-Reported Knowledge of the JD Ag Tech Program

	n	%
Knowledgeable of the JD Ag Tech program	111	39.93
Somewhat knowledgeable of the JD Ag Tech program	145	52.16
Unfamiliar of the JD Ag Tech program	22	7.91

Questions 19a through 19f asked the service managers for their perceptions relating to the JD Ag Tech program. Respondents were asked to circle a number from 1 to 5, indicating the extent to which they agreed or disagreed with statements relating to the JD Ag Tech program. The values were: 5 strongly agree, 4 agree, 3 undecided, 2 disagree, and 1 strongly disagree. The six Questions 19a through 19f emphasized specific areas that related to the JD Ag Tech program; these areas were highlighted in bold print (see Question 19 in Appendix D). These questions form the dependent variable used in the correlation tests and the multiple regression tests.

Among the 279 respondents, 274 of them answered all six Questions, 19a through 19f. Two of the respondents that checked “no knowledge” in Question 18 did not answer Questions 19a through 19f. Three other respondents answered portions of 19a through 19f, but not all of them. The results of Question 19 are presented in Table 14.

The service managers’ perceptions of the JD Ag Tech program formed the study’s dependent variable. A summated rating scale was computed by adding each of the respondent’s ratings for Questions 19a through 19f. The 274 summated values had a low score of 6, a high score of 30, a mean of 23.60 and a standard deviation of 3.613.

Table 14

Means and Standard Deviations for Perceptions of the JD Ag Tech Program (n = 274)

	Mean	Std. Deviation
19a. I believe there is a financial benefit to the dealership for hiring JD Ag Tech graduates?	4.13	.767
19b. I believe the locations of the 16 JD Ag Tech schools enable our dealership to hire JD Ag Tech technicians	3.46	.914
19c. I believe JD Ag Tech schools do a better job of educating students than other technical schools	3.77	.906
19d. I would rather hire a JD Ag Tech student than other technical school students	3.82	.999
19e. John Deere should continue funding the JD Ag Tech program	4.41	.736
19f. John Deere should continue to rely upon community colleges for facilitating the JD Ag Tech program	4.01	.773

Note: Scale used 5 = Strongly Agree, 4 = Agree, 3 = Undecided, 2 = Disagree, 1 = Strongly Disagree

The five independent variables were the (a) number of technicians employed at John Deere dealerships; (b) number of stores the dealer-organizations owned; (c) distance between John Deere dealerships and the closest JD Ag Tech school; (d) number of JD Ag Tech students John Deere dealerships had sponsored; and, (e) service managers' age." The descriptive statistics for the five independent variables are located in Table 15.

Table 15

Descriptive Statistics for the Five Independent Variables

	n	Min	Max	Mean	Std. Deviation
Question 28: What is the number of full-time technicians employed at your dealership?	271	1	45	7.29	4.753
Question 29: How many John Deere Agricultural equipment stores does your dealer-company own?	271	1	56	4.47	6.554
Question 27: What is the approximate distance to the closest JD Ag Tech school from your dealership (in miles)?	279	8	1203	227.98	191.386
Question 10: How many technicians have you hired from JD Ag Tech schools over the past 3 years?	85	1	4	1.58	0.792
Question 36: What is your age (years)?	269	21	66	44.35	9.773

The researcher found that many of the respondents were unable to answer Question 27. Therefore, to improve the accuracy of Question 27, the Internet “Mapquest” website, <http://www.mapquest.com>, was used to determine the distances between the dealership locations and the closest JD Ag Tech schools. Distances were obtained by entering the postal zip code for each of the 306 sampled dealerships and the 16 JD Ag Tech schools.

A Pearson *r* correlation coefficient was calculated for the five relationships (see Table 16).

Table 16

Pearson Correlation Coefficients between Service Managers’ Perceptions of the JD Ag Tech Program and the Five Independent Variables

	<i>r</i>	Sig. (2-tailed)	n
Number of full-time technicians employed at the dealership (question 28)	.133	.031*	266
Number of John Deere Agricultural equipment stores the dealer-company owns (question 29)	.012	.841	267
The distance to the closest JD Ag Tech school from the dealership (question 27)	-.176	.004*	274
Number of technicians the store has hired from JD Ag Tech schools over the past 3 years (question 10)	.123	.261	85
Service manager age (question 36)	.111	.073	264

* $p < .05$

Two statistically significant relationships were found at an alpha level of .05. The first relationship was “service managers’ perceptions of the JD Ag Tech program” and the “number of full-time technicians employed at the dealership.” Null Hypothesis 1, “There is no statistically significant relationship between the number of technicians JD dealerships employ and service managers’ perceptions of the John Deere Ag Tech program” was rejected. However, even though the relationship was statistically significant, according to Davis (1971) the relationship only had a *low association* (p. 49).

The second statistically significant relationship was “service managers’ perceptions of the JD Ag Tech program” and “the distance from the dealership to the closest JD Ag Tech school,” which resulted in a negative relationship. Null Hypothesis 3, “There is no statistically significant relationship between the distances of John Deere dealerships from the closest JD Ag Tech School and John Deere service managers’ perceptions of the JD Ag Tech program” was rejected. Although this relationship was statistically significant, it too had a “low association” according to Davis (1971, p. 49). Null Hypothesis 2, 4, and 5 were not rejected.

Research Question 4 - Among the dealerships that have sponsored Ag Tech students, what are the service managers’ perceptions of the JD Ag Tech program?

The next research question sought the perceptions of service managers who sponsored a JD Ag Tech student. Question 20 asked the respondents if they sponsored a JD Ag Tech student in the past 10 years. Among the 275 service managers that responded to the question, 174 indicated that they sponsored a JD Ag Tech student and proceeded to Question 21, while the other 101 respondents stated that they had not, and skipped to Question 27.

Questions 21a through 21e asked the respondents to respond to five statements relating the JD Ag Tech program by circling a “5” if they strongly agreed, “4” agreed, “3” were undecided, “2” disagreed, and a “1” if they “strongly disagreed” (see Table 17).

Table 17

Means and Standard Deviations for the Perceptions of Service Managers who have Sponsored JD Ag Tech Students

	N	Mean	Std Deviation
21a. JD Ag Tech schools provide quality technical education	173	4.10	.607
21b. JD Ag Tech instructors are effective teachers	173	4.03	.655
21e. JD Ag Tech school laboratory experiences are effective	171	3.94	.757
21d. I believe the content taught in JD Ag Tech schools is the correct content	171	3.90	.764
21c. JD Ag Tech schools do a good job of following-up with dealerships to see how students perform	172	3.80	.941

Note. Scale used 5 = Strongly Agree, 4 = Agree, 3 = Undecided, 2 = Disagree, 1 = Strongly Disagree

Among the service managers that sponsored a JD Ag Tech student in the past 10 years, the group as a whole responded positively towards the JD Ag Tech program. The questions receiving the most favorable ratings were 21a, “JD Ag Tech schools provide quality technical education” and 21b, “JD Ag Tech instructors are effective teachers.” Not only did these statements receive the highest overall means, but they also received the lowest standard deviations. On the other hand, Question 21c, “JD Ag Tech schools

do a good job of following-up with dealerships to see how students perform” received the lowest rating and the largest variation.

The previous Questions 21a through 21e focused on the overall JD Ag Tech program. The remaining questions in part 3 of the questionnaire asked the respondents for their perceptions of the JD Ag Tech program concerning whether or not each of the four partners contributed their fair share to the partnership and their perceptions of the internship experience. Question 22 was written to obtain service managers’ perceptions of the “dealer-partner,” Question 23 sought perceptions of the “school-partner,” Question 24 sought the perceptions of the “John Deere corporation-partner,” and Question 25 was the “student-partner.” The individual means and standard deviations were listed for each item in Table 18. In addition, an overall mean and standard deviation was computed for each of the four partners.

Overall, the service managers responded positively to each of the four partners. The dealer-partner and school-partner received the most favorable responses yielding means of 4.19 and 4.07 respectively (on a 5.0 Likert type scale). Although the student-partner had a favorable mean of 3.83, it was the lowest mean, as well as receiving the largest variation, with a standard deviation of .674.

Table 18
 Service Managers' Perceptions of the Partners and Internship Experience

	N	Mean	Std. Deviation
22. JD <u>dealers</u> contribute their share to the JD Ag Tech partnership by providing JD Ag Tech students:			
e. the potential for a career	172	4.36	.560
a. internship opportunities	172	4.21	.532
b. work experience	172	4.20	.582
d. uniforms for working & school	172	4.12	.651
c. wages while learning on the job	171	4.05	.621
Overall perception for <u>dealers</u> (22a-22e)		4.18	.468
23. JD Ag Tech <u>schools</u> contribute their share to the JD Ag Tech partnership by:			
b. maintaining facilities	172	4.20	.515
c. maintaining equipment/tools	172	4.16	.555
a. employing faculty	172	4.12	.550
e. educating the students	171	4.08	.681
d. developing curriculum	172	4.05	.610
f. communicating with JD dealers	172	3.80	.816
Overall perception for <u>schools</u> (23a-23f)		4.07	.485
24. <u>Deere and Company</u> contributes their share to the JD Ag Tech partnership, by providing:			
b. special service tools	172	4.20	.599
a. schools with agricultural machinery	172	4.19	.631
c. training aids	172	4.19	.615
f. instructor professional development	170	3.95	.732
g. program promotion	171	3.79	.828
d. scholarships	170	3.75	.843
e. assistance in student recruitment	170	3.62	.890
Overall perception for <u>Deere & Company</u> (24a-24g)		3.96	.589
25. JD Ag Tech <u>students</u> contribute their share to the JD Ag Tech partnership by adding value to the dealership through:			
b. the work they perform in the service department	172	4.03	.679
d. respecting the customer	172	3.95	.774
a. studying hard in school	172	3.92	.737
e. communicating clearly with customers	172	3.79	.832
c. remaining loyal to the dealership that invested in them	172	3.48	1.111
Overall perception for <u>students</u> (25a-25e)		3.83	.674

Note. Scale used 5=Strongly Agree, 4=Agree, 3=Undecided, 2=Disagree, 1=Strongly Disagree

Seven individual questions, Questions 22e, 22a, 22b, 23b, 24b, 24a, and 24c, received the highest mean scores ranging from 4.19 to 4.36 (on a 5.0 Likert type scale). Service managers commended the dealerships for offering the potential for a career, internship opportunities, and work experience. The respondents also looked favorably upon the schools for maintaining facilities and John Deere for providing special service tools, agricultural machinery, and training aids. No individual student question received a mean of 4.19 or higher. In fact, the student-partner only had one question that received a mean greater than 4.0 and it was for the work they performed in the service department, with a mean of 4.03.

Individually, the student partner also received the single lowest rating, Question 25c, “JD Ag Tech students contribute their share to the JD Ag Tech partnership by adding value to the dealership through remaining loyal to the dealership that invested in them,” had a mean of 3.48 and a standard deviation of 1.111. This area, along with Question 24e, Deere and Company assistance in student recruitment, received the lowest mean scores and the highest variations. These two items were clearly at the bottom of the list, raising concerns about areas needing improvement.

Question 26 was the last question located in part 3 of the questionnaire. The question asked for the respondents’ perception of the internship experience, “The dealership internship experience that is coordinated between the JD Ag Tech schools and the dealership has worked well for us.” One hundred sixty-eight respondents answered the question, resulting in a mean of 3.74 and a standard deviation of .870. This question, when grouped with the results of Questions 22 through 25, yielded the third lowest mean among the individual questions.

Research Question 5 - Which of the following variables will best predict or explain the service managers' perceptions of the JD Ag Tech program: (a) number of technicians employed at the dealerships, (b) number of stores the dealer-organizations own, (c) distances between the dealerships and the closest JD Ag Tech school, (d) number of JD Ag Tech students the dealerships have sponsored, and (e) service managers' age?

The last research question sought to determine: (a) how much of the dependent variables' variance could be explained by the independent variables; and, (b) which variables or combination of variables best predict "Service managers' perceptions of the JD Ag Tech program" (Pedhaazur, 1997, p.196-198).

A correlation matrix was calculated to determine if the independent variables were highly correlated with one another (Kahane, 2001, p.113). Table 19 illustrates that the highest relationship was only .182. The correlations were well below the value of "0.8" (Lewis-Beck, 1980, p. 60). However, Lewis-Beck also states that this test alone "fails to take into account the relationship of an independent variable with all the other independent variables" and therefore recommends "assessing multicollinearity" (p. 60).

Collinearity statistics were ran using SPSS. The VIFs ranged from 1.002 to 1.073, which were close to the acceptable "minimum" of "1.00" (Pedhazur, 1997, p. 302). The tolerances ranged from .932 to .998, which were also acceptable (Norusis, 2000, p. 468).

Table 19

Pearson Correlation Coefficients between the Independent Variables and Dependent Variable

		Number of technicians employed at dealership	Number of stores owned by dealer	Service Managers' age	Number of sponsored JD Ag Tech students
Distance to JD Ag Tech school	<i>r</i>	.061	.127*	.061	.014
	Sig	.314	.037	.316	.899
	n	271	271	269	88
Number of technicians employed at	<i>r</i>		.182**	.070	-.068
	Sig		.003	.255	.532
	n		269	267	86
Number of stores by dealer	<i>r</i>			.001	-.088
	Sig			.987	.418
	n			267	86
Service managers' age	<i>r</i>				-.081
	Sig				.456
	n				86

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

The dependent variable, along with the five independent variables was analyzed using two types of multiple regression analyses. A simultaneous multiple regression was first performed by entering the dependent variable along with the five independent variables. This model did not yield a significant coefficient of determination, R^2 . Therefore, the five independent variables were unable to collectively explain a proportion of the dependent variable's variance "service managers' perception of the JD Ag Tech program" (see Table 20).

Table 20
Simultaneous Multiple Regression

Model	R^2	Adjusted R^2	Std. Error of the Estimate	Sig.
Enter	.102	.046	3.08986	.118

Note. The dependent variable is service managers' perceptions of the JD Ag Tech program.
 $F = 1.821$

In addition to analyzing the entire group of independent variables simultaneously, another regression analysis was performed to determine which combination of predictors could best predict service managers' perceptions of the JD Ag Tech program. The variable-selection technique used was backward elimination (Norusis, 2000, p. 470-471). The results are presented in Table 21.

Table 21

Backward Elimination for Service Managers' Perceptions of the JD Ag Tech program to the Independent Variables

Models	Variable (predictor)	Adjusted R^2	T	Sig.
Backward elimination	Service managers' age	0.048	2.295	0.024
	(Constant)		14.965	0.000

Note. The criterion was “service managers’ perceptions of the JD Ag Tech program.”
 $F = 5.267$
 $p = .024$

The best predictor and only statistically significant predictor was service managers’ age. However, this predictor, service managers’ age, only accounted for 4.8% of the criterion’s variance “service managers’ perceptions of the JD Ag Tech program.”

Additional Questions Answered by the Questionnaire

During the process of designing the questionnaire the researcher sought input from several different agencies, including; a survey researcher, John Deere agricultural service managers, John Deere corporate managers, and the Dissertation Committee. The remaining Questions, 30 through 35, and 37 were additional demographic questions that were useful for describing the sample of respondents and questions that John Deere corporate managers asked to be included in the questionnaire.

Question 30 asked the respondents to indicate the size of the largest city within 25 miles of the dealership. Hiring practices could be affected by the location of a business, depending upon if the business was located in a large metropolitan area or a small rural farming community. Two hundred sixty-six respondents answered this question (see Table 22).

Table 22

Frequencies and Percentages of the Largest City Population within 25 Miles of the Dealership (266)

	n	%	Sub-Totals
City of 9,999 or less people	62	23.31	
City of 10,000 to 19,999 people	43	16.17	
City of 20,000 to 29,999 people	33	12.41	51.88%
City of 30,000 to 39,999 people	26	9.77	
City of 40,000 to 49,999 people	19	7.14	16.92%
City of 50,000 to 99,000 people	33	12.41	
City of 100,000 or more people	50	18.80	31.20%
	266	100.00	

A little more than half of the service managers reported that the largest city located within 25 miles of the dealership had a population less than 20,000 people. Close to one-third of the service managers indicated that their dealership was located within 25 miles of a city that had a population of 50,000 or more.

Question 31 asked the respondents their shop service hourly-labor rate. The questionnaire provided seven different ranges rather than a blank solely for the goal of obtaining a higher response rate. Two hundred seventy-two service managers answered Question 31 (see Table 23). Eight out of 10 respondents indicated that their shop service labor rate was \$65 per hour or less.

Table 23

Frequencies and Percentages of the *Shop Service Labor Rate Dealerships Charge*

Customers Per Hour

	n	%	Cumulative %
\$50 or less per hour	19	6.99	6.99
\$51 to \$55 per hour	29	10.66	17.65
\$56 to \$60 per hour	97	35.66	53.31
\$61 to \$65 per hour	75	27.57	80.88
\$66 to \$70 per hour	29	10.66	91.54
\$71 to \$75 per hour	13	4.78	96.32
\$76 or more per hour	10	3.68	100.00
Total	272	100.00	

Questions 32 and 33 asked the participants to indicate how much they paid a beginning technician. Question 32 asked for the starting wage paid to technicians that had not attended a technical school, and Question 33 asked for the starting wages paid to technicians that had graduated a technical school. The questionnaire provided several pay range choices for the same goal previously mentioned of obtaining a higher response rate (see Table 24).

Table 24

Frequencies and Percentages of Technician Starting Wages Based on Graduating from a Technical School

<u>Has not attended</u> a technical school (Question 32)	N	%	Cumulative %
\$6.99 or less per hour	8	2.99	2.99
\$7 to \$8.99 per hour	97	36.19	39.18
\$9 to \$10.99 per hour	106	39.55	78.73
\$11 to \$12.99 per hour	37	13.81	92.54
\$13 to \$14.99 per hour	14	5.22	97.76
\$15 or more per hour	1	0.37	98.13
Or, would not hire an untrained technician	5	1.87	100.00
Total	268	100.00	

<u>Has graduated</u> from a technical school (Question 33)	N	%	Cumulative %
\$7 to \$8.99 per hour	15	5.70	5.70
\$9 to \$10.99 per hour	61	23.19	28.89
\$11 to \$12.99 per hour	111	42.21	71.10
\$13 to \$14.99 per hour	45	17.11	88.21
\$15 to \$16.99 per hour	19	7.22	95.43
\$17 or more per hour	11	4.18	99.62
Or, would not hire an untrained technician	1	0.38	100.00
Total	263	100.00	

Seventy-five percent of the respondents reported starting wages for untrained technicians between \$7 and \$11 per hour. The starting wages reported for technical school graduates were higher. Eight out of 10 respondents indicated that they paid graduates between \$9 and \$15 per hour.

Questions 32 and 33 determined the starting wages for service technicians based upon whether the technicians had graduated from a technical school or had not attended a technical school. The next question, Question 34, was a hypothetical question, which

asked the respondents how much they would be willing to pay a perfect technician if they could hire a perfect technician. The mean wage service managers would be willing to pay a “perfect technician” was \$17.52 per hour. The standard deviation for Question 34 was 3.584.

Service managers were asked to provide their gender for Question 35. Among the 273 respondents answering the question, four service managers were female, which equaled 1.5%. The remaining 269 service managers were male equaling 98.5%. The descriptive statistics for Questions 27, 28, 29, and 36 were reported earlier in Table 15.

Question 37 asked service managers if they would pay a JD Ag Tech graduate more than a graduate from a general diesel technical school. Respondents were offered three answer choices: “yes,” “no,” or “undecided.” The results of Question 37 are located in Table 25.

Table 25
Frequencies and Percentages for, “Would you Pay a JD Ag Tech Graduate More Per Hour than a General Diesel Technical School Graduate?”

	N	%
No	42	15.6
Yes	126	46.7
Undecided	102	37.8
Total	270	100.0

Respondents that chose “yes” were asked to list how much more money they would be willing to pay the JD Ag Tech graduate per hour than the general diesel technical school graduate. Among the 126 respondents who chose “yes”, 105 answered the second part to Question 37. Those respondents indicated that they would pay on

average \$2.01 more per hour for a JD Ag Tech graduate. The standard deviation was 1.041.

Qualitative Comments

The questionnaire also provided the opportunity for participants to list additional comments directly after Question 37. Among the 279 participants that returned questionnaires, 108 wrote additional comments. The comments ranged in length from several sentences up to a few paragraphs. The comments were broken into data units and then placed in the following eight categories: (a) experience; (b) JD Ag Tech program and schools; (c) John Deere corporation; (d) pay and wages; (e) recruitment; (f) students and technicians; (g) training and education; and (h) other.

Experience

Four participants provided comments relating to “experience.” One mentioned “Experienced technicians are hard to find.” Others indicated that although schools provide the basics, experience has no substitute. Another service manager stated “technicians need more hands on.”

JD Ag Tech Program and schools

The qualitative category that received the most comments was “JD Ag Tech program and schools.” Fifty-two respondents gave comments relating to the JD Ag Tech program and or the specific JD Ag Tech schools.

Several service managers were unfamiliar with the program. Six mentioned that they knew little about the JD Ag Tech program or had never hired a JD Ag Tech graduate. Two reported they did not know the location of the closest JD Ag Tech school.

For the respondents familiar with the JD Ag Tech program, the researcher categorized 21 responses as positive, 9 as neutral, and 20 as negative. The majority of the positive responses mentioned that the JD Ag Tech program was great, good, the best program, or that they liked the program. Five service managers reported that they graduated from the JD Ag Tech program or knew a service manager that graduated from the JD Ag Tech program. One respondent stated, “really do notice difference in Ag Tech and regular college students.” Another service manager reported that their dealership sent seven students to the JD Ag Tech school and all seven were still employed with a John Deere dealer. The respondent further stated, “I feel this is a good program to help dealers to grow, and provide customer satisfaction, because (of) the training the student receives.” Another service manager noted, “Our dealership would be nothing without JD Ag Tech.” JD Ag Tech schools located in Garden City, KS; Calmar, IA; Milford, NE; Toledo, OH; and Wahpeton, ND, were cited individually by the service managers with positive remarks.

Nine respondents provided suggestions and neutral type-comments related to the JD Ag Tech program. Some of the neutral comments provided were (a) their dealership had a JD Ag Tech student currently enrolled; (b) JD Ag Tech was doing okay; and, (c) “nothing wrong with [listed the name of the local non-JD Ag Tech school].” Two other respondents indicated that one JD Ag Tech school was better than another.

Some service managers wrote suggestions; one suggestion was to “turn the Columbus Training Center into a one year full-time course.” The Columbus, OH, location is the John Deere Columbus branch training center used for training company personnel. The John Deere Pro-Tech program also uses the facility to train current John

Deere technicians. Another respondent suggested adding another quarter semester of dealership training to help students pay their way through school by working every other quarter. One respondent recommended that students work one full year prior to starting the program. An additional service manager mentioned that a technician hired from a southern JD Ag Tech program knew southern agricultural equipment well, but was not proficient on all equipment.

Among the negative responses, four mentioned that schools were giving students false hopes of wages that they should be receiving and the students arrived at the dealership expecting high wages. Five respondents indicated that JD Ag Tech students received too basic an education and/or lacked the ability to perform hands-on repairs. Two reported that graduates did not stay and work for the dealership. Three stated that JD Ag Tech graduates had attitudes or were unable to be content, and one of the respondents was upset because the school did not communicate to their dealership that the student had an attitude problem. Another respondent indicated that the schools were “weak” in the area of teaching technicians how to order parts. Three additional comments were: (a) non-JD Ag Tech schools had outperformed the JD Ag Techs; (b) some students should have never been admitted to the program; and, (c) the students did not apply themselves. The last four comments pertained to the locations of the JD Ag Tech schools being too far away from the dealerships. One elaborated:

It is very difficult to hire an employee and ask that employee to move 130 to 200 miles from home for \$10-\$12 an hour. They have to worry about finding a place to live, will the job work out? And the distance between what is comfortable for

them. I think the industry loses a lot of good techs to other industries for these reasons.

John Deere Corporation

The next qualitative category, John Deere Corporation, contained comments from six service managers. One respondent questioned how much John Deere spent on the program and also mentioned that they would like to receive an annual promotional packet. Three respondents voiced the opinion that John Deere should contribute more to the program by stating: (a) “there should be full ride scholarships available from Deere;” (b) “the dealer and John Deere need to put more out of pocket to help the students that do not have the money;” and, (c) “John Deere company can’t control the tech will stay at a dealership. John Deere may need to contribute something with the dealership.”

Additionally, two other respondents listed negative comments about John Deere. One noted that the company’s attitude was “going down hill.” Another noted that they were unable to locate a JD Ag Tech school using the John Deere website.

Pay and wages

Twenty-eight respondents provided comments relating to the “pay and wages” category. Four reported that their wages could not compete with other employers such as government agencies, railroads, or manufacturing plants. Nine voiced their concern that new technicians demanded too high of wages in spite of their lack of experience. Two of those respondents blamed the JD Ag Tech schools for inflating the students’ high expectations for starting wages. Another stated, “most technicians develop a hired gun mentality.” In addition, one indicated that rising wages were causing the dealership to charge more for service repairs than customers were willing to pay. However, two of

those respondents agreed that technicians do deserve a fair wage. One indicated that dealerships “need to find a way to get benefits and wages up where they need to be.” The other noted, “on the other hand, for what we expect techs to know electrical, hydraulic, computers, engines and all of the new technology, how do you bring them together?”

Ten respondents mentioned that technician wages were dependent upon different factors. The factors listed were: (a) “experience,” (b) “experience and education,” (c) “the individual,” (d) “knowledge,” (e) “knowledge and attitude, not years of experience.” (f) “the person,” (g) “productivity, schooling and other experience,” (h) “technical aptitude,” and (i) “the transcript and interview presentation.” Another respondent stated, “a young JD Ag Tech has to prove his ability to do the job as any tech would.” One respondent gave an alternative view stating “a lot of different factors to hiring tech’s other than pay.”

Five other comments were listed relating to pay. One service manager said that he did not know what technicians were paid because the general manager set the pay. Two others listed specifics relating to their pay scale: (a) “starting salary for an Ag Tech is between \$7 to \$9 per hour and then we go to a base salary;” and, “top pay is \$14 with benefits.” One respondent said that they “would pay more for the JD Ag Tech student than the diesel student because he is trained in more areas than just diesel training.” Another respondent stated that they “would pay a graduate from one specific Ag Tech school more than a graduate from another Ag Tech school.”

Recruitment

Service managers also provided four qualitative comments related to recruitment. Three comments related to recruiting technicians from JD Ag Tech schools were: (a) “JD

Ag Tech should continue to recruit new students;” (b) “the JD Ag Tech program has been a great recruiting tool for us at local high schools and colleges;” and, (c) “in the past our methods for hiring service personnel have been through advertisement, friends, etc. We have not had the best of luck. In the future we plan to sponsor and hire from the JD Ag Tech program.” The last comment related to recruitment was “The pool of farm boys is disappearing. That was the best help I ever had . . . Work habits of new hires is lacking . . . Trade schools is my best choice at the moment.”

Students and technicians

Another area that emerged from the service managers’ comments was a category for the individual “student and technician.” Thirty-seven data units were placed in this category.

A popular concern was the “need for technicians.” Eleven comments centered on the need for technicians. Some of the statements were: (a) “can’t find people interested in this field;” (b) “help us find some good mechanics;” (c) “it has been very hard for our dealership to hire good younger technicians that are willing to work hard and like what they are doing;” (d) “the Ag industry is in bad need of good techs;” (e) “trying to find an Ag Tech is nearly impossible;” (f) “we need more techs. It is our biggest challenge;” and, (g) “I need 10 techs between 4 stores, (it is a) critical need.”

Loyalty to the dealership was a concern listed by seven respondents. One respondent stated, “We have had two John Deere Ag Tech students and the hardest part is keeping them loyal to the dealer after graduation.”

Similar to loyalty, another concern mentioned by four respondents was keeping the technicians happy once they were employed. One respondent said, “biggest problem is getting techs hired who want to stay in position.” Another respondent agreed stating:

Securing a long term employment has been a problem. Techs seem to have other desires or wants coming out of the Ag Tech schools. Have we selected the wrong people or has there been false expectations presented from the Ag Tech schools?

In the process of trying to successfully employ technicians, nine respondents indicated that the individual student or technician was the critical variable to the problem. Two stated that they had sponsored JD Ag Tech students, but one of their students had a bad attitude. One stated, “It starts with a person that really knows what he or she wants out of the class.” Two mentioned that natural abilities, along with work ethic and drive, were important for success in the service department. Another service manager indicated, “JD Company can’t control the tech will stay at a dealership. JD may need to contribute something with the dealership.” Additionally, a service manager agreed with the previous comments by stating, “It isn’t the quality of the school as much as it is quality of student. Good people to send to school is [*sic*] hard to find. Hard [*sic*] to find people wanting to be a mechanic.” One service manager noted that the student’s life-experiences were a key to being a successful technician. He stated, “techs are born and raised around men who repair things . . . They’ve had their hands-on training while growing up. Head knowledge isn’t enough.” A second service manager indicated that the level of formal education is not necessarily an indicator of a technician’s success, as he stated that their dealership had “hired very intelligent high school students who have

superseded higher graduates.” Another service manager noted that “effort” was critical by stating “the success of any student is decided by the effort put into the program.”

Three other respondents gave comments related to the students and technicians. One stated, “Technicians should have a good personality and sense of humor to work with farmers. Also having a farm background helps.” One respondent commented that it was difficult to find technicians, because after high school, “students do not want to stay in town.” Another respondent listed the number of technicians they hired from various school locations: (a) four were from JD Ag Tech schools and three of them continued to work for the dealership; (b) three were from a local community college; (c) one was from a motorcycle technician school; (d) two were from other technical schools; and (e) two were hired straight out of high school.

Training and education

Thirteen of the responses contained information related to technician training and student education. Eight were directed toward the education that students received prior to becoming a technician. Several service managers listed specific areas they would like to see improved or taught. Two mentioned customer relations as an area they would like taught. Other areas listed were: (a) people skills, (b) communications, (c) time management, (d) older equipment, (e) spelling, (f) better diagnostics, (g) confidence, (h) equipment set-up, (i) lawn and garden equipment, (j) computer literacy, and (k) problem solving.

In addition to listing specific areas needing implemented, the service managers also stated: (a) “tech schooling is a good foundation of knowledge;” (b) “the need for tech training (education), will increase, would like to see more offered at the high school

level;” and, (c) “let the students find (the) answers to problems on their own.” One respondent agreed that teaching the basics was necessary; however, it seemed as though the everyday dealership tasks had not reached the classroom. Additionally the respondent recommended, “Study your program. Find out where it pinches and cut out the waste.” One respondent added, “post high school education is a must.” Another wrote “students need to do a quicker job of performing repairs. I find most too cautious, slow or unsure of their work.”

Five responses focused on the training technicians received after college. Two respondents noted that the rapidly changing technology required continued training, and one said that the training made it hard “to have time for repair work.” Another service manager wrote that they were firm believers in continuing technician education and that every technician had a learning plan. One respondent recommended teaching an “AMS-GPS” refresher course for older technicians. Another respondent stated that JD Ag Tech program was doing okay, but the John Deere training program for current technicians, Pro-Tech, needed some improvement.

Other

Among the qualitative comments, nine responses were placed in the “other” category. Two respondents listed their dealership’s name and the city location. Another stated that they had a manager for all of the company’s service departments and that other stores had sponsored and hired JD Ag Tech students. A respondent stated that the responses were based on the location of one store. One was thankful that they were able to participate in the study and wrote, “I hope this helps find a solution to this growing problem.” An additional respondent mentioned that they “would like to receive some

type of summary of this study.” One stated that the dealership just merged with another group of John Deere dealers and that he or she had only been in that position for a year.

An industrial John Deere dealership noted that they primarily sold construction equipment. The researcher called the store and found that they also sold some John Deere Agriculture equipment. One service manager explained that he or she was unsure how to respond to Question 19c. The researcher called the respondent to clarify the respondent’s answer selection.

Summary

This chapter presented the study’s findings. More than 90% of the sampled respondents chose to participate in the study. Service managers indicated that they did plan to hire technicians over the next three years. Service managers reported hiring 970 technicians over the past three years, 367 came from some type of technical school. Among the remaining 610 technicians that came from places other than technical schools, more than half, 338 came from just three locations, John Deere dealerships, off the farm, and non John Deere dealerships. Among the service managers that had hired JD Ag Tech students, they were on average satisfied with the students. Service managers that had hired non-JD Ag Tech students were on average a little less than satisfied. In terms of rating each partner’s contributions to the JD Ag Tech partnership, respondents rated the dealership partner the highest, the school partner second, the company partner third, and the student partner last. Lastly, only 40% of the respondents indicated that they were familiar with the JD Ag Tech program.

Chapter 5

Summary

Agricultural equipment manufacturers, along with other manufacturing industries such as automotive, truck and construction equipment, have struggled over the past several years to find qualified technicians to service their products. The manufacturers continue to predict a shortage of qualified technicians. The purpose of this study was three fold. First, the study focused upon one agricultural original equipment manufacturer (OEM), John Deere's, needs for service technicians. The study also investigated what John Deere dealerships were doing to locate technicians. Finally, the study sought to determine the service managers' perceptions of the JD Ag Tech program.

A random stratified proportional sample of John Deere agricultural dealership service managers was drawn from the continental United States. Over 90% of the 306 sampled service managers answered a questionnaire. The questionnaire was developed by the researcher while being guided by a panel of experts. The questionnaire was validated through the process of: (a) interviewing four John Deere dealership service managers; (b) conducting a focus group with nine John Deere dealership service managers; and (c) performing a pilot study of 18 John Deere dealership service managers. The reliability of the instrument was determined by performing a Cronbach Alpha test on the pilot group's perceptions and the main study group's perceptions.

Conclusions

The conclusions are presented for the following five research questions based upon the findings reported in chapter 4.

Research Question 1 – What are the John Deere dealership service technician needs as perceived by JD dealer service managers?

The data indicated that service managers planned to hire one technician over the next 12 months and two technicians over the next three years. These results concurred with the literature, which reported that the automotive, truck, and heavy equipment industries all have long needed service technicians (Simone, 1996; Stewart, 1997; Sutton, 2003). The results also confirmed the John Deere corporate managers' opinion that dealerships needed service technicians, as reported in chapter 2. The findings of this study validate that the need for technicians in John Deere agricultural dealerships is real and is projected to continue over the next three years.

Although some of the most advanced technology areas, such as “combine harvesters” and “AMG/GPS,” were identified as an area of technical need by just one-third of the service managers, the two most common areas of technical need were “tractors” and “basic technicians.” The respondents also reported having technical expertise in those two areas. However, even though those areas were reported as strengths, the service departments still had voids to fill in those areas.

Research Question 2 – What are the methods John Deere service managers use to identify potential service technicians?

Service managers reported where they found technicians and ranked their top three preferred methods for finding technicians. The top three preferences were: (a) asked current employees; (b) placed advertisement in a newspaper, magazine, or journal; and, (c) contacted a technical school. Over the past three years, service managers hired 977 technicians from the following locations: (a) 138 from JD Ag Tech schools, (b) 229

from non-JD Ag Tech schools, and (c) 610 from places other than technical schools.

Among those 610 technicians hired found outside of technical schools, more than half came from three areas: (a) John Deere dealerships, (b) off the farm, and (c) agricultural dealerships other than John Deere.

This author was unable to identify any sources that listed methods used by agricultural equipment dealers to locate technicians. However, several authors reported on techniques for employing workers in similar technical fields. Some of those authors recommended that employers need to improve their hiring strategies by doing a better job of targeting future employees. Stewart (1997) reported that dealership-training directors should spend more time in high schools and technical schools to recruit future technicians and should spend less time training current technicians (p. 29). Herman, Olivo, and Gioia (2003) stated that employers who want to stay ahead of the curve would need to change their ways and “carefully recruit just the kind of people they need to operate the company” which will “enable them to hire people who will perform better and stay longer” (p. 39).

Other authors suggested that today’s younger generation was different and required a different mindset when trying to hire them. Birkland (2006) reported that employers should no longer just offer technician jobs, but instead should provide careers where technicians have a clear understanding of the multiple career opportunities within their company (p. 28-32). John Deere dealerships have positions available within parts departments, sales departments, as well as management. Roberts (2006a) explained that today’s generation is an instant gratification and instant access type of generation, and that although many managers are tempted to try finding technicians through a

newspaper's classified advertising section, in reality the technique is outdated simply because today's generation does not even read a printed newspaper (p. 11). Roberts stated today's young people obtain information through wireless technology by using a laptop or a cell phone to access the World Wide Web (p. 11).

Research Question 3 – What are the relationships between the service managers' perceptions of the JD Ag Tech program and the: (a) number of technicians employed at the dealerships, (b) number of stores the dealer-organizations own, (c) distances between the dealerships and the closest JD Ag Tech school, (d) number of JD Ag Tech students the dealerships have sponsored, and (e) service managers' age?

The literature indicated that the size of an organization could influence the organization's commitment to education and training (Smith & Dowling, 2001; Ator-James, 1993). This study reasoned that larger dealerships required more technicians. The relationship between the number of technicians dealerships employed and service managers' perception of the JD Ag Tech program did yield a significant correlation, a .133 correlation coefficient. Although the coefficient value was low (Davis, 1971), the relationship was a positive correlation. The larger dealerships, which employed more technicians, tended to have a more positive perception of the JD Ag Tech program.

The other variable used to qualify a large organization, the number of stores a dealer company owned, did not significantly correlate with the service managers' perception of the JD Ag Tech program. One possible alternative reason why this independent variable did not correlate with service managers' perceptions of the JD Ag Tech program, was perhaps service managers were at a lower level of management within the dealership organization, and that the number of stores dealer-companies own

could better correlate with the perceptions of higher levels of management, such as the dealership principals' perceptions.

The third independent variable "distance between the dealership and the closest JD Ag Tech school" had a negative correlation with the service managers' perceptions of the JD Ag Tech program. Dealerships that were located further away from the JD Ag Tech schools had less than positive perceptions of the JD Ag Tech program. Although the correlation was significant, the -0.176 correlation coefficient was low (Davis, 1971). However, the results are similar to Miller (1992) who stated, "The further the partners were away from each other, the more difficult it has been for the partnership to succeed" (p. 218).

The fourth independent variable, the number of technicians that dealerships have hired from JD Ag Tech schools over the past three years, did not obtain a significant correlation with the service managers' perceptions of the JD Ag Tech program. This result was not surprising due to a lack of knowledge of the JD Ag Tech program.

The fifth independent variable, service managers' age, did not obtain a significant correlation with the service managers' perceptions of the JD Ag Tech program. One possible reason the correlation was not significant could be that the distribution of service managers' age slightly resembled a leptokurtic distribution, with 83 of the service managers' age being between located between the ages 44 to 50 years old. According to Kirk (1978) whenever one of the correlated variables is restricted, its truncated range in effect will reduce the size of the correlation coefficient (p. 110).

Research Question 4 - Among the dealerships that have sponsored Ag Tech students, what are the service managers' perceptions of the John Deere Ag Tech program?

Eighty-five service managers rated their satisfaction level of the JD Ag Tech graduates that they had recently hired. On average they were satisfied with the JD Ag Tech graduates (\bar{x} =3.07 on a 4.0 Likert type scale). Among the service managers who had sponsored a JD Ag Tech student over the past 10 years, on average, those service managers agreed that JD Ag Tech schools provided quality technical education and JD Ag Tech instructors were effective teachers. The service managers agreed (\bar{x} =3.94 on a 5.0 Likert type scale) that the JD Ag Tech school laboratory experiences were effective and that the content taught in the JD Ag Tech schools was the correct content (\bar{x} =3.90 on a 5.0 Likert type scale). The program area receiving the lowest rating was, "JD Ag Tech schools do a good job of following-up with dealerships to see how the students perform" (\bar{x} =3.80 on a 5.0 Likert type scale). However, the respondents' rating was still closer to agreement than being undecided on the "follow-up issue."

In addition to those JD Ag Tech program areas, further questions were asked to determine whether or not the individual four partners: (a) John Deere dealerships, (b) JD Ag Tech schools, (c) John Deere Corporation, and (d) JD Ag Tech students were contributing their fair share to the partnership (see Table 18). Service managers unsurprisingly rated their own place of employment, dealerships the highest contributing partner (\bar{x} =4.18 on a 5.0 Likert type scale). Service managers are most familiar with the contributions that dealerships make to the partnership and responded most favorably towards the dealership partner.

The second highest rated partner was “schools” (\bar{x} =4.07 on a 5.0 Likert type scale). It is understandable that respondents would rate this partner as the next highest contributor to the partnership. Among the three partners that service managers are familiar to working with, “schools” would be the next most noticeable “partner” from the service managers’ vantage point. Although schools have substantially less capital than John Deere Corporation, service managers can appreciate the contributions “schools” make by: (a) maintaining facilities, equipment and tools; (b) employing faculty; (c) educating the students, and (d) developing curriculum. The only “school-partner” attribute that fell below the 4.0 mean was “23f communicating with JD dealers.” From the service managers’ point of view, JD Ag Tech schools are also contributing their fair share to the partnership.

John Deere Corporation received the second overall lowest rating (\bar{x} =3.96 on a 5.0 Likert type scale). Unless a service manager serves on a JD Ag Tech school advisory board, he or she probably is not afforded the opportunity to see all of John Deere’s contributions to the JD Ag Tech program. The service managers did rate favorably the company’s contributions for providing the partnership with special service tools, agricultural machinery, and training aids. The four areas that service managers rated below a 4.0 mean were: instructor professional development, program promotion, scholarships, and assistance in student recruitment. This last area, assistance in recruitment, yielded the second overall lowest individual mean (\bar{x} =3.62).

It was interesting to note that the partner who had the lowest rating was the “students” (\bar{x} =3.83 on a 5.0 Likert type scale). Only one individual attribute received a value above a 4.0, which was the work they (students) perform in the service

department.” The remaining four student attributes had a mean rating below 4.0. The student attribute, “remaining loyal to the dealership that invested in them,” received the overall lowest single mean ($\bar{X}=3.48$). When considering the ratings service managers gave the “dealership” partner for providing potential careers, internship opportunities, and work experience; those same service managers expect to see a return on that investment, which includes seeing those students performing good service on equipment for more than just a year or two.

As will be mentioned later in this chapter, today’s generation of students tend to hop from job to job more quickly than generations did in the past. In addition, it is plausible that students become disloyal when considering: (a) the relative low pay students receive for their two years of college education, (b) the hundreds of dollars or thousands of dollars they have invested in tools which are required for the dealership job, and (c) the fringe benefits offered by local manufacturing plants, which students must overlook when they choose to remain working at the John Deere dealership.

Research Question 5 - Which independent variables best predict and explain the dependent variable?

All five independent variables were entered into a multiple regression analysis to determine which variables could best predict or explain the service managers’ perceptions of the JD Ag Tech program. When all five independent variables were entered into the analysis simultaneously, the model did not yield a significant coefficient of determination, R^2 ; therefore, the independent variables were unable to collectively explain a proportion of the variance of service managers’ perceptions of the JD Ag Tech program.

The variables were also entered into the multiple regression analysis using the backward elimination variable-selection technique. A low, but significant coefficient of determination, R^2 of .048 was obtained. The best predictor and only statistically significant predictor for determining service managers' perceptions of the JD Ag Tech program, was "service managers' age."

However, as reported earlier, service managers' age did not statistically correlate with service managers' perceptions on the bivariate correlation. It was also stated that part of the reason might be due to a leptokurtic type of distribution of service managers' ages. One reason why service managers' age appeared to be significant in the regression analysis, might be due to an unknown independent variable, which was not measured in this study and could be influencing service managers' age; for example service managers' education level; or, the number of years of a service manager has managed John Deere Agriculture Technicians; or, the number of years a service manager has worked with JD Ag Tech schools.

Further Conclusions

One of the central issues raised by John Deere, which led to the development of this study, was the question: if the dealerships needed technicians, then why were their JD Ag Tech schools not full and have students on waiting lists for entering the program? Based upon the results of this study, the researcher suggests that part of the problem is insufficient marketing. This analysis is based upon the measured responses that 60% of the service managers were only somewhat knowledgeable about the program or not knowledgeable at all. Miller (1992) listed poor marketing as a barrier to successful partnerships (p. 217).

Further evidence of this concern is that one-third of the respondents took the time to write additional comments at the end of the questionnaire; several of those underscored an insufficient level of marketing by mentioning that they did not know much about the JD Ag Tech program or that they had never hired a JD Ag Tech graduate. Two wrote that they did not even know the location of the closest JD Ag Tech school. The data also indicated that nearly half of the service managers (46%) contacted a technical school to locate a technician; and, contacting a technical school was rated as one of the three most effective methods for locating possible technicians. If service managers are contacting technical schools, then it is in John Deere's best interest that the service managers first contact a JD Ag Tech school; especially since the results of the study indicated that participants who had hired a JD Ag Tech student reported a higher satisfaction of those schools ($\bar{x}=3.07$) than the service managers who had hired students from non-JD Ag Tech schools ($\bar{x}=2.79$).

The review of literature also revealed that programs gain credibility through partnerships (Benoit, 1995, p. 70; Brown, 2004, p. 75; Miller, 1992, p. 152). If the service managers are unfamiliar with the programs, the partnership's credibility advantage is not being fully harnessed.

To further investigate the concern for insufficient marketing, the researcher performed an ad hoc search on the John Deere corporate website, by typing in "Ag Tech program" or "technician," neither search provided a quick link to the JD Ag Tech program. A link was found to the Construction and Forestry Tech program, but nothing to the Ag Tech program. The John Deere website also contained a link for careers, similar to the Caterpillar website. However, the John Deere website, unlike Caterpillar's

site, was focused entirely upon John Deere corporate jobs, and did not provide a link for the JD Ag Tech program or for a career path within a John Deere dealership. A search was also performed within John Deere's on-line communication system called "Pathways." Within Pathways, the JD Ag Tech program was only found by searching with the words "career partnerships." If the company is going to corporately sponsor an education program then it needs to provide readily accessible information on the corporate website and within its internal communication system "Pathways."

In addition to the need for improved marketing, another area requiring further clarification is service managers' preference of how long students should attend a technical school, if any at all? Among the 977 technicians that were hired over the last three years, 367 came directly from some type of technical school. Technical schools offer programs that vary greatly in time span and levels of education. The top three preferred lengths of time, along with their respective averages were: 19 to 24 months post secondary, 68%; 7 to 12 months, 59%; and, high school graduate; 48%. Based on the data, service managers' appear to disagree regarding top preferred grade levels of education required by technicians. Their levels of education preferences were: post secondary diploma or certificate, 76%; high school technical school, 66%; and post secondary associate's degree, 46%. The researcher concludes that the service managers are mixed in opinion as to their preference in hiring a trained technician from a 2-year post-secondary college with a diploma, versus hiring a technician straight out of high school.

Part of this disagreement could be contributed to the differences in the individual student or technician, being considered for employment. As one service manager

commented, they had hired a high school student that out performed other technical school graduates. If that service manager was given the choice between hiring a dynamic high school graduate versus a marginal technical school graduate, then the service manager's preference would be the top quality high school graduate. The researcher also concludes that even though the respondents ranked the "19 to 24 months" category, as the top length of time students should spend in school, that the differences among individual students is equal in importance to the time the students spend in school and the level of education that students should earn in school.

Recommendations

Practice

Based on the aforementioned results of the study, the following recommendations are presented to the partners of the JD Ag Tech program, i.e., JD Ag Tech Schools, John Deere Corporation, John Deere Agriculture equipment dealerships, and students of the JD Ag Tech program: Two items are recommended for practice: (a) improve the marketing of the JD Ag Tech program; and, (b) focus on improving the "student" partner within the partnership.

Marketing

As stated earlier in this chapter, the author suggests that the JD Ag Tech program could benefit from improved marketing. All John Deere agriculture service managers should be very familiar with the program. The data indicated that only 40% of the service managers were familiar with the program. Among the service managers who were not familiar with the program, some wrote comments indicating that they did not know how to obtain information about the program.

The researcher recommends that both the JD Ag Tech schools and John Deere Corporation work together to improve the marketing of the program. The researcher suggests that John Deere define regions of responsibility for every JD Ag Tech school. The schools would then be responsible for contacting the service managers in their region. The goal would be to develop program exposure and to educate the service managers about the programs so that the service managers have the opportunity to become involved in the partnership. However, the data indicated that four respondents had hired students from more than one JD Ag Tech school. Therefore, the researcher suggests that it would be counterproductive to limit a dealership to working with only one specific school. The schools would be responsible for educating the service managers within their region, but would be allowed to partner with any dealer that chose to participate with their school.

While the schools were contacting the dealerships and nurturing relationships with those service managers, the schools could also offer solutions for recruiting top quality students, a strategy that could also improve the “student” partner component of the partnership.

The review of literature indicated that successful partners often have individual champions within the organization who ensure the partnership is a success (Kantor, Kipp, & Zeis, 1996; Alexander, 1997). The results of this study indicated that 60% of the respondents knew little to nothing about the JD Ag Tech program. As schools improve their relations with the service managers, they should encourage those managers, especially the younger service managers, to become future JD Ag Tech champions. After all, they are not only the service managers of tomorrow, but as found in the multiple

regression selection techniques, service managers' age was this study's only variable that could be used to predict the service managers' perceptions of the JD Ag Tech program.

Communication was listed as an important factor in chapter 2 for successful partnerships. This study found that some service managers believed the schools should do a better job of following up with the dealership regarding student performance. JD Ag Tech instructors could greatly improve communication between the schools and the dealerships while they are making their dealership visits. The instructors would also become the school's champion of the JD Ag Tech program, and also hopefully convert the service managers into becoming the dealership's champion of the JD Ag Tech program.

The last marketing recommendation is to provide easy access to the JD Ag Tech program's website through user-friendly navigation starting at the corporate John Deere home page. The general public should be able to access and learn about the educational opportunities that are available through the JD Ag Tech program.

The Student Partner

The second recommendation for practice is to focus on improving the "student" partner within the partnership. This is a critical recommendation because the student partner received the overall lowest rating for "contributing their fair share" to the partnership program; and, because the one individual statement that received the lowest rating was "the student remaining loyal to the dealership that invested in them." Considering these two points and that the author was unable to locate literature that focused upon the student partner, the researcher suggests that focusing on this partner will provide the most potential for improving the overall partnership.

Several qualitative responses, from the open ended question, spoke to this concern. One service manager indicated that the “biggest problem is getting techs hired who want to stay in position.” Another declared, “trying to find an Ag Tech is nearly impossible.” One respondent stated “We had two John Deere Ag Tech students and the hardest part is keeping them loyal to the dealer after graduation.” And one service manager proclaimed, “It isn’t the quality of the school, as much as it is quality of the student.”

The author recommends two methods for improving the “student” partner. One is for the dealerships, the JD Ag Tech schools, and corporate John Deere to begin engaging prospective students earlier in their academic career, for example when the students are freshmen or sophomores in high school, rather than waiting until they graduate high school. Engaging students earlier will allow the partners to work with a larger pool of candidates, which might also help dealerships find top caliber candidates. The other suggestion, also reported by Birkland (2006, p. 28-32), is to market a career for the students, rather than simply offering them a job.

The researcher suggests that improving the student partner should begin at the dealership level. This belief is reinforced by Gregory Poole, CEO of the Gregory Poole Caterpillar dealership group, who was quoted in the journal *Construction Equipment* stating

It has been too easy to accept that our role in industry is to hire the qualified applicants who graduate from our community colleges and let the colleges handle recruitment and curriculum development . . . It hasn’t worked, and it’s unfair for

us to assume community colleges can adequately describe and promote our industries for us. (Stewart, 1997, p. 31)

When John Deere dealerships work in conjunction with John Deere and the JD Ag Tech schools, they not only pool their recruitment resources, but they also add credibility to the process (Benoit, 1995). All three partners should harness that credibility for the common good of recruiting the best talent into the JD Ag Tech program.

John Deere and Caterpillar both annually recruit technicians for their JD Ag Tech program and ThinkBIG program from the National FFA convention and National Skills USA Competition (S.L. Hitch, Personal Communication October 19, 2006). It would be valuable to offer an educational program to the high school freshmen so they could immediately begin working towards a career in a John Deere dealership, before the student interests are directed to other academic areas, as parents and guidance counselors have been doing for the past “25 years” (Stewart, 1997, p. 31). The educational program could contain a pre-JD Ag Tech education, such as primer type courses. The courses could be used to capture the students’ interests as well as provide students a solid foundation for a future education in John Deere agricultural equipment technology.

These recommended changes are a paradigm shift. However, Herman, Olivo, and Gioia state in *Impending Crises* that companies need to make changes with the goal of recruiting the right talent from the start:

Enlightened employers, sensitive to the need to do things differently, will redesign the way they are structured. They will challenge their processes. . . . they will carefully recruit just the kind of people they need to operate the

company . . . Their studied deliberation will enable them to hire people who will perform better and stay longer. (2003, p. 39)

Mel Kleiman, a recruiting consultant, presented *Effective Employee Recruitment and Retentions Strategies* to the Technology and Maintenance Council (Roberts, 2006b, p. 11). Roberts summarized Kleiman's presentation by stating "if you are constantly and systematically looking for qualified technicians, you are much more likely to find them when you need them . . . if you are looking for eagles, you are less likely to end up with turkeys" (p. 11).

Future Research

The researcher recommends five items for future research. The first recommendation is to investigate how to improve the measurement of service managers' perceptions of corporately sponsored education programs. As stated in chapter 3, construct validity "is often determined only after years of experience with a survey instrument" (Litwin, 1995, p. 43). This study considered recommendations from many important stakeholders during the development of the questionnaire. However, it is still just one study conducted at one point in time.

The second research recommendation is to replicate the study after improving the program's marketing and improving the student partner component. The replicate study should determine the differences in service managers' perceptions found in this study and those found in the replicated study.

The third recommendation centers on the concept that service managers' age did influence service managers' perceptions of the JD Ag Tech program. However, service managers' age was unable to greatly predict service managers' perceptions of the JD Ag

Tech program due to the low coefficient of determination ($R^2 = .048$). Service managers' age might have been influenced by other demographic variables that were not measured in this study, such as the number of years the service managers have managed technicians, or the service managers' level of education. The researcher recommends determining whether those two variables will influence their perceptions of the JD Ag Tech program.

The fourth recommendation is to determine the differences in perceptions between service managers and their bosses, the dealership principal. Pugh (1998, p. 103) and Puckett (1994, p. 107) noted that the level of management could influence perceptions. This study did not focus upon the dealership principals' perceptions, but instead focused upon the technician's direct supervisor, the service managers themselves.

The last recommendation is to determine what the other two partners' perceptions are of the JD Ag Tech program. In this study, service managers had the opportunity to provide their opinions of the program, as well as the John Deere corporate managers had the opportunity to participate through the development of the questionnaire. However, the JD Ag Tech students and the JD Ag Tech instructors have not had the opportunity to participate, and their perceptions should be determined as well as compared with the results of this study, that is service managers' perceptions of the JD Ag Tech program.

Summary

This chapter concluded that John Deere service managers do plan to hire more technicians over the next one to three years. Among the service managers that hired JD Ag Tech students, they were on average satisfied with those students. However, it was also reported that the JD Ag Tech program was not being properly marketed, and

recommendations were made on how to improve the marketing of the program. The researcher also recommended focusing upon the “student” partner within JD Ag Tech partnership and that this focus could provide the most potential for improvement. Lastly recommendations were made for future research, including determining the students’ and instructors’ perceptions of the JD Ag Tech program.

References

- Adams, B. (2006a). Best Practices: Tricks of the Trade. Leading by example. *Fleet Equipment*, 32(11), 30-31.
- Adams, B. (2006b). Best Practices: Tricks of the Trade. Tuning in to technicians. *Fleet Equipment*, 32(12), 30-31.
- Alexander, A.E. (1997). Perceived critical success factors in triad partnerships between a community college and business and industry. *Dissertation Abstracts international*, 58 (07A), 2505. (UMI No. 9802814).
- American Council on Education. (2005). *Bridging Troubled Waters: Competition, Cooperation, and the Public Good in Independent and Public High Education* (Third in a series of Essays: The Changing Relationship Between States and Their Institutions). Washington, DC. http://www.acenet.edu/bookstore/pdf/2005_BridgingWaters.pdf
- Andersen-Smith, K. L. (1993). The applicability of an interagency arrangement model to three selected system-wide educational partnerships in Maryland (Doctoral dissertation, University of Maryland, 1993). *Dissertation Abstracts International*, 54, 105.
- As always, quality, service and integrity guide John Deere. (1996, September). *Agri Marketing*, 34, 54.
- Avry, D., Jacobs, L.C., & Razavieh, A. (1985). *Introduction to Research in Education* (3rd ed.). New York: Holt, Rinehart and Winston.

- Benoit, D. R. (1995). A Study of vocational/technological training partnerships between community colleges and the business/industry community. *Dissertation Abstracts International*, 56 (05a), 1590. (UMI No. 9530189).
- Birkland, C. (1993). Technician Training, *Fleet Equipment*, 19, 28-31.
- Briant, D. G. (1996). Corporate/college collaboration: identifying and comparing elements of certain product service technician education program agreements (Doctoral dissertation, Northern Arizona University, 1996). *Dissertation Abstracts International*, 57 (07a), 2890. (UMI No. 9636608).
- Briefing room food cpi, prices, and expenditures: outlook for food prices in 2005*, (n.d). Retrieved April 21, 2005, from <http://www.ers.usda.gov/Briefing/CPIFoodAndExpenditures/outlook.htm>
- Brown, W. F. (2004). *Characteristics of successful partnerships between Arkansas two-year colleges and business/industry*. Unpublished doctoral dissertation, Arkansas State University, Jonesboro.
- Buettner, D.L., Morrison, M. C., & Wasicek, W. (2002). Successful Experiences with Making Partnering an Operational Strategy. *Developing Successful Partnerships with Business and the Community*, 100, (5-12).
- Carmines, E.G., & Zeller, R.A. (1979). *Reliability and Validity Assessment*. Beverly Hills, CA: Sage Publications.
- Caterpillar ThinkBIG, Big locations*, (n.d.). Retrieved October 27, 2006 from <http://www.CAT.com/thinkbig>
- Challenger: A Winning Combination. (2004, November/December). *Agri Marketing*, 42, 62.

- Davis, J.A. (1971). *Elementary survey analysis*. Englewood Cliffs, NJ: Prentice-Hall, Inc.
- Deierlein, B. (1996). Surviving the technician shortage. *World Wastes*, 39, 76.
- Deierlein, B. (1999). Technicians, Where are they? *Fleet Equipment*, 25, 48-51.
- Devier, D.H., (1999). Corporate Partnerships: Winning Relationships, *Tech Directions*, 59, 20-22.
- Dillman, D. A. (2000). *Mail and Internet Surveys the Tailored Design Method* (2nd ed). New York: JohnWiley & Sons, Inc.
- Fahey, J. (2004). Bumper to Bumper Education. *Forbes*, 174, 77-80.
- Fewer technicians has industry scrambling. (1996, May 6). *Engineering news-Record*, 236, p. 20.
- Fishbein, M., & Ajzen, I., (1975). *Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research*, Reading, MA: Addison-Wesley Publishing Company.
- Foreign Agricultural Trade of the United States*. (n.d). Retrieved August 8, 2006, from <http://www.ers.usda.gov/Data/FATUS/MonthlySummary.htm>
- Frequently Asked Questions About Agricultural Trade*. (n.d). Retrieved April 21, 2005, from <http://www.fas.usda.gov/itp/Policy/tradeFAQ.htm#1>
- Gardner, P.L., (1975). Scales and Statistics, *Review of Educational Research*, 45(1), 43-57.
- Gilroy, R. (2004). Technicians Are Still Going Elsewhere, *Light & Medium Truck*, 17, 26.

- Grubb, G. C. (1999). Corporate/college partnerships and their impact on corporations and institutions of higher education: A corporate perspective. *Dissertation Abstracts International*, 61(12), 4646. (UMI No. 9999553)
- Hagedorn, L. S. (1999). Vocational Education and the Collegiate Ideal: The Threat and the Challenge of Limited Resources, *New Directions for Higher Education*, 27, 91-100.
- Herman, R., Olivo, T. & Gioia, J. (2003). *Impending Crisis Too Many Jobs Too few People*. Winchester, VA: Oakhill Press.
- Hinkle, D. E., Wiersma, W., & Jurs, S. G. (2003). *Applied Statistics for the Behavioral Sciences* (5th ed.). Boston: Houghton Mifflin Company.
- Jackman, M. J. G., & Mahoney, J.R. (1982). *Shoulders to the wheel: Energy-related college/Business cooperative agreements*. Washington, DC: American Association of Community and Junior Colleges.
- Jonker, J. (1996). Delta college and General Motors Corporation. In L. Johnson, (Ed.), *Common Ground: Exemplary Community College and Corporate Partnerships*. (pp. 24-29). Monograph of League for Innovation in the Community Colleges; National Association of Manufacturers. (ERIC Document Reproduction Service No. ED393490).
- Johnson, L. (ed.). (1996). *Common Ground: Exemplary Community College and Corporate Partnerships*. (pp. 24-29). Monograph of League for Innovation in the Community Colleges; National Association of Manufacturers. (ERIC Document Reproduction Service No. ED393490).
- John Deere's system. (2003, March). *Appropriate Technology*, 30, 50.

- John Deere power up your career, choose your path ag-tech*, (n.d.). Retrieved October 27, 2006, from <http://www.jdpowerup.com/>
- Kahane, L.H. (2001). *Regression Basics*. Thousand Oaks, CA: Sage Publications.
- Kantor, S., Kipp, R., & Zeis, P. A. (1996). Central Piedmont Community College and Okuma America. In L. Johnson, (Ed.), *Common Ground: Exemplary Community College and Corporate Partnerships*. (pp. 24-29). Monograph of League for Innovation in the Community Colleges; National Association of Manufacturers. (ERIC Document Reproduction Service No. ED393490).
- Kenny, D.A. (1979). *Correlation and Causality*. New York: John Wiley & Sons.
- Keppel, G., Wickens, T. D. (2004). *Design and Analysis A Researcher's Handbook* (4th ed.). New Jersey: Upper Saddle River.
- Kerlinger, F.N. (1973). *Foundations of Behavioral Research* (2nd ed.). New York: Holt, Rinehart and Winston, Inc.
- Kerlinger, F.N. (1979). *Behavioral Research a conceptual approach*. New York: Holt, Rinehart and Winston, Inc.
- Kilcarr, S. (2005). The Technician Shortage: How bad is It? *FleetOwner*, 100, 20-24.
- Kirk, R.E. (1978). *Introductory Statistics*. Monterey, CA: Brooks/Cole Publishing Company.
- Krathwohl, D. R., (1998). *Methods of Educational & Social Science Research* (2nd ed.). New York: Longman.
- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, 30, 607-610.

- Larose, M., (2004, February 17). Proposed Job Training Grants Reward Partnerships. *Community College Times*. Retrieved April 1, 2005, from <http://www.aacc.nche.edu>
- Leedy, P.D., & Ormrod, J.E. (2001). *Practical Research Planning and Design* (7th ed.). New Jersey: Merrill Prentice Hall.
- Lewis-Beck, M.S. (1980). *Applied Regression, An Introduction*. Beverly Hills, CA. Sage Publications, Inc.
- Litwin, M.S. (1995). *How to measure survey reliability and validity*. Thousands Oaks, CA. Sage Publications, Inc.
- McCabe, F. A. (1995). The application of a specific interagency arrangement model in two selected voluntary educational partnerships. (Doctoral dissertation, University of Maryland, 1995). *Dissertation Abstracts International*, 56, (11A), 4228. (UMI No. 9607801).
- McMahon, K., (2000). Changing face of your dealer. *Farm Industry News*, 33, 28-33.
- Miller, L., Lidner, J., & Torres, B. (2005, May). Conducting valid survey research. *Proceedings of the National Agriculture Education Research Conference*, San Antonio, TX.
- Miller, L.E., & Smith, K.L. (1983). Handling nonresponse issues. *Journal of Extension*, 21, 45-50.
- Nasworthy, C. S. C. (1988). Public/private sector partnerships: integration into the educational organization. (Doctoral dissertation. The University of Texas at Austin, 1988). *Dissertation Abstracts International*, 50,(02A), 0227. (UMI No. 8909717).

- National Association of Partners in Education (2001). *Partnerships 2000: A Decade of Growth and Change*. Alexandria, VA. <http://www.napehq.org/2001Survey.htm>
- Norusis, M.J. (2000). *SPSS 10.0 Guide to Data Analysis*. Upper Saddle River, NJ: Prentice Hall
- Nunnally, J.C. (1967). *Psychometric Theory*. New York: McGraw-Hill Book Company.
- Pedhazur, E.J. (1997). *Multiple Regression in Behavioral Research: Explanation and Prediction*. Belmont, CA: Wadsworth.
- Puckett, D. P. (1994). Initiating and implementing partnerships between community colleges and business and industry in North Carolina. (Doctoral dissertation. North Carolina State University at Raleigh, 1994). *Dissertation Abstracts International*, 55, (04A), 0845. (UMI No. 9425486).
- Pugh, S. W. (1998). Initiating and implementing partnerships between community colleges and business and industry in Virginia. (Doctoral dissertation. North Carolina State University at Raleigh, 1998). *Dissertation Abstracts International*, 60, (06A), 1880. (UMI No. 9933893).
- Radakovich, D., Lindsay, S., & Osborn, B. (1996). Johnson County Community College and Burlington Northern Railroad . In L. Johnson, (Ed.), *Common Ground: Exemplary Community College and Corporate Partnerships*. (pp. 24-29). Monograph of League for Innovation in the Community Colleges; National Association of Manufacturers. (ERIC Document Reproduction Service No. ED393490).
- Roberts, C. (2006a). Management techniques. Managing the risk of hiring entry-level technicians. *Fleet Equipment*, 32(8), 10.

- Roberts, C. (2006b). Technician recruitment. Notes from the TMC Fall Meeting. *Fleet Equipment*, 32(11), 11.
- Savarese, J. R. (2002). The business partnerships between Microsoft and Working Connections community Colleges. (Doctoral dissertation. Dowling College at Oakdale, New York, 2002). *Dissertation Abstracts International*, 64, (01A), 53. (UMI No. 3077245).
- Schueller, J. K. (2000). In the service of abundance. *Mechanical Engineering*, 122, 58-65. Retrieved April 2, 2005, from OCLC FirstSearch database.
- Seigel, S. (1997). Insight into tech shortage. *Fleet Owner*, 92, 112.
- Simone, B. S. (1996). *Interdependence Through Partnerships: Transforming Education* (Report submitted to the National Science Foundation Roundtable). Madison, WI: Madison Area Technical College. (ERIC Document Reproduction Service No. ED400896).
- Smith, H. C. (1999). Corporate/college partnerships and their impact on corporations and institutions of higher education: A higher education perspective. *Dissertation Abstracts International*, 61(12), 4646. (UMI No. 9999558).
- Smith, S., & Dowling, P.J. (2001). Analyzing Firm Training: Five Propositions for Future Research. *Human Resource Development Quarterly*, 2, 147-167.
- Spangler, M. S. (2002). Conducting observations on successful partnerships. *Developing Successful Partnerships with Business and the Community*, 100, (77-80).

- Spencer, C.J. (1988). Philosophical and implementational issues related to installing and Operating cooperative programs with business and industry. (Doctoral dissertation, The Ohio State University, 1988). *Dissertation Abstracts International*, 49, 09A.
- Stewart, L. (1997). Who Will Service Today's Technology? *Construction Equipment*, 96, 28-42.
- Thompson Gale Business & Company Resource Center, (n.d). Retrieved Mar 3, 2005 from <http://www.gale.com/BusinessRC/>
- Sutton, R. (2003). Stand in the Gap. *Construction Equipment*, 106, 7.
- Thompson Gale Business & Company Resource Center, (n.d). Retrieved Mar 3, 2005 from <http://www.bls.gov/oco/home.htm>
- United States Department of Labor Bureau of Labor Statistics. (n.d.). *Occupational Outlook Handbook*, 2004-05 edition. Retrieved April 1, 2005, from <http://www.bls.gov/oco/home.htm>
- Wehrspann, J. (2003). 10 biggest causes of machinery breakdowns (and how to prevent them). *Farm Industry News*, 36, 26.
- Wenzel, W. J. (2004, February). Technologies transforming agriculture. *Farm Industry News*, 37, 6-10.

Appendix A – Location of John Deere Ag Tech Schools

The 16 John Deere Ag Tech Schools located in the United States in 2006

Arkansas State University- Beebe Branch	Beebe, AR
Ft. Scott Community College	Ft. Scott, KS
Garden City Community College	Garden City, KS
Guilford Technical Community College	Jamestown, NC
Lake Land Community College	Mattoon, IL
Madison Area Technical College	Madison, WI
Navarro College	Corsicana, TX
North Dakota State College of Science	Wahpeton, ND
Northeast Iowa Community College	Calmar, IA
Northwest Mississippi Community College	Senatobia, MS
Owens Community College	Toledo, OH
Southeast Community College	Milford, NE
State University of New York-Cobleskill	Cobleskill, NY
Southwest Georgia Technical College	Thomasville, GA
Vincennes University	Vicennes, IN
Walla Walla Community College	Walla Walla, WA

<http://www.jdpowerup.com/>

Appendix B - Four Service Managers' Interview Documents

Pre-Notice Letter

October 25, 2005

*Pittsburg State University
Letterhead*

Service Manager
Implement, Inc.
STREET ADDRESS
CITY, ST, ZIP

Dear Service Manager:

In a couple of days you will receive a request to complete a questionnaire for a study that is being conducted by Kansas State University with the assistance of John Deere Corporation.

The study will assist community colleges and John Deere in understanding the current needs for service personnel in John Deere dealerships and service managers' opinions of the John Deere Ag Tech program.

We are contacting you ahead of time, because many people like to be notified ahead of time that they will be asked to participate in this study.

Thank you for consideration in this important study.

Sincerely,

Tim Dell
PhD Student, Kansas State University
Instructor, Pittsburg State University

Dr. Steven R. Harbseit
Agriculture Education
Kansas State University

Tom Hughes
Mgr of College Partnerships
John Deere Corporation

P.S. We will be enclosing a small token of appreciation with the questionnaire as a way of saying thanks.

Appendix B - Four Service Managers' Interview Documents

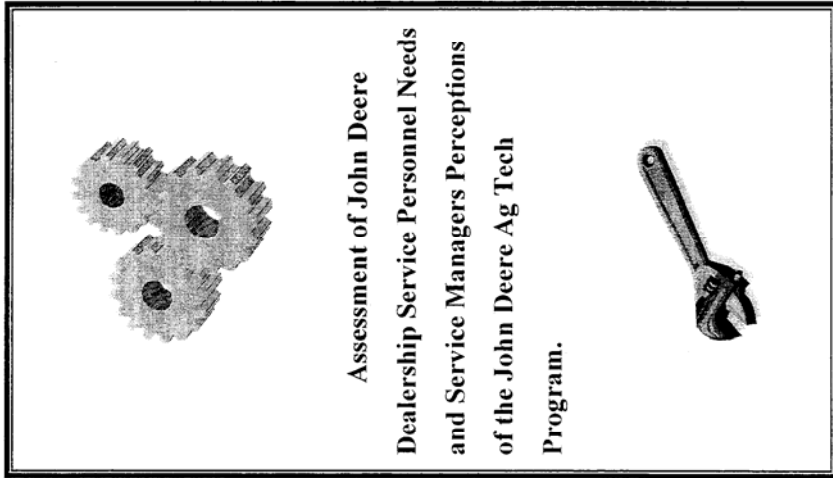
Questionnaire

questionnaire 1.29 10/4/2005 4:07:10 PM 11

Code Number: _____

Please return your completed questionnaire in the enclosed envelope to:

Pittsburg State University
Automotive Technology
Tim Dell
1701 S Broadway
Pittsburg, KS 66762



Please answer the following questions based upon your perception.

4. If you could hire technicians today, in which of the three areas listed below would you have the most need? Please rank the top three by placing a "1" in your first choice, "2" in your second choice, and "3" in your third choice.

- ___ air conditioning systems
- ___ AMS/GPS
- ___ combine harvesting equipment
- ___ electricity & electronics
- ___ engines & fuel systems
- ___ hay & forage equipment
- ___ hydraulics
- ___ lawn and outdoor power equipment
- ___ planting & seeding equipment
- ___ Service Advisor
- ___ tillage equipment
- ___ tractors

Check here if your service department has no specific area(s) of need
Or, list a different area if needed: _____

5. Considering your service department's expertise, what are your three major areas of technical strength? Please rank the top three by placing a "1" in your first choice, "2" in your second choice, and "3" in your third choice.

- ___ air conditioning systems
- ___ AMS/GPS
- ___ combine harvesting equipment
- ___ electricity & electronics
- ___ engines & fuel systems
- ___ hay & forage equipment
- ___ hydraulics
- ___ lawn and outdoor power equipment
- ___ planting & seeding equipment
- ___ Service Advisor
- ___ tillage equipment
- ___ tractors

The following questionnaire will enable us to determine the future needs of John Deere dealership service departments and the steps dealerships are currently using to meet their current service personnel needs. In addition, the questionnaire is designed to determine service manager perceptions of the John Deere Ag Tech program. You can assist us by responding to each of the four parts of the questionnaire.

The questionnaire is strictly voluntary, and should take approximately 8 to 13 minutes to complete. Questions that make you uncomfortable may be skipped. The questionnaire is confidential and has been approved by the Kansas State University Institutional Review Board. The Institutional Review Board mandates that respondents' anonymity must be maintained. Once the researcher receives the questionnaire (completed or uncompleted), the researcher will destroy all documents that could be used to link their responses to their identity.

Please answer the questions for the location where you are managing the service department. If you are responsible for more than one store please answer for the store location that received this questionnaire.

Part 1 - John Deere Dealership Service Personnel Needs Assessment

Please answer the following questions by listing the appropriate number.

1. How many technicians did you hire over the last 12 months? _____
2. How many technicians do you expect to hire in the next 12 months? _____
3. How many technicians do you need to hire over the next 3 years? _____

Part 2 - Methods for Finding Service Personnel

Please provide answers to the following questions.

6. Over the past three years, what methods have you used to locate persons to work in your service department? Check all that apply.

- asked customers
placed advertisement in newspaper, magazine or journal
posted position at job employment agency
posted job on internet website
contacted a high school
contacted a technical school
contacted a college
contacted an organization (FFA, 4-H, Skills USA, etc.)
contacted an agriculture dealer
contacted other types of dealers, like automotive or construction
asked friends, relatives and neighbors
hired a walk-in candidate right off the street
I have not hired any service personnel in the past three years
Other

7. Considering the methods listed below, choose the three methods that you believe are the most effective for locating persons to work in your service department. Please rank the top three by placing a "1" in your first choice, "2" in your second choice, and "3" in your third choice.

- asked customers
placed advertisement in newspaper, magazine or journal
posted position at job employment agency
posted job on internet website
contacted a high school
contacted a technical school
contacted a college
contacted an organization (FFA, 4-H, Skills USA, etc.)
contacted an agriculture dealer
contacted other types of dealers, like automotive or construction
asked friends, relatives and neighbors
hired a walk-in candidate right off the street
check here if your service dept has not hired any service personnel in the past three years
Other

8. Have you hired any technicians in the past 3 years? Check one box and follow the arrow for the next step.

Yes No (skip to #18)

9. Have you hired any technicians in the past 3 years from a JD Ag Tech school?

Yes No (skip to #12)

10. For the past 3 years, please: (1) List the name the names of the JD Ag Tech schools where you have hired technicians; (2) Choose how satisfied you are in general with students coming from the schools; and, (3) list the number of technicians you have hired from the schools.

Table with columns: example, Not Satisfied, Moderately Satisfied, Very Satisfied, number of technicians hired. Row 1: Garden City Community College, 1, 2, 3, 4.

11. Considering the JD Ag Tech students you have hired as listed above, how many still remain employed at your dealership?

12. Have you hired any technicians, in the past 3 years, from schools other than JD Ag Tech schools?

Yes No (skip to #14)

13. Among the technicians you have hired in the past 3 years, please: (1) List the name the names of the non-JD Ag Tech schools (high school or college) where you have hired technicians; (2) Choose how satisfied you are in general with students coming from the schools; and, (3) list the number of technicians you have hired from the schools.

Table with columns: example, Not Satisfied, Moderately Satisfied, Very Satisfied, number of technicians hired. Row 1: South West Kansas Technical School, 1, 2, 3, 4.

Please answer the following questions.

14. Considering the technician(s) your dealership has hired over the past 3 years, please list how many came from locations other than technical schools and colleges:
- _____ number of technicians hired from other John Deere (Agriculture/Commercial & Consumer / Construction & Forestry) dealers
 - _____ number of technicians hired from agricultural dealerships other than John Deere
 - _____ number of technicians hired out of the military
 - _____ number of technicians hired straight out of high school
 - _____ number of technicians hired from an automotive dealership
 - _____ number of technicians hired from a semi-truck dealership
 - _____ number of service personnel hired from a construction equipment dealership

List other areas from where you hired service personnel _____

15. Considering the technicians your store has hired over the last 3 years, list the highest educational level they achieved prior to working at your dealership. For example: if you have hired three technicians straight out of high school then list 3 in the blank beside "high school diploma, but no technical education."

- _____ no high school diploma, and no GED
- _____ has a GED, but did not graduate from a high school
- _____ high school diploma, but no technical education
- _____ high school technical school
- _____ technical college, but no certificate/diploma
- _____ technical college certificate/diploma
- _____ technical college associate's degree
- _____ non-technical college
- _____ technical four-year bachelor's degree,
- _____ non-technical four-year bachelor's degree
- _____ more than a four-year bachelor's degree

16. How much time should students spend in high school and/or post-secondary school (college) prior to starting full-time employment as a technician? Please rank the top three by placing a "1" in your first choice, "2" in your second choice, and "3" in your third choice.

- _____ less than high school
- _____ high school graduate
- _____ 1 to 6 months post secondary (college)
- _____ 7 to 12 months post secondary (college)
- _____ 13 to 18 months post secondary (college)
- _____ 19 to 24 months post secondary (college)
- _____ 25 to 30 months post secondary (college)
- _____ 31 to 36 months post secondary (college)
- _____ 4-year bachelor's degree,
- _____ more than a bachelor's degree

17. What level of education would you prefer students to complete prior to starting full-time employment as a technician? Please rank the top three by placing a "1" in your first choice, "2" in your second choice, and "3" in your third choice.

- _____ no high school diploma
- _____ GED, but did not graduate high school
- _____ high school diploma, but no technical education
- _____ high school technical school
- _____ post secondary/college, but no diploma or certificate
- _____ post secondary/college, with a diploma or certificate
- _____ post secondary/college, with an associate's degree
- _____ post secondary/college, with a bachelor's degree

Part 3 – Perceptions of the John Deere Ag Tech Program

18. How would you rate your knowledge of the John Deere Ag Tech program?

Check one box.

- knowledgeable
- some what knowledgeable
- not knowledgeable

19. To what extent do you agree/disagree with the following statements? Circle your response.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
	1	2	3	4	5
a. I believe there is a financial benefit to the dealership for hiring JD Ag Tech graduates.	1	2	3	4	5
b. I believe the locations of the 16 JD Ag Tech schools enable our dealership to hire JD Ag Tech technicians.	1	2	3	4	5
c. I believe JD Ag Tech schools do a better job of educating students than other technical schools.	1	2	3	4	5
d. I would rather hire a JD Ag Tech student than other technical school students.	1	2	3	4	5
e. The appropriated funding used to support the John Deere Ag Tech program should continue to be used to support the John Deere Ag Tech program.	1	2	3	4	5
f. John Deere should continue to rely upon community colleges for facilitating the John Deere Ag Tech program.	1	2	3	4	5

20. Have you sponsored a JD Ag Tech student in the past 10 years? Check one box and follow the arrow for the next step.

Yes
 No → (skip to #27)

21. Please provide your perceptions of the John Deere Ag Tech program. Circle your response.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
	1	2	3	4	5
a. JD Ag Tech programs provide quality technical education.....	1	2	3	4	5
b. JD Ag Tech instructors are effective teachers.....	1	2	3	4	5
c. JD Ag Tech schools do a good job of following-up with dealerships to see how students perform.....	1	2	3	4	5

d. I believe the content taught in JD Ag Tech schools is the correct content.....	1	2	3	4	5
e. JD Ag Tech school laboratory experiences are effective.....	1	2	3	4	5

Please provide your perceptions regarding the contributions each of the four partners bring to the JD Ag Tech partnership. Circle your response.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
	1	2	3	4	5
22. JD dealers contribute more than their share to the JD Ag Tech partnership by providing JD Ag Tech students:					
a. internship opportunities.....	1	2	3	4	5
b. work experience.....	1	2	3	4	5
c. wages while learning on the job.....	1	2	3	4	5
d. uniforms for working & school.....	1	2	3	4	5
e. the potential for a career.....	1	2	3	4	5

Please continue to provide your perceptions regarding the contributions each of the four partners bring to the JD Ag Tech partnership. Circle your response.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
	1	2	3	4	5
23. JD Ag Tech colleges contribute more than their share to the JD Ag Tech partnership by:					
a. employing faculty.....	1	2	3	4	5
b. maintaining facilities.....	1	2	3	4	5
c. maintaining equipment/tools.....	1	2	3	4	5
d. developing curriculum.....	1	2	3	4	5
e. educating the students.....	1	2	3	4	5

24. Deere and Company contributes more than their share to the JD Ag Tech partnership by providing:

a. schools with agricultural machinery...1	2	3	4	5
b. special service tools.....1	2	3	4	5
c. training aids.....1	2	3	4	5
d. scholarships.....1	2	3	4	5
e. assistance in student recruitment.....1	2	3	4	5
f. instructor professional development...1	2	3	4	5
g. program promotion.....1	2	3	4	5

25. JD Ag students contribute more than their share to the JD Ag Tech partnership by adding value to the dealership through:

a. studying hard in school.....1	2	3	4	5
b. the work they perform in the service department.....1	2	3	4	5
c. remaining loyal to the dealership that invested in them.....1	2	3	4	5

Please provide your perception regarding the internship. Circle your response.

Strongly Disagree 1 Disagree 2 Undecided 3 Agree 4 Strongly Agree 5

26. The dealership internship experience that is coordinated between the JD Ag Tech schools and the dealership has worked well for us. 1 2 3 4 5

Part 4 -Demographic Information

For the following questions please provide the appropriate number in the blank.

27. What is the approximate distance (one-way) to the closest John Deere Ag Tech College from your dealership (in miles)?

28. What is the number of full-time technicians employed at your dealership?

29. How many John Deere Agricultural equipment stores does your dealership own?

30. Considering the dealership's proximity to a metropolitan area, what is the population of the largest city within 25 miles of your dealership? Check one box.

- city of 9,999 or less people
city of 10,000 to 19,999 people
city of 20,000 to 29,999 people
city of 30,000 to 39,999 people
city of 40,000 to 49,999 people
city of 50,000 to 99,999 people
city of 100,000 or more people

31. What is the shop service labor rate that your customers pay per hour? Check one box.

- \$50 or less per hour
\$51 to \$55 per hour
\$56 to \$60 per hour
\$61 to \$65 per hour
\$66 to \$70 per hour
\$71 to \$75 per hour
\$76 to \$80 per hour
\$81 or more per hour

32. What is the pay range for your beginning technicians who have not attended a technical school? Check one box.

- \$6 or less per hour
\$7 to \$9.99 per hour
\$10 to \$12.99 per hour
\$13 to \$15.99 per hour
\$16 to \$18.99 per hour
\$19 or more per hour

33. What is the pay range for your beginning technicians who have graduated from a technical school? Check one box.

- \$6 or less per hour
\$7 to \$9.99 per hour
\$10 to \$12.99 per hour
\$13 to \$15.99 per hour
\$16 to \$18.99 per hour
\$19 or more per hour

34. If you could hire a perfect technician today, how much would you be willing to pay that technician per hour? List the wage in dollars per hour

35. What is your gender? Check one box
female
male

36. What is your age (years)? List the number

37. Would you pay a JD Ag Tech graduate more than a graduate from a general diesel technical school? Check one box and follow arrow as needed.

- Yes -> How much more per hour?
No

Feel free to provide any comments you would like to share.

Blank lines for providing comments.

I appreciate you taking the time to complete this questionnaire. Thank you very much!

Sincerely,
Tim Dell
Graduate Student
Kansas State University,
College of Education

Appendix C – Pilot Study Documents

“Questionnaire Cover Letter” used in the Pilot Study

*Pittsburg State University
Letterhead*

November 10th, 2005

(service mgr name)
(dealership name)
(street address)
(City, ST, ZIP)

Per our phone conversation, please find the enclosed questionnaire and return envelope. We greatly appreciate you help!

Ken Buell at John Deere recommended contacting you for this important phase of the study. A pilot group of twenty John Deere agricultural service managers, including yourself, are being asked to complete this questionnaire. This questionnaire was produced and revised using the assistance of John Deere company personnel, a research committee at Kansas State University, and two different groups of John Deere agriculture service managers.

Obtaining your input is the only way we can receive representative information concerning the needs for technicians within John Deere dealerships and the true opinions of the John Deere dealership service managers.

The information received from this pilot group will be used to make improvements to the questionnaire. The questionnaire will be revised one last time before it is sent to a randomly selected group of 306 John Deere agricultural service managers located throughout the continental U.S.

The results of this study will allow community colleges and John Deere to assess the need for technicians and the opinions of the John Deere Ag Tech program. The results of the study will enable community colleges and John Deere to make more informed decisions regarding the education of technicians.

A small token has been enclosed as a way of saying we appreciate your expertise and hope you will assist us by providing us your first hand experience of your dealership.

Your answers are completely confidential. Although the survey is voluntary, your input will greatly assist us in gaining an accurate representation of John Deere dealership needs and John Deere service manager opinions.

Please complete the questionnaire and please write in comments throughout the questionnaire to assist us in improving the questionnaire as well. Your input is extremely important and much appreciated. We also included phone numbers at the bottom if you would like to visit by phone.

Sincerely,

Tim Dell
PhD Student, Kansas State University
Instructor, Pittsburg State University
620-235-4182

Dr. Steven R. Harbstreit
Agriculture Education
Kansas State University
785-532-5928

Tom Hughes
Mgr of College Partnerships
John Deere Corporation
913-310-8232

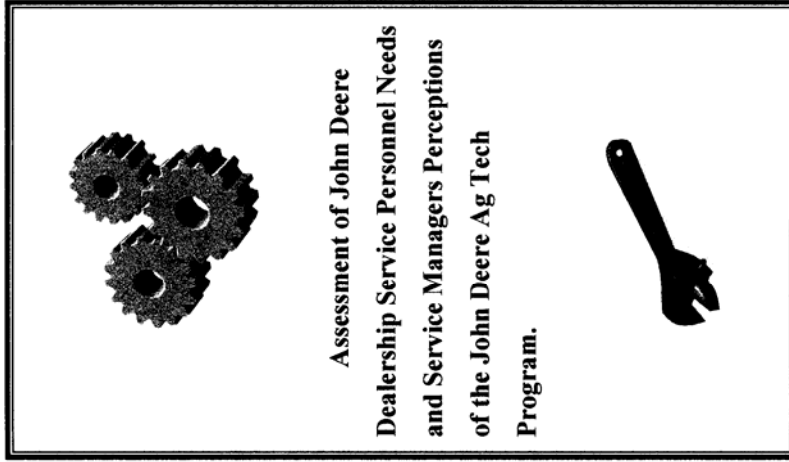
Appendix C – Pilot Study Documents

Pilot Study Questionnaire

11

Pilot Study Questionnaire

Code Number: _____



Please return your completed questionnaire in the enclosed envelope to:

Tim Dell
Automotive Technology
Pittsburg State University
1701 S Broadway
Pittsburg, KS 66762

The following questionnaire will enable us to determine the future needs of John Deere dealership service departments and the steps dealerships are currently using to meet their current service personnel needs. In addition, the questionnaire is designed to determine service manager perceptions of the John Deere Ag Tech program. You can assist us by responding to each of the four parts of the questionnaire.

The questionnaire is strictly voluntary, and should take approximately 11 to 16 minutes to complete. Questions that make you uncomfortable may be skipped. The questionnaire is confidential and has been approved by the Kansas State University Institutional Review Board. The Institutional Review Board mandates that respondents' anonymity must be maintained. Once the researcher receives the questionnaire (completed or uncompleted), the researcher will destroy all documents that could be used to link their responses to their identity.

Please answer the questions for the location where you are managing the service department. If you are responsible for more than one store please answer for the store location that received this questionnaire.

Part 1 - John Deere Dealership Service Personnel Needs Assessment

Please answer the following questions by listing the appropriate number.

1. How many technicians did you hire over the last 12 months? _____
2. How many technicians do you expect to hire in the next 12 months? _____
3. How many technicians do you need to hire over the next 3 years? _____

Please answer the following questions based upon your perception.

4. If you could hire technicians today, in which of the three areas listed below would you have the most need? We want to assess your biggest "NEEDs" not "wants". Please rank your top three areas of NEED by placing a "1" in your first choice, "2" in your second choice, and "3" in your third choice.
 - ___ air conditioning systems
 - ___ AMS/GPS
 - ___ basic technician (electrical, hydraulics, & Service Advisor)
 - ___ combine harvesting equipment
 - ___ engines & fuel systems
 - ___ field service
 - ___ hay & forage equipment
 - ___ lawn and outdoor power equipment
 - ___ planting & seeding equipment
 - ___ tillage equipment
 - ___ tractors
 - ___ Check here if your service department has no specific area(s) of need

Or, list a different area if needed: _____

5. Considering your service department's expertise, what are your three major areas of technical strength? Please rank the top three by placing a "1" in your first choice, "2" in your second choice, and "3" in your third choice.

- ___ air conditioning systems
- ___ AMS/GPS
- ___ basic technician (electrical, hydraulics, & Service Advisor)
- ___ combine harvesting equipment
- ___ engines & fuel systems
- ___ field service
- ___ hay & forage equipment
- ___ lawn and outdoor power equipment
- ___ planting & seeding equipment
- ___ tillage equipment
- ___ tractors

Part 2 - Methods for Finding Service Personnel

Please provide answers to the following questions.

6. Over the past three years, what methods have you used to locate persons to work in your service department? Check all that apply.

- asked current employees
 - asked customers
 - asked friends, relatives and neighbors
 - asked John Deere company personnel
 - placed advertisement in newspaper, magazine or journal
 - posted position at job employment agency
 - posted job on internet website
 - contacted a high school
 - contacted a technical school
 - contacted a college
 - contacted an organization (FFA, 4-H, Skills USA, etc.)
 - contacted an agriculture dealer
 - contacted other types of dealers, like automotive or construction
 - hired a walk-in candidate right off the street
 - I have not hired any service personnel in the past three years
- Other _____

7. Considering the methods listed below, choose the three methods that you believe are the most effective for locating persons to work in your service department. Please rank the top three by placing a "1" in your first choice, "2" in your second choice, and "3" in your third choice.

- _____ asked current employees
 - _____ asked friends, relatives and neighbors
 - _____ asked John Deere company personnel
 - _____ placed advertisement in newspaper, magazine or journal
 - _____ posted position at job employment agency
 - _____ posted job on internet website
 - _____ contacted a high school
 - _____ contacted a technical school
 - _____ contacted a college
 - _____ contacted an organization (FFA, 4-H, Skills USA, etc.)
 - _____ contacted an agriculture dealer
 - _____ contacted other types of dealers, like automotive or construction
 - _____ hired a walk-in candidate right off the street
 - _____ check here if your service dept has not hired any service personnel in the past three years
- Other: _____

8. Have you hired any technicians in the past 3 years? Check one box and follow the arrow for the next step.

- Yes →
- No → (skip to #18)

9. Have you hired any technicians in the past 3 years from a JD Ag Tech school?

- Yes →
- No → (skip to #12)

10. For the past 3 years, please: (1) List the names of the JD Ag Tech schools where you have hired technicians; (2) Choose how satisfied you are in general with students coming from the JD Ag Tech schools; and, (3) list the number of technicians you have hired from the JD Ag Tech schools.

example	Not Satisfied ▼	Moderately Satisfied ▼	Satisfied ▼	Very Satisfied ▼	number of technicians hired
Garden City Community College	1	2	3	4	_____
_____	1	2	3	4	_____
_____	1	2	3	4	_____
_____	1	2	3	4	_____

11. Considering the JD Ag Tech students you have hired as listed above, how many still remain employed at your dealership? _____

12. Have you hired any technicians, in the past 3 years, from technical schools other than JD Ag Tech schools?

- Yes →
- No → (skip to #14)

13. Among the technicians you have hired in the past 3 years, please: (1) List the names of the non-JD Ag Tech schools (high school or college) where you have hired technicians; (2) Choose how satisfied you are in general with students coming from the non-JD Ag Tech schools; and, (3) list the number of technicians you have hired from the non-JD Ag Tech schools.

example	Not Satisfied ▼	Moderately Satisfied ▼	Satisfied ▼	Very Satisfied ▼	number of technicians hired
South West Kansas Technical School	1	2	3	4	_____
_____	1	2	3	4	_____
_____	1	2	3	4	_____
_____	1	2	3	4	_____

Please answer the following questions.

14. Considering the technician(s) your dealership has hired over the past 3 years, please list how many came from locations other than technical schools and colleges:
- _____ number of technicians hired from other John Deere (Agriculture/Commercial & Consumer / Construction & Forestry) dealers
 - _____ number of technicians hired from agricultural dealerships other than John Deere
 - _____ number of technicians hired out of the military
 - _____ number of technicians hired straight out of high school
 - _____ number of technicians hired from an automotive dealership
 - _____ number of technicians hired from a semi-truck dealership
 - _____ number of service personnel hired from a construction equipment dealership
 - _____ List other areas from where you hired service personnel _____

15. Considering the technicians your store has hired over the last 3 years, list the highest educational level they achieved prior to working at your dealership. For example: if you have hired three technicians straight out of high school then list 3 in the blank beside "high school diploma, but no technical education."
- _____ no high school diploma, and no GED
 - _____ has a GED, but did not graduate from a high school
 - _____ high school diploma, but no technical education
 - _____ high school diploma with technical school
 - _____ technical college, but no certificate/diploma
 - _____ technical college certificate/diploma
 - _____ technical college associate's degree
 - _____ non-technical college
 - _____ technical four-year bachelor's degree
 - _____ non-technical four-year bachelor's degree
 - _____ more than a four-year bachelor's degree

16. How much time should students spend in high school and/or post-secondary school (college) prior to starting full-time employment as a technician? Please rank the top three by placing a "1" in your first choice, "2" in your second choice, and "3" in your third choice.
- _____ less than high school
 - _____ high school graduate
 - _____ 1 to 6 months post secondary (college)
 - _____ 7 to 12 months post secondary (college)
 - _____ 13 to 18 months post secondary (college)
 - _____ 19 to 24 months post secondary (college)
 - _____ 25 to 30 months post secondary (college)
 - _____ 31 to 36 months post secondary (college)
 - _____ 4-year bachelor's degree
 - _____ more than a bachelor's degree

17. What level of education would you prefer students to complete prior to starting full-time employment as a technician? Please rank the top three by placing a "1" in your first choice, "2" in your second choice, and "3" in your third choice.
- _____ no high school diploma
 - _____ GED, but did not graduate high school
 - _____ high school diploma, but no technical education
 - _____ high school technical school
 - _____ post secondary/college, but no diploma or certificate
 - _____ post secondary/college, with a diploma or certificate
 - _____ post secondary/college, with an associate's degree
 - _____ post secondary/college, with a bachelor's degree

Part 3 – Perceptions of the John Deere Ag Tech Program

18. How would you rate your knowledge of the John Deere Ag Tech program?

Check one box.

- knowledgeable
- some what knowledgeable
- not knowledgeable

19. Questions 19a-19f make up the foundation of this study and are the most important questions of the questionnaire. Please indicate to what extent you agree/disagree with the following statements? Circle your response.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
	1	2	3	4	5
a. I believe there is a financial benefit to the dealership for hiring JD Ag Tech graduates	1	2	3	4	5
b. I believe the locations of the 16 JD Ag Tech schools enable our dealership to hire JD Ag Tech technicians	1	2	3	4	5
c. I believe JD Ag Tech schools do a better job of educating students than other technical schools	1	2	3	4	5
d. I would rather hire a JD Ag Tech student than other technical school students	1	2	3	4	5
e. John Deere should continue funding the JD Ag Tech program	1	2	3	4	5
f. John Deere should continue to rely upon community colleges for facilitating the John Deere Ag Tech program	1	2	3	4	5

Have you sponsored a JD Ag Tech student in the past 10 years? Check one box and follow the arrow for the next step.

- Yes
- No → (skip to #27)

20. Please provide your perceptions of the John Deere Ag Tech program. Circle your response.

- | | Strongly Disagree | Disagree | Undecided | Agree | Strongly Agree |
|---|-------------------|----------|-----------|-------|----------------|
| | 1 | 2 | 3 | 4 | 5 |
| a. JD Ag Tech schools provide quality technical education..... | 1 | 2 | 3 | 4 | 5 |
| b. JD Ag Tech instructors are effective teachers..... | 1 | 2 | 3 | 4 | 5 |
| c. JD Ag Tech schools do a good job of following-up with dealerships to see how students perform..... | 1 | 2 | 3 | 4 | 5 |
| d. I believe the content taught in JD Ag Tech schools is the correct content..... | 1 | 2 | 3 | 4 | 5 |
| e. JD Ag Tech school laboratory experiences are effective..... | 1 | 2 | 3 | 4 | 5 |

The JD Ag Tech program consists of 4 partners: Dealers, Colleges, John Deere Corporation, and Students. Please provide your perceptions regarding the contributions each of the four partners bring to the JD Ag Tech partnership. Circle your response.

- | | Strongly Disagree | Disagree | Undecided | Agree | Strongly Agree |
|---|-------------------|----------|-----------|-------|----------------|
| | 1 | 2 | 3 | 4 | 5 |
| 22. JD dealers contribute more than their share to the JD Ag Tech partnership by providing JD Ag Tech students: | | | | | |
| a. internship opportunities..... | 1 | 2 | 3 | 4 | 5 |
| b. work experience..... | 1 | 2 | 3 | 4 | 5 |
| c. wages while learning on the job..... | 1 | 2 | 3 | 4 | 5 |
| d. uniforms for working & school..... | 1 | 2 | 3 | 4 | 5 |
| e. the potential for a career..... | 1 | 2 | 3 | 4 | 5 |

Please continue to provide your perceptions regarding the contributions each of the four partners bring to the JD Ag Tech partnership. Circle your response.

- | | Strongly Disagree | Disagree | Undecided | Agree | Strongly Agree |
|--|-------------------|----------|-----------|-------|----------------|
| | 1 | 2 | 3 | 4 | 5 |

23. JD Ag Tech schools contribute more than their share to the JD Ag Tech partnership by:

- | | | | | | |
|---------------------------------------|---|---|---|---|---|
| a. employing faculty..... | 1 | 2 | 3 | 4 | 5 |
| b. maintaining facilities..... | 1 | 2 | 3 | 4 | 5 |
| c. maintaining equipment/tools..... | 1 | 2 | 3 | 4 | 5 |
| d. developing curriculum..... | 1 | 2 | 3 | 4 | 5 |
| e. educating the students..... | 1 | 2 | 3 | 4 | 5 |
| f. communicating with JD dealers..... | 1 | 2 | 3 | 4 | 5 |

24. Deere and Company contributes more than their share to the JD Ag Tech partnership, by providing:

- | | | | | |
|--|---|---|---|---|
| a. schools with agricultural machinery...1 | 2 | 3 | 4 | 5 |
| b. special service tools.....1 | 2 | 3 | 4 | 5 |
| c. training aids.....1 | 2 | 3 | 4 | 5 |
| d. scholarships.....1 | 2 | 3 | 4 | 5 |
| e. assistance in student recruitment....1 | 2 | 3 | 4 | 5 |
| f. instructor professional development...1 | 2 | 3 | 4 | 5 |
| g. program promotion.....1 | 2 | 3 | 4 | 5 |

25. JD Ag Tech students contribute more than their share to the JD Ag Tech partnership by adding value to the dealership through:

- | | | | | |
|--|---|---|---|---|
| a. studying hard in school.....1 | 2 | 3 | 4 | 5 |
| b. the work they perform in the service department.....1 | 2 | 3 | 4 | 5 |
| c. remaining loyal to the dealership that invested in them.....1 | 2 | 3 | 4 | 5 |
| d. respecting the customer.....1 | 2 | 3 | 4 | 5 |
| e. communicating clearly with customers.....1 | 2 | 3 | 4 | 5 |

Please provide your perception regarding the internship. Circle your response.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5
▼	▼	▼	▼	▼

26. The dealership internship experience that is coordinated between the JD Ag Tech schools and the dealership has worked well for us..... 1 2 3 4 5

Part 4 -Demographic Information

For the following questions please provide the appropriate number in the blank.

27. What is the approximate distance (one-way) to the closest John Deere Ag Tech school from your dealership (in miles)? _____
28. What is the number of full-time technicians employed at your dealership? _____
29. How many John Deere Agricultural equipment stores does your dealership own? _____
30. Considering the dealership's proximity to a metropolitan area, what is the population of the largest city within 25 miles of your dealership?
Check one box.
- city of 9,999 or less people
 - city of 10,000 to 19,999 people
 - city of 20,000 to 29,999 people
 - city of 30,000 to 39,999 people
 - city of 40,000 to 49,999 people
 - city of 50,000 to 99,999 people
 - city of 100,000 or more people

31. What is the shop service labor rate that your customers pay per hour?
Check one box.
- \$50 or less per hour
 - \$51 to \$55 per hour
 - \$56 to \$60 per hour
 - \$61 to \$65 per hour
 - \$66 to \$70 per hour
 - \$71 to \$75 per hour
 - \$76 to \$80 per hour
 - \$81 or more per hour

32. What is the pay range for your beginning technicians who HAVE NOT attended a technical school? Check one box.

- \$6 or less per hour
- \$7 to \$9.99 per hour
- \$10 to \$12.99 per hour
- \$13 to \$15.99 per hour
- \$16 to \$18.99 per hour
- \$19 or more per hour
- Or, check here if you would not hire an untrained technician

33. What is the pay range for your beginning technicians who HAVE graduated from a technical school? Check one box.

- \$6 or less per hour
- \$7 to \$9.99 per hour
- \$10 to \$12.99 per hour
- \$13 to \$15.99 per hour
- \$16 to \$18.99 per hour
- \$19 or more per hour

34. If you could hire a perfect technician today, how much would you be willing to pay that technician per hour? List the wage in dollars per hour _____

35. What is your gender? Check one box

- female
- male

36. What is your age (years)? List the number _____

37. Would you pay a JD Ag Tech graduate more than a graduate from a general diesel technical school? Check one box and follow arrow as needed.

- Yes → How much more per hour _____?
- No
- Undecided

Feel free to provide any comments you would like to share _____

I appreciate you taking the time to complete this questionnaire. Thank you very much!

Sincerely,
 Tim Dell
 PhD Student, Kansas State University
 Instructor, Pittsburg State University

Appendix D – Mass Sample Documents

Pre-Notice Letter

*Pittsburg State University
Letter Head*

January 03, 2006

*Service Manager Name
Dealership Name
Street address or PO Box
City, ST ZIP*

Dear (*service manager name*):

In a couple of days you will receive a request to complete a questionnaire for a study that is being conducted for John Deere through Kansas State University and Pittsburg State University.

The study will assist community colleges and John Deere in understanding the current needs for service personnel in John Deere dealerships and service managers' opinions of the John Deere Ag Tech program.

We are contacting you in advance, because many people like to be notified ahead of time that they will be asked to participate in this study.

Thank you for consideration in this important study.

Sincerely,

Tim Dell
PhD Student, Kansas State University
Instructor, Pittsburg State University

Dr. Steven R. Harbstreet
Agriculture Education
Kansas State University

Tom Hughes
Mgr of College Partnerships
John Deere Corporation

P.S. We will be enclosing a small token of appreciation with the questionnaire as a way of saying thanks.

Appendix D – Mass Sample Documents continued

Questionnaire Cover Letter

*Pittsburg State University
Letter Head*

January 6, 2006

*Service Manager Name
Dealership Name
Street address or PO Box
City, State Zip, code*

Dear (*service manager name*):

We would kindly like to ask you to take a few moments in assisting us in an important study.

Obtaining your input is the only way this study can receive representative information concerning the needs for technicians within John Deere dealerships and the true opinions of the John Deere dealership service managers.

You have been randomly selected from a list of John Deere Agricultural dealerships located throughout the continental U.S. We have received word that you are the service manager responsible for this John Deere dealership.

The results of this study will allow community colleges and John Deere to determine if dealerships need technicians and the opinions of the John Deere Ag Tech program. The results of the study will enable community colleges and John Deere to make more informed decisions regarding the education of technicians.

A small token has been enclosed as a way of saying we appreciate your expertise and hope you will assist us by providing us your first hand experience of your dealership.

Your answers are completely confidential. After receiving your completed survey your name will be removed from the mailing list and never connected to your answers.

Although the survey is voluntary, your input will greatly assist us in gaining an accurate representation of John Deere dealership needs and John Deere service manager opinions.

If you have any questions or concerns about this study, we would be happy to talk with you. The phone numbers are listed at the bottom.

Sincerely,

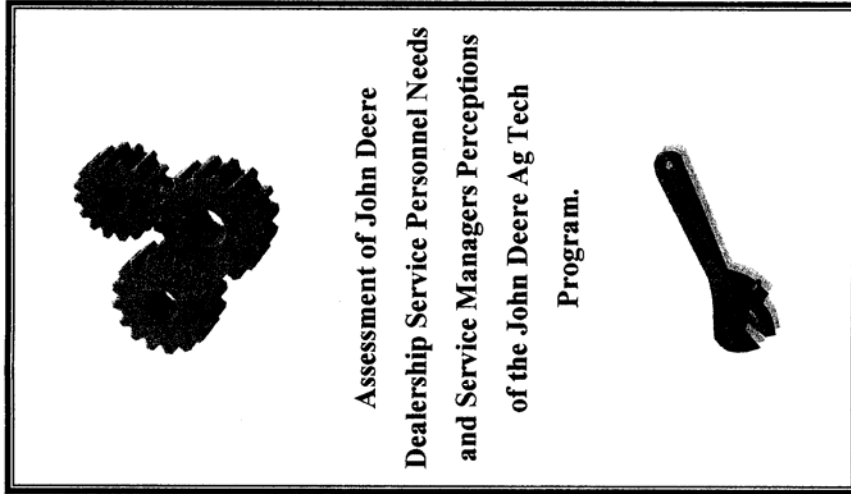
Tim Dell
PhD Student, Kansas State University
Instructor, Pittsburg State University
620-235-4182

Dr. Steven R. Harbstreet
Agriculture Education
Kansas State University
785-532-5928

Tom Hughes
Mgr of College Partnerships
John Deere Corporation
913-310-8232

Appendix D – Mass Sample Documents continued

Questionnaire



11

Stratified Sample Questionnaire

Code Number: _____

Please return your completed questionnaire in the enclosed envelope to:

**Tim Dell
Automotive Technology
Pittsburg State University
1701 S Broadway
Pittsburg, KS 66762**

The following questionnaire will enable us to determine the future needs of John Deere dealership service departments, and the steps dealerships are currently using to meet their current service personnel needs. In addition, the questionnaire is designed to determine service manager perceptions of the John Deere Ag Tech program. You can assist us by responding to each of the four parts of the questionnaire.

The questionnaire is strictly voluntary, and should take approximately 11 to 16 minutes to complete. Questions that make you uncomfortable may be skipped. The questionnaire is confidential and has been approved by the Kansas State University Institutional Review Board. The Institutional Review Board mandates that respondents' anonymity must be maintained. Once the researcher receives the questionnaire (completed or uncompleted), the researcher will destroy all documents that could be used to link their responses to their identity.

Please answer the questions for the location where you are managing the service department. If you are responsible for more than one store please answer for the store location that received this questionnaire.

Part 1 - John Deere Dealership Service Personnel Needs Assessment

Please answer the following questions by listing the appropriate number.

1. How many technicians did you hire over the last 12 months? _____
2. How many technicians do you expect to hire in the next 12 months? _____
3. How many technicians do you need to hire over the next 3 years? _____

Please answer the following questions based upon your perception.

4. If you could hire technicians today, in which of the three areas listed below would you have the most need? We want to assess your biggest "NEEDs" not "wants". Please rank your top three areas of NEED by placing a "1" in your first choice, "2" in your second choice, and "3" in your third choice.
 - ___ air conditioning systems
 - ___ AMS/GPS
 - ___ basic technician (electrical, hydraulics, & Service Advisor)
 - ___ combine harvesting equipment
 - ___ engines & fuel systems
 - ___ field service
 - ___ hay & forage equipment
 - ___ lawn and outdoor power equipment
 - ___ planting & seeding equipment
 - ___ tillage equipment
 - ___ tractors

___ Check here if your service department has no specific area(s) of need
Or, list a different area if needed: _____

5. Considering your service department's expertise, what are your three major areas of technical strength? Please rank the top three by placing a "1" in your first choice, "2" in your second choice, and "3" in your third choice.
 - ___ air conditioning systems
 - ___ AMS/GPS
 - ___ basic technician (electrical, hydraulics, & Service Advisor)
 - ___ combine harvesting equipment
 - ___ engines & fuel systems
 - ___ field service
 - ___ hay & forage equipment
 - ___ lawn and outdoor power equipment
 - ___ planting & seeding equipment
 - ___ tillage equipment
 - ___ tractors

Part 2 - Methods for Finding Service Personnel

Please provide answers to the following questions.

6. Over the past three years, what methods have you used to locate persons to work in your service department? Check all that apply.

- asked current employees
 - asked customers
 - asked friends, relatives and neighbors
 - asked John Deere company personnel
 - placed advertisement in newspaper, magazine or journal
 - posted position at job employment agency
 - posted job on internet website
 - contacted a high school
 - contacted a technical school
 - contacted a college
 - contacted an organization (FFA, 4-H, Skills USA, etc.)
 - contacted an agricultural equipment dealer
 - contacted other types of dealers, like automotive or construction
 - hired a walk-in candidate right off the street
 - I have not hired any service personnel in the past three years
- Other _____

7. Considering the methods listed below, choose the three methods that you believe are the most effective for locating persons to work in your service department. Please rank the top three by placing a "1" in your first choice, "2" in your second choice, and "3" in your third choice.

- _____ asked current employees
 - _____ asked customers
 - _____ asked friends, relatives and neighbors
 - _____ asked John Deere company personnel
 - _____ placed advertisement in newspaper, magazine or journal
 - _____ posted position at job employment agency
 - _____ posted job on internet website
 - _____ contacted a high school
 - _____ contacted a technical school
 - _____ contacted a college
 - _____ contacted an organization (FFA, 4-H, Skills USA, etc.)
 - _____ contacted an agriculture dealer
 - _____ contacted other types of dealers, like automotive or construction
 - _____ hired a walk-in candidate right off the street
 - _____ check here if your service dept has not hired any service personnel in the past three years
- Other: _____

8. Have you hired any technicians in the past 3 years? Check one box and follow the arrow for the next step.

- Yes _____ (skip to #18)
- No _____

9. Have you hired any technicians in the past 3 years from a JD Ag Tech school?

- Yes _____ (skip to #12)
- No _____

10. For the past 3 years, please: (1) List the names of the JD Ag Tech schools where you have hired technicians; (2) Choose how satisfied you are in general with students coming from the JD Ag Tech schools; and, (3) list the number of technicians you have hired from each of the JD Ag Tech schools.

example	Not Satisfied	Moderately Satisfied	Very Satisfied	number of technicians hired
<u>Garden City Community College</u>	1	2	3	2
_____	1	2	3	4
_____	1	2	3	4
_____	1	2	3	4

11. Considering the JD Ag Tech students you have hired as listed above, how many still remain employed at your dealership? _____

12. Have you hired any technicians, in the past 3 years, from technical schools other than JD Ag Tech schools?

- Yes _____ (skip to #14)
- No _____

13. Among the technicians you have hired in the past 3 years, please: (1) List the names of the non-JD Ag Tech schools (high school or college) where you have hired technicians; (2) Choose how satisfied you are in general with students coming from the non-JD Ag Tech schools; and, (3) list the number of technicians you have hired from each of the non-JD Ag Tech schools.

example	Not Satisfied	Moderately Satisfied	Very Satisfied	number of technicians hired
<u>South West Kansas Technical School</u>	1	2	3	2
_____	1	2	3	4
_____	1	2	3	4

Please answer the following questions.

14. Considering the technician(s) your dealership has hired over the past 3 years, please list the number of technicians that came from locations other than technical schools and colleges:
- _____ number of technicians hired from other John Deere (Agriculture/Commercial & Consumer / Construction & Forestry) dealers
 - _____ number of technicians hired from agricultural dealerships other than John Deere
 - _____ number of technicians hired from a farm
 - _____ number of technicians hired out of the military
 - _____ number of technicians hired straight out of high school
 - _____ number of technicians hired from an automotive dealership
 - _____ number of technicians hired from a semi-truck dealership
 - _____ number of service personnel hired from a construction equipment dealership

List other areas from where you hired service personnel _____

15. Considering the technicians your store has hired over the last 3 years, list the highest educational level they achieved prior to working at your dealership. For example: if you have hired three technicians straight out of high school then list 3 in the blank beside "high school diploma, but no technical education."
- _____ no high school diploma, and no GED
 - _____ has a GED, but did not graduate from a high school
 - _____ high school diploma, but no technical education
 - _____ high school diploma with technical school
 - _____ technical college, but no certificate/diploma
 - _____ technical college certificate/diploma
 - _____ technical college associate's degree
 - _____ non-technical college
 - _____ technical four-year bachelor's degree,
 - _____ non-technical four-year bachelor's degree
 - _____ more than a four-year bachelor's degree

16. How much time should students spend in high school and/or post-secondary school (college) prior to starting full-time employment as a technician? Please rank the top three by placing a "1" in your first choice, "2" in your second choice, and "3" in your third choice.
- _____ less than high school
 - _____ high school graduate
 - _____ 1 to 6 months post secondary (college)
 - _____ 7 to 12 months post secondary (college)
 - _____ 13 to 18 months post secondary (college)
 - _____ 19 to 24 months post secondary (college)
 - _____ 25 to 30 months post secondary (college)
 - _____ 31 to 36 months post secondary (college)
 - _____ 4-year bachelor's degree
 - _____ more than a bachelor's degree

17. What level of education would you prefer students to complete prior to starting full-time employment as a technician? Please rank the top three by placing a "1" in your first choice, "2" in your second choice, and "3" in your third choice.
- _____ no high school diploma
 - _____ GED, but did not graduate high school
 - _____ high school diploma, but no technical education
 - _____ high school technical school
 - _____ post secondary/college, but no diploma or certificate
 - _____ post secondary/college, with a diploma or certificate
 - _____ post secondary/college, with an associate's degree
 - _____ post secondary/college, with a bachelor's degree

Part 3 – Perceptions of the John Deere Ag Tech Program

18. How would you rate your knowledge of the John Deere Ag Tech program? Check one box.

- knowledgeable
- some what knowledgeable
- no knowledge

19. Questions 19a-19f make up the foundation of this study and are the most important questions of the questionnaire. Please indicate to what extent you agree/disagree with the following statements? Circle your response.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
	1	2	3	4	5
a. I believe there is a financial benefit to the dealership for hiring JD Ag Tech graduates	1	2	3	4	5
b. I believe the locations of the JD Ag Tech schools enable our dealership to hire JD Ag Tech technicians	1	2	3	4	5
c. I believe JD Ag Tech schools do a better job of educating students than other technical schools	1	2	3	4	5
d. I would rather hire a JD Ag Tech student than other technical school students	1	2	3	4	5
e. John Deere should continue funding the JD Ag Tech program	1	2	3	4	5
f. John Deere should continue to rely upon community colleges for facilitating the JD Ag Tech program	1	2	3	4	5

20. Have you sponsored a JD Ag Tech student in the past 10 years? Check one box and follow the arrow for the next step.

Yes
 No → (skip to #27)

21. Please provide your perceptions of the John Deere Ag Tech program. Circle your response.

- | | Strongly Disagree | Disagree | Undecided | Agree | Strongly Agree |
|--|-------------------|----------|-----------|-------|----------------|
| | 1 | 2 | 3 | 4 | 5 |
| a. JD Ag Tech schools provide quality technical education | 1 | 2 | 3 | 4 | 5 |
| b. JD Ag Tech instructors are effective teachers | 1 | 2 | 3 | 4 | 5 |
| c. JD Ag Tech schools do a good job of following-up with dealerships to see how students perform | 1 | 2 | 3 | 4 | 5 |
| d. I believe the content taught in JD Ag Tech schools is the correct content | 1 | 2 | 3 | 4 | 5 |
| e. JD Ag Tech school laboratory experiences are effective | 1 | 2 | 3 | 4 | 5 |

The JD Ag Tech program consists of 4 partners: Dealers, Colleges, John Deere Corporation, and Students. Please provide your perceptions regarding the contributions each of the four partners bring to the JD Ag Tech partnership. Circle your response. A "1" would mean that you strongly believe the partner does not contribute their share, and a "5" would mean that you strongly believe that the partner does contribute their share to the JD Ag Tech partnership.

- | | Strongly Disagree | Disagree | Undecided | Agree | Strongly Agree |
|---|-------------------|----------|-----------|-------|----------------|
| | 1 | 2 | 3 | 4 | 5 |
| 22. JD dealers contribute their share to the JD Ag Tech partnership by providing JD Ag Tech students: | | | | | |
| a. internship opportunities | 1 | 2 | 3 | 4 | 5 |
| b. work experience | 1 | 2 | 3 | 4 | 5 |
| c. wages while learning on the job | 1 | 2 | 3 | 4 | 5 |
| d. uniforms for working & school | 1 | 2 | 3 | 4 | 5 |
| e. the potential for a career | 1 | 2 | 3 | 4 | 5 |

Please continue to provide your perceptions regarding the contributions each of the four partners bring to the JD Ag Tech partnership. Circle your response.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
	1	2	3	4	5

23. JD Ag Tech schools contribute their share to the JD Ag Tech partnership by:

- | | | | | | |
|----------------------------------|---|---|---|---|---|
| a. employing faculty | 1 | 2 | 3 | 4 | 5 |
| b. maintaining facilities | 1 | 2 | 3 | 4 | 5 |
| c. maintaining equipment/tools | 1 | 2 | 3 | 4 | 5 |
| d. developing curriculum | 1 | 2 | 3 | 4 | 5 |
| e. educating the students | 1 | 2 | 3 | 4 | 5 |
| f. communicating with JD dealers | 1 | 2 | 3 | 4 | 5 |

24. Deere and Company contribute their share to the JD Ag Tech partnership, by providing:

- | | | | | | |
|--|---|---|---|---|---|
| a. schools with agricultural machinery | 1 | 2 | 3 | 4 | 5 |
| b. special service tools | 1 | 2 | 3 | 4 | 5 |
| c. training aids | 1 | 2 | 3 | 4 | 5 |
| d. scholarships | 1 | 2 | 3 | 4 | 5 |
| e. assistance in student recruitment | 1 | 2 | 3 | 4 | 5 |
| f. instructor professional development | 1 | 2 | 3 | 4 | 5 |
| g. program promotion | 1 | 2 | 3 | 4 | 5 |

25. JD Ag Tech students contribute their share to the JD Ag Tech partnership by adding value to the dealership through:

- | | | | | | |
|--|---|---|---|---|---|
| a. studying hard in school | 1 | 2 | 3 | 4 | 5 |
| b. the work they perform in the service department | 1 | 2 | 3 | 4 | 5 |
| c. remaining loyal to the dealership that invested in them | 1 | 2 | 3 | 4 | 5 |
| d. respecting the customer | 1 | 2 | 3 | 4 | 5 |
| e. communicating clearly with customers | 1 | 2 | 3 | 4 | 5 |

Please provide your perception regarding the internship. Circle your response.

Strongly Disagree 1 Disagree 2 Undecided 3 Agree 4 Strongly Agree 5

26. The dealership internship experience that is coordinated between the JD Ag Tech schools and the dealership has worked well for us. 1 2 3 4 5

Part 4 -Demographic Information

For the following questions please provide the appropriate number in the blank.

27. What is the approximate distance (one-way) to the closest John Deere Ag Tech school from your dealership (in miles)? _____

28. What is the number of full-time technicians employed at your dealership? _____

29. How many John Deere Agricultural equipment stores does your dealership own? _____

30. Considering the dealership's proximity to a metropolitan area, what is the population of the largest city within 25 miles of your dealership?
Check one box.

- city of 9,999 or less people
- city of 10,000 to 19,999 people
- city of 20,000 to 29,999 people
- city of 30,000 to 39,999 people
- city of 40,000 to 49,999 people
- city of 50,000 to 99,999 people
- city of 100,000 or more people

31. What is the shop service labor rate that your customers pay per hour?
Check one box.

- \$50 or less per hour
- \$51 to \$55 per hour
- \$56 to \$60 per hour
- \$61 to \$65 per hour
- \$66 to \$70 per hour
- \$71 to \$75 per hour
- \$76 or more per hour

32. What is the pay range for your beginning technicians who HAVE NOT attended a technical school? Check one box.

- \$6.99 or less per hour
- \$7 to \$8.99 per hour
- \$9 to \$10.99 per hour
- \$11 to \$12.99 per hour
- \$13 to \$14.99 per hour
- \$15 or more per hour

Or, check here if you would not hire an untrained technician

33. What is the pay range for your beginning technicians who HAVE graduated from a technical school? Check one box.

- \$6.99 or less per hour
- \$7 to \$8.99 per hour
- \$9 to \$10.99 per hour
- \$11 to \$12.99 per hour
- \$13 to \$14.99 per hour
- \$15 to \$16.99 per hour
- \$17 or more per hour

Or, check here if you would not hire an untrained technician

34. If you could hire a perfect technician today, how much would you be willing to pay that technician per hour? List the wage in dollars per hour _____

35. What is your gender? Check one box

- female
- male

36. What is your age (years)? List the number _____

37. Would you pay a JD Ag Tech graduate more than a graduate from a general diesel technical school? Check one box and follow arrow as needed.

- Yes → How much more per hour _____?
- No
- Undecided

Feel free to provide any comments you would like to share.

I appreciate you taking the time to complete this questionnaire. Thank you very much!

Sincerely,
 Tim Dell
 PhD Student, Kansas State University
 Instructor, Pittsburg State University

Appendix D – Mass Sample Documents continued

Post Card “Thank You / Reminder”

Month, XX, 2006

Dear (service manager name):

A questionnaire was mailed to you two weeks ago asking for your input regarding needs for technicians within John Deere dealerships and opinions of the John Deere Ag Tech program.

If you have already completed and returned the questionnaire to us, thank you very much! We appreciate it! If you have not completed the questionnaire, please complete it today. Only by asking people like you can we understand the needs for technicians in John Deere dealerships and opinions of the John Deere Ag Tech program. We are thankful for your support.

If you did not receive a questionnaire or cannot find the questionnaire, please call us and we will get another one in the mail to you today.

Sincerely,

Tim Dell
PhD Student, Kansas State University
Diesel Instructor, Pittsburg State University
620-235-4182

Dr. Steven R. Harbseit
Agriculture Education
Kansas State University
785-532-5928

Tom Hughes
Mgr of College Partnerships
John Deere Corporation
913-310-8232

Appendix E – Results of Question 13

Table 26

Frequencies of Non-JD Ag Tech Schools that Service Managers Had Used to Hire Technicians over the Last Three Years

Number of entries	School Name
1	Arkansas State University, Searcy, AR
1	Black River Technical College, Paragould, AR
1	University of Arkansas Community College Hope, AR
1	ITT Technical Institute, AZ
1	Merced, Junior College, CA
1	Reedly Community College (Cat), Reedly, CA
1	Denver Automotive and Diesel, Denver, CO
1	Northeastern Junior College, Sterling, CO
1	Trinidad State Junior College, Trinidad, CO
1	Southwest Georgia Technical College, Thomasville, GA
1	Des Moines Area Community College, Des Moines, IA
2	Indian Hills Community College, Ottumwa/Centerville, IA
1	Kirkwood Community College, Cedar Rapids, IA
1	Northwest Iowa Community College, IA
1	Scott Community College, IA
1	Idaho State University Diesel Technology, Pocatello, ID
2	Illinois Central Community College, Peoria, IL
1	Parkland College, Champaign, IL
1	Rend Lake College, Ina, IL
1	Spoon River Colleges, Canton, IL
2	Lincoln Technical, Indianapolis, IN
1	Hutchison Community College, Hutchinson KS
1	Kaw Valley Area Tech, Topeka, KS
3	North Central Kansas Technical, Beloit, KS
1	North East Kansas Technical College, Atchison, KS
2	Northwest Kansas Technical College, Goodland, KS
1	Pratt Community College, KS
1	Kentucky VoTech, KY
2	Northwestern Michigan College, Traverse City, MI
3	Alexandria Tech College, MN
2	Mankato, MN
1	Minnesota State College Southeast Technical, Winona, MN
1	Minnesota West Community and Technical College, Pipestone, MN
1	Riverland Tech, MN
1	Chillicothe Vo-Tech, MO
2	Linn State Technical College, Linn, MO
5	North Dakota State, ND

1	Williston State College, Williston, ND
1	Central Community College Hastings, NE
1	Mid Plains Community College, McCook/North Platte, NE
3	North East Community College, Norfolk, NE
4	Southeast Community College, Milford, NE
1	NH Community College, NH
1	Cornell University, NY
1	Suny Morrisville State College, Morrisville, NY
1	Northwestern, Lima, OH
1	University of Northwestern Ohio, Lima, OH
1	Northeast Technology Center Pryor, OK
1	Southwest Technology Center, Altus OK
1	University of Oregon, Skagit Valley College, OR
1	Cumberland/Perry Area Vocational Technical school, Mechanicsburg, PA
1	Lake Area Technical Institute, Watertown, SD
5	Nashville Auto Diesel College, Nashville, TN
1	South Plains College, Levelland, TX
1	Texas State Technical College, Waco, TX
1	Utah State University, Logan, UT
1	Advance Technical Institute Virginia Beach, VA
1	Chesterfield Tech, Chesterfield, VA
1	Black Hawk Technical College, Janesville, WI
1	Fox Valley Tech, Appleton, WI
1	Southwest Wisconsin Technical College, Fennimore, WI
1	Western Technical College, La Crosse, WI
1	Wisconsin Indianhead Technical College, New Richmond, WI
3	WyoTec, Laramie, WY
1	Cat Tech (Caterpillar Technical College, location unknown)
1	Motorcycle Mechanics Institute, UTI, AZ and or FL
1	(name of High School, not published for anonymity reasons)
1	(student's name, not published for anonymity reasons)
3	(school name not specified)
1	(writing unreadable)
