

5-13-2022

Attitudes and perceptions of college students and recent college graduates towards forestry and wood products science fields

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Attitudes and perceptions of college students and recent college graduates towards forestry and
wood products science fields

By

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A Thesis
Submitted to the Faculty of
Mississippi State University
in Partial Fulfillment of the Requirements
for the Degree of Master of Science
in Sustainable Bioproducts
in the Department of Sustainable Bioproducts

Mississippi State, Mississippi

May 2022

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2022

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Title of Study: Attitudes and perceptions of college students and recent college graduates towards forestry and wood products science fields

Pages in Study: 83

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Over the past few decades, university level US Forestry and Wood Science and Technology programs have faced declining enrollment. As a result, the seeming disinterest of younger generations has impacted employment in these sectors. In an attempt to bridge the communication gap among colleges/industries, this study was created to attract the interest and maintain the enthusiasm of new generations of professionals and currently enrolled college students in the United States.

In September 2021, an online survey was created and distributed to over 1500 alumni and students and received 1,495 usable surveys. Analysis performed on the resultant data included descriptive statistics and chi-square calculations. Although the study results indicate that the current generation of students and professionals appear to have basic knowledge surrounding the forestry and wood products/science industries, they showed a lack of awareness of the available careers linked to the sector.

Key words: college students, career, perception/attitudes, forestry, wood products.

DEDICATION

I would like to dedicate this achievement to God, who has always given me the strength and wisdom to face the challenge that is pursuing a degree in a second language. I would also like to dedicate this to my husband Edicarlos that always believed in my capacities and encouragement throughout this journey. Thank you very much for the endless love, support, and dedication. I would also dedicate this thesis to my parents, Jonas Peres Bedette and Zenaide Vieira Bedette, and to my sisters, Aline Bedette, Andreia Bedette, and Aressa Bedette. There are no words to describe how thankful I am for having you all as my family. *Amo muito vocês!*

ACKNOWLEDGEMENTS

To my husband, Edicarlos. Thank you for supporting and encouraging me during this time of great adventure and change. I feel incredibly lucky to have you as my partner. You serve as an inspiration and great life advisor. Te amo!

I would like to thank my major professor, Dr. Rubin Shmulsky for the mentorship, guidance, and for providing me all the resources to develop and become a better professional. I am extremely grateful to you for the opportunity to pursue this degree. Being part of MSU as a student was without a doubt one of the biggest adventures and professional achievement, thus far in my life. Thank you!

To Dr. Iris Montague. Thank you for your guidance, assistance, technical input, and for always being available to exchange ideas and thoughts. Thank you for accepting to be a member of my committee when I needed it most. I will never forget that.

I would also like to thank Dr. Beth Stokes. Your constant support and advice were a source of strength and motivation. Without your patience, guidance, and prodding, I would still be lost in my literature review.

To Jeanie McNeel. You are an amazing woman! Since the beginning of my program, you were the person that made me feel that I could triumph this challenge. I am especially grateful for your support, words of wisdom, and encouragement over the past two years. Know that I will always be praying for you.

For Gabrielly and Dercilio. Thank you for coming into my life at the most opportune time and for being present throughout this journey. I will treasure every memory my friends!! Who would have guessed that an informal conversation about the future at Applebee's would bring me here?

Lastly, I also would like to thank my past and current fellow graduate students, student workers, and staff members who have contributed and helped throughout my MSc degree including: Mia Craig, Laurice Spianelli, Marly Carmona, Yali, Aika Owens, and Kimia Borazjani. I have absolute appreciation for every single one of you.

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CHAPTER I

INTRODUCTION

Professional choice is a central element of an individual's life. Generally, the decision of a major is made when the student is in the adolescent phase or early adulthood phase (Sheppard 2013). Though, this decision can bring a lot of doubt and anxiety to future undergraduates. The psychologist Rafaela Brissac (2018) once said, “The best choice is always the one made conscientiously, taking into consideration information about you and the world around you. The security of choice is the only possible way to avoid future frustration.” Therefore, universities must continue to search for new strategies to provide information about what each major accurately represents. In this way, future students can identify themselves and have clarity about what they will be studying in their majors and consequently what expect for their future profession.

Over the past several years, concerns exist regarding the reasons for the steady decline in enrollment in U.S. Forestry and Wood Science and Technology programs. Consequently, this situation reflects directly in these relative industries, that nowadays are struggling to attract young professionals (T. L. Sharik 2015, Stout, Montague and Shmulsky 2020). Some studies imply that this decline is due to a lack of interest in and/or a lack of awareness of these fields and the possible career opportunities (Smith and Valverde 2019). It is important to point out that Stout et. al (2020) states that the current industry workforce nears retirement age, there is an

increased need to recruit and employ younger generations. However, little is known about the cause of this disinterest.

This study was designed to help bridge the gap in communication between United States (U.S.) Forestry and Wood Science and Technology programs and the new generation of college students and professionals. The focus is to gauge the perceptions and attitudes that the new generation of college students and recent college graduates have regarding the wood products industry as a career choice. The broad objectives of this study were: 1) understand how undergraduate students choose majors, 2) evaluate students' attitudes/perception of forestry and wood science sector, and 3) evaluate respondents' attitudes/perceptions of potential career in forestry and the wood products industry.

Illuminating the perceptions of these individuals can help U.S. Forestry and Wood Science and Technology programs and related companies better strategize the recruitment of this new generation of professionals. It can also help them to assess whether the information is being passed on correctly or whether students carry with them only superficial information or stereotypes regarding the field.

CHAPTER II

LITERATURE REVIEW

2.1 Forest Education in the U.S.

The history of professional forestry education in the United States dates back more than two centuries ago when the first forestry school was founded, the Biltmore Forest School (Green 2006). The pioneer school's purpose was to train professionals to work in logging companies, federal and state service agencies, and educational institutions (Dana and Johnson 1963, Wilson 2014, Beanblossom 2020). The first course covered a twelve-month duration. During this time, students learned theoretical and practical instruction on aspects of forestry which led them to a bachelor's degree in Forest Engineering (Dana and Johnson 1963).

The founders of forestry education debated extensively on the curriculum. However, a committee was not established to discuss and standardize the curriculum content for Forestry Schools until the founding of the Society of American Foresters (SAF) in 1900 (Dana and Johnson 1963). According to Green (2006), SAF members believed that the creation of specialized forestry professionals could help control and manage forests. As a result, the committee decided to emphasize subjects such as biology (40%), mathematics and business (52%), and economics (8%) (Dana and Johnson 1963). In the early 1900s forestry education was designed to be practical and by the end of the century, the goal was to cover the entire range of ecological and social values of forests (Fisher 1996). In 1935, SAF established the Accreditation of Forestry program, the national accreditation program for schools and forestry institutions

(Sharik, Lillieholm, et al. 2015). In the beginning, accreditation was offered to schools based on the qualities of the college, such as administrative and programmatic. In 1950, accreditation requirements shifted to the evaluation of the curricula content rather than the quality of the school (Skok 1996, Green 2006). According to Sample (2015), in the last 100 years, the importance of technical knowledge of forests and forest management, social science, and professional and communication skills has been increasingly recognized by forestry programs. The goal over the years was to keep forestry curricula and educational programs aligned with the changing needs of employers and society. Currently, 54 institutions across the country offer forestry curricula accredited by the SAF (Society of American Foresters 2021).

O'Hara and Salwasser (2015) argued that forestry education is shifting from the focus of training professionals to work in logging companies, government agencies, and educational forestry to address complex ecological issues. However, one of the biggest challenges of the forestry education system is the constant changes and advances of the industry. That said, the curriculum must adapt to remain relevant to real-world circumstances (Arevalo, et al. 2010, Bal, Rouleau, et al. 2020).

2.2 Wood Science programs

Wood is a renewable, sustainable, and abundant material, which can bring many benefits to society and the environment. One of wood's main advantages is that trees sequester carbon dioxide from the atmosphere as they grow and continue to store this carbon throughout their life cycle and conversion to wood products. Thus, compared to cement and steel, used in comparable construction purposes, the manufacturing of wood products generates lower levels of greenhouse gases (GHGs) (Schultz, Nicholas and Preston 2007, Winchester and Reilly 2020).

According to Youngs (2003), the first report on wood mechanics testing was done in 1881 by the Army Ordnance Department. In 1910 Forestry programs began scientific research in the mechanics, physics, chemistry, anatomy, and mycology of wood. However, it was during the First and Second World Wars that the demand for forest products increased dramatically. This shift required experts to go deeper into research and advance the technology of this biomaterial (Young 2003). The first wood science and technology academic program was established in the state of North Carolina in 1929, with the intent of boosting the state's economy by spurring growth in forestry-related fields (Ellis 1964, North Carolina State University 2021). Currently, wood science programs are composed of researchers from different fields, including biology, chemistry, forestry, economics, architecture, civil engineering, and many other specialties (Smith and Valverde 2019).

Courses related to wood science are taught in several areas of specialization. The main areas are agriculture, architecture, civil engineering, and forestry. Nevertheless, many programs have eliminated their wood science curricula due to the lack of demand. This has had a negative impact on the wood industry, which often has difficulty attracting the young professionals (Gupta and Gopu 2005, Balcarczyk, et al. 2015, Rouleau, et al. 2017, Stout, Montague and Shmulsky 2020). Thus, the future of wood science academic programs has been a subject of much debate among academic experts in the field (Gupta and Gopu 2005, Balcarczyk, et al. 2015).

Due to these circumstances, wood science programs are looking for methods to communicate to university students the attributions and responsibilities of a specialist in this area. Many programs even rebranded their names to garner a better perception from potential students (Armstrong, Bustos and Barnes 2014). Nowadays, it is rare to find a program that

carries names such as wood science and technology or forest products. Names such as Sustainable Bioproducts, Biosystems Engineering, and Renewable Materials are common. The changes are not just in program branding as, many programs have endeavored to restructure their programs, modify curricula, and implement aggressive recruitment techniques (Armstrong, Bustos and Barnes 2014, Smith and Valverde 2019).

2.3 Forest Products Industry Economics

Forests have always been a reliable resource for humans due to the vast amount of readily available renewable materials. Currently, the production of lumber, paper, paper board, and other forest resources continue to create jobs and generate income (Brandeis, et al. 2021). According to Alvarez (2007), the United States is one of the world's top producers and consumers of forest products. Forest products in the United States generate more than 1 million direct jobs and contribute more than \$100 billion to the US Gross Domestic Product (Ritter, Skog and Bergman 2011). In 2017, the production of lumber (softwoods plus hardwoods) in the US was \cong 42.2 billion board feet (bf). Softwood represented \cong 33.9 billion bf or 80% of total lumber production (Howard and Liang 2019). In addition to the benefits mentioned above, forests provide ecological, aesthetic, and recreational benefits (Dahal, Henderson and Munn 2015).

In 2017, Southern U.S. was responsible for 21.5 billion dollars of production, representing the largest lumber-producing region in the country. In the same year, wood pulp production in U.S. mills was estimated to be about \cong 52.7 million tons based on data published by the American Forest & Paper Association and the roundwood production was 15.9 billion ft³ (Howard and Liang 2019). In 2016, the output for forestry and forest products industry generated \$251.1 billion in the South and supported 1 million direct jobs, about 2% of the total jobs in the southern U.S. (Forest2Market 2019).

Globalization and international competition play crucial roles in the change of wood product company operations. These changes are generating new opportunities and challenges. Forestry companies with multiple mill sites might prioritize one site over the other because it generates greater income (Alvarez 2007). Another development in many wood product industries is the addition of third-party environmental certifications that help decrease environmental issues in the sector. However, different types of innovation depend on company's size and its strategy to survive in the marketplace (Wagner and Hansen 2005).

The economy of the forest products industry plays a significant role regarding forestry and wood science enrollments. In a survey carried out in 2010, it is highlighted that one of the reasons for the student's decision to pursue a specialization the wood science program is that the U.S. has a strong economic component in the forestry area (Anagnost and Oporto 2010). With a strong economy, the demand for products and services increases, creating more employment opportunities.

2.4 Potential factors affecting enrollment in Forestry and related Natural Resource (FRNR) college programs

Forestry and related natural resource (FRNR) education are currently facing numerous challenges. One major concern is that the focus on environmental issues in the US is causing increased enrollment in environmental programs and decreased enrollment in forestry related fields (Sharik, Lilieholm, et al. 2015). Another reason for low enrollment may be the lack of diversity in forestry programs due to the challenge of recruiting women and minority students who feel more welcomed in environmental programs (Rouleau, et al. 2017). The lack of female professors and perceived limited opportunities have suggested that there is little potential for advancement as long as men have historically held higher positions (Anagnost and Oporto 2010,

McGown 2015). Armstrong (2014) emphasizes that the underrepresentation of women in FRNR programs is troubling as female student's enrollment approached and surpassed half of the college-bound population. In its 2017 quarterly report, the USDA Forest Service indicated having about 25,000 plus employees, where 62 percent were men and 38 percent women (USDA Forest Service 2017).

Another important factor that may affect enrollment is the increased cost of tuition, regardless of the major and degree program. When comparing forestry careers to other professions, other careers may have equal or greater salary ranges, creating more competition among majors. One positive factor is forestry programs are multidisciplinary. However, the diversity of careers available in this major needs to be well presented throughout society. Knowing the vast number of job opportunities available should make forestry programs more competitive (McGown 2015).

It is important to mention that the interests of students have changed over the years. Today, students are more likely to want to make a positive impact in a sustainable way for both society and the environment (Smith and Valverde 2019). Worldwide data reported by Panwar (2010) suggests that the forest sector has a negative reputation in terms of environmental impacts. Increased deforestation, loss of biodiversity, and illegal logging are all often globally linked to the sector, thus giving challenges to the recruiters of these universities (Panwar, Hansen and Anderson 2010).

Several factors have been cited as reasons for the decreasing enrollment. However, key determinant factors are the lack of diversity in academic programs and in the organizations that employ these professionals (Sharik, Lilieholm, et al. 2015, Balcarczyk, et al. 2015, Gervais, et al. 2017, Bal and Sharik 2019), student's desire to engage in a career they perceive has a positive

and sustainable impact on the environment (Smith and Valverde 2019), and the lack or misunderstanding of students' knowledge of forestry and wood science programs (Balcarczyk, et al. 2015).

2.5 Generations: The current workforce

Industry globalization is transforming the entire economic and social scenario. The age distribution of the population can strongly influence overall labor force. According to Dos Santos 2014, with advancements in technology, especially in communication, it is estimated that new generations will be formed in increasingly shorter time intervals, creating considerable diversity in the perception of the role, attitude, and commitment in the work environment. Also, these characteristics will vary by race/ethnicity (Dos Santos, et al. 2014).

It is important to understand the difference in attitudes, perceptions, and experiences of each generation for employers to know how to react in different situations. The generations that are currently active in U.S. labor force are Baby Boomers (born between 1946 to 1964) , Generation X (born between 1965 to 1980), Millennials (born between 1981 to 1996), and Generation Z (born between 1997 to 2015) (DeVaney 2015, Fry 2018, D. Howard 2021).

To belong to a generation has many meanings. The word generation could pertain to a specific lineage of a family or even being born in a range of years. Each generation has perceptions, attitudes, stereotypes, and distinct viewpoints from each other (Bennett and Rademacher 1997). Generalizing groups of generations is inherently difficult, there are many crosscurrents in play, such as culture, raising, and different life experiences. Baby Boomers, the oldest generation in the workplace that have already begun entering retirement age, emerged after World War II (Coleman, Hladikova and Savelyeva 2006, Rudolph, Rauvola and Zacher, Retirement, Workforce Aging And. 2018). According to literature so far, the characteristics and

values of the veteran's generation (Baby Boomers) are stability and hierarchy in the workplace, live to work (workaholic), and work hard to get to the top (Hassel and Perrew 1995, Hedge, Borman and Lammlein 2006, Hogan, Perez and Bell 2008, Tolbize 2008). According to some literature on generational labels, Baby Boomers do not like to learn new skills, they are less willing to participate in training programs and for this reason they are known as might not being good with technology (Ng and Feldman 2012, Rudolph and Toomey 2018). One of the social marks that they experienced was the insertion of women into the labor market (Yellen 2020).

Generation X is a group comprising individuals that are known as being self-trusting, creative, and prioritize the balance between professional and personal life. The greatest motivation for them in the search for balance is the fact that they grew up with less attention from their parents, as both parents most likely worked away from the home (American Psychological Association 2005, Jenkins 2007). They grew up with a stagnant labor market, and limited wage mobility as a result of the Vietnam War, AIDS epidemic, and other events that brought economic instability at the time (Tolbize 2008, Berkup 2014).

Regarding the qualifications of Generation X as professionals, often they are loyal to their employers but tend to question authority as opposed to the Baby Boomers (Bova and Kroth 2001, Karp and Sirias 2001, Zemke, Raines and Filipczak 2013). The Gen X's see the workplace as a place to learn and develop and are open to change (Bova and Kroth 2001, Zemke, Raines and Filipczak 2013). They prefer flexible working hours as they place more value on the work done and not the fixed time spent in the "office" (Goessling 2017). Gen X is the first generation to be considered global thinkers, due to the advancement of technology at that time. The Gen X's were the first generation to focus on working abroad and developed a preference to work for global companies (Reeves 2008). In this range of years, women started to enter the labor market

naturally. During this time there was an increase of protests against environmental issues around the country, resulting in a generation more ecologically aware compared to past generations. The first Earth Day event that addressed topics related to the world's environmental problems was held in April 1970 (Funk and Kennedy 2020).

In 2019, Millennials were the largest generation group in the U.S., with an estimated population of 72.1 million (Wey and Sutton 2002, Statista 2021). The youngest member is 25 years old, while the oldest turned 40 in 2021. The Digital Generation, as some Millennials have labeled themselves, share many of the characteristics of Generation X. For example, they are enthusiastic challengers, they feel uncomfortable in traditional work structures, they have a 'multitasking' profile, they prefer jobs without much routine, and they are adaptable to changes (Jekins 2007, Berkup 2014). They are the most highly educated and racially and ethnically diverse generation in American history (Tolbize 2008, Levenson 2010, Frey 2018).

Millennials have seen severe consequences of the Great Recession crisis (2007-2009), such as a shortfall in the expected household income, tough labor market, high debt levels, stagnation of income, and large-scale loss of jobs (Berridge 2014). Regarding technology, millennials are the first generation to grow up having technology (computers, smartphones, social media) as a part of their daily lives (Pedro 2007).

Generation Z births begin in the first decade of the 21st century. Post-Millennials are an independent generation, digital centric, and they are bringing new patterns of behavior (Moscrip 2019). Preferences of work and workplace are different for different generations. For Gen Z, they prefer to work with what they like. Additionally, they look for companies that have a more ecologically and socially positive image, even if they are paid less for the work (Singh and Dangmei 2016). Gen Z is vocal with their opinions, and they interpret as a sign of disrespect

when their ideas are ignored (Schawbel 2014). The most similar attitude that Millennials and Generation Z'ers share is impatience. Both want to solve problems instantly because of the impact of social media, smartphones, and technology in their lives (Berkup 2014).

In contrast to the bad experience that Millennials have had related to economic life (DeVaney 2015), Generation Z tends to recognize that they must work hard to achieve their goals and are aware that economic planning for the future is necessary (Turner 2015). However, Generation Z is entering adulthood with less experience in the labor market than previous generations (Schroth 2019). Past research raises the hypothesis that previous generations lived in households with lower household income compared to the Z generation, making this group highly educated as well (Fry and Parker 2018). The Born Digital generations (Millennials and Gen Z) are known for being self-taught. Generation Z is known for considering the internet (Youtube, Google, online courses, etc.) as excellent learning methods (Berkup 2014, Schroth 2019).

The shift in the overall demographics of college students in the U.S. could be observed when Millennials entered college. DeBard (2004) mentions that beginning in 2000, white student enrollment as a percentage of the total decreased twenty percent, whereas, enrollment of minorities (female and non-white students) increased. (Frey 2018). According to the National Center for Education Statistics (2021), there has been a more than 20% increase in overall higher education enrollment. Considering that, undergraduate student's demography related to forestry and natural resources has changed considerably in recent decades.

Between the 70s and 90s, most students who enrolled in natural resources related courses came from rural backgrounds and had outside hobbies, such as fishing and hunting (Slocombe 1986). Currently, this picture is changing. According to Dokes (2020), there is a significant

increase in urban students with a lifestyle not related to wildlife activities. Trends indicate that the new generation of students is looking for programs related to ecosystems (Sharik, Lilieholm, et al. 2015).

It is a fact that the younger generations of students cannot form specialized perceptions and critical thinking about a wood products industry and wood science programs without basic knowledge of the industry and what it does. To comprehend and combat the decrease of enrollment in these programs, a survey of the new generation of students and professionals will bring answers of extreme importance for the sector. It will provide insight into undergraduate, graduate students and youth professional's perceptions about natural resources as a profession and what prior knowledge they may have of wood science. Obtaining feedback from younger generations is an important method for wood science programs to understand the best way to recruit future students and thus train more professionals for the area.

CHAPTER III

MATERIAL AND METHODS

3.1 Introduction

This chapter describes the methodology and design used in this study. The chapter includes a description of the research design selected to gather data on the perceptions of the U.S. college students and recent college graduates towards forestry and wood products science university programs and the career potential in these industries. Furthermore, the chapter includes survey questionnaire creation, methods to establish questionnaire validity, Institutional Review Board information, data collection procedures, and analysis procedures.

3.2 Survey questionnaire creation

Survey question topics were created based on information found in the literature review along with input from collegiate level professors. The target population of this research are college students (undergraduate and graduate students) who are currently enrolled in a certificate, associate, bachelor's, and graduate degree program at a U.S. based colleges/university and anyone who has successfully completed a certificate, associate, bachelor's, and graduate degree program within the last 8 years.

The first stage of the development of the survey instrument was to create a list of topics, questions, and thoughts from the research team (graduate student and committee members). After several iterations and with input from additional collegiate-level professionals the survey questionnaire was compiled and entered into Qualtrics. Qualtrics is an online platform that

provides survey software to build and construct effective instruments with relatively simple designs that provide high-quality data (Southern Illinois University Edwardsville 2019).

The format of the questions was created according to Dillman's design method (Dillman, Smyth and Christian 2014). The survey instrumented consist of 32 total questions (see Appendix A). Most questions consist of a closed-ended format, allowing the participant to select their answers from the various options provided. Formats consisted of multiple-choice, five-point Likert scale, grading, and tile. Another format used was a combination of closed-ended and open-ended questions with the option "other" allowing the participant to give a different answer if the respondent has a response that is not listed in the pre-prepared statement list.

Demographics, including age, education level, race/ethnicity, and state of residence, made up thirteen of the 32 questions. The first question of the questionnaire was the screening question. The screeners were designed to make sure the tracker selected the right audience and kept the wrong participants out. Another crucial factor to point out is that, Captcha (Completely Automated Public Turing Test) verification was added in the beginning of the survey. Captcha verification is a common web technique used to help ensure that respondents are real humans and not a program written to spam your survey (Qualtrics 2021).

The online questionnaire included five sections. Section one was responsible for tracking the target audience via demographic questions. Academic rating, age, gender, and race/ethnicity were arranged as screener and quota questions. The second section ascertained specifics about respondents' college information and factors that might have influenced the respondents' choice of major. Validation question was provided in the middle of the questionnaire to verify if the respondent was attentive, if the respondent answered the question incorrectly, the software system immediately ended the survey and considered it as an invalid response. Section three

examined the factors that can influence respondents regarding their job choice and ideal job location (by area and regions in US). The fourth section asked about respondents' perception of forestry and wood products professions. Finally, section five assessed respondents' perceptions of forestry and wood products industry.

3.3 Method of establish a validity questionnaire

Stroub (2004) defined content validation as “the degree to which items in an instrument reflect the content universe to which the instrument will be generalized.” One of the most efficient procedures to validate and reliability of a new survey instrument is the evaluation of the questionnaire by a panel of specialists (Taherdoost 2016). To achieve a validity instrument, this questionnaire was evaluated by specialists in Forestry and Wood Science and Technology. For this research, the panel of specialists consisted of a group of professors and graduate students from the Department of Sustainable Bioproducts, Mississippi State University. Researchers from U.S. Forest Service (USDA) and Michigan Technological University also provided input.

Multiple rounds of discussion occurred among the research team members and the panel of specialists before achieving consensus regarding the instrument. Specifically, the panel of specialists was created to review the instrument with the objective of to seek for clarity and comprehensiveness, readability, possible bias, and come to some level of agreement as to which items should be included or excluded in the final questionnaire (Stout, Montague and Shmulsky 2020). Subsequently, the researcher made the necessary revisions after receiving recommendations from the panel of specialists.

3.4 Institutional Review Board

The survey associated with this study was approved to be administered to human subjects by the University's Investigational Review Board (IRB). Mississippi State University policies require any research that involves human subjects to be approved by IRB before the survey spread procedures begin. Addressing regulatory and human participant protection issues with Institutional Review Boards (IRB) administration entities is an essential component of conducting survey research considering the board looks for compliance with federal regulations and ethical standards (Gilbert, et al. 2010). The survey determined not to be associated with physical, psychological, social, and it was considered minimal risks to the respondents. Information that is considered identifiers such as, names, addresses, and phone numbers were not required for participation in this study.

3.5 Data collection

In the fall of 2021, the survey was conducted in the United States and responses were collected from a national sample of 1497 respondents. Among various survey methods, such as phone, in-person interview, mail, and e-mail (online), an online survey via a third-party company was chosen due to advantages including low administration cost, instant access to a wide audience, quick data collection, and evidences of reduction in measurement error (Ilieva, Baron and Healey 2002, Evans and Mathur 2005, Farrel and Petersen 2010, Dillman, Smyth and Christian 2014). Methods of surveying populations using the online panel sample have evolved due to growing market demand and the practicality that the method offers to the respondents (Van Ryzin 2014).

The survey was conducted by Dynata LLC, a company that provides data collection services, by panel-based sampling, for research relative to marketing strategies. Dyanata LLC

offers several sample sources, including panel, web intercept sample, and specialty list, to satisfy the needs of each project. Each recruitment channel delivers a different population and slightly different results, thus increasing diversity and representativeness (Dynata 2020). Dynata's mission is “to bring the voice of the customers to their marketing continuum- from strategy to innovation, to branding, advertising, measurements, and optimization (Pendleton 2020). The panels are composed of individuals who have voluntarily consented to participate as respondents to the study. The number of responses requested plus specific screen demographics constitute some of the possible study/panel terms. Survey respondents are only allowed one-time participation and when the total number of needed responses is reached, the survey is closed.

Various quality control techniques were used in this study. Demographic quotas (gender and race) were applied to ensure that the samples reflected the study’s target population. Quotas are specific demographic number of participants that the survey needs to reach to be considered representative (Qualtrics 2022). The stipulated quotas were based on the Census 2020, 50.8% females and 76% White (Caucasian) (United States Census Bureau 2021). Additionally, Pendleton (2020) states that Dynata LLC uses robust scripting and programming to deliver surveys to any type of device (cell phones, laptops, etc.). The author also affirms that Dynata LLC uses Artificial Intelligence and Machine Learning to develop reliable automated data and self-service solutions.

In a study of surveys in marketing research, Ilieva (2002) emphasizes that short response time is the most significant advantage of online surveys; this method allows messages to be delivered instantly to their recipients. With this immediate return, respondents can provide fast feedback to the team responsible for the survey. Obstacles such as system problems, respondents' queries, and even difficulties in submitting the questionnaire can be resolved instantly. Self-

service solutions also provide information necessary for the Dynata's system to conclude by Machine Learning techniques if a respondent is real and unique, based on the available clues (device data, geolocation data, behavioral data in the platform) (Dynata 2020).

3.6 Pre-testing the survey

One round of pre-testing was done with the survey before the official version was ready for distribution. The pre-testing wave collected 105 valid responses, 7% of the total data collected. According to Dillman (2014), the pretest of surveys is a recommended method for reducing measurement errors with survey questions before the start of the full test. The pre-test occurred with Dynata. For this survey, the pre-test method of choice was to conduct a pilot study of a small number of respondents from the desired sample population before mass distribution.

Based on the pre-test process and data (August 26 to September 8, 2021), it was concluded that the number of subsequent responses would not likely be sufficient to be a valid representation of the target population, so the researchers decided to make a change in the criteria. The first population criterion was to sample the population of undergraduate students who were currently enrolled in a certificate, associate, and bachelor's degree programs at a US college/university. The revised criterion added current U.S graduate students and individuals who have successfully completed a certificate, associate, bachelor, and/or graduate degree program at a U.S. college/university within the past 8 years to the target audience.

3.7 Sample collection

To be given access to complete the survey, the researcher included two requirements: 1) The individual must be 18 years of age or older and 2) The respondent should be currently enrolled in a certificate, associate, bachelor's or graduate degree program at a US

college/university or have successfully completed a certificate, associate, bachelor's and/or graduate degree program in the last 8 years. All the other demographics were random. Dynata distributed the survey to a random sample from an online panel. The target number of responses was 1,500 and responses were collected until the target number was met. The 105 usable pre-test responses were included in the target of 1,500. Full field testing for the first wave occurred from September 9, 2021 to September 10, 2021.

The first wave involved 1,102 usable responses, including the 105 pretest responses. The second wave was open from September 20, 2021 to September 22, 2021 and collected 323 usable completes. A third wave was launched in an attempt to more closely hit the 1,500 target numbers. The third wave took place from September 24th to 25th, 2021 and 70 usable responses were collected. The overall total number of responses from the three waves was 1,835. During response validation approximately 340 responses were removed because respondents did not complete the questionnaire or respondents were considered potential bots according to the Qualtrics system. This filtering resulted in a total of 1,495 usable responses.

3.8 Methods of analysis

The IBM SPSS statistics software was utilized to analyze the survey data. Descriptive statistics such as frequencies and means were used to analyze the data. Further analysis included chi-square tests performed on yes-or-no, multiple choice, and all of the five-point Likert scale questions.

Data analysis was divided into five pillars for this study: 1) Demographics, 2) Respondent's information on college and major, 3) Major decision, 4) Respondent's career interests, 4) Population knowledge about forestry and wood science professions, 5) Population perceptions/attitudes about the industry/company that are related to forestry and wood

product/science. The significance level for this study was at $\alpha = 0.05$. The chi-square (χ^2) test of independence was calculated to determine if significant relationships existed between select questions and the respondent demographics.

After performing the chi-square test, the Post Hoc test was conducted to determine what was significantly different within the demographic groups. The demographic variables tested were age range, gender, race/ethnicity, academic classification, and type of raised background, and geographic region of residence. For each question, the author selected statistically significant representative demographic groupings to discuss. Thus, the demographics tested results were discussed, with the exception of geographic location of residence, which was not statistically significant for any of the questions.

The chi-square is a nonparametric statistic that is appropriate to use in random samples (Gray, Grove and Sutherland 2016). The chi-square statistic is used to identify differences in the data measured at the nominal (also called categorical) and ordinal data (Likert scale) level, and they also are used when the data do not fit a normal distribution (McHugh 2013, Connelly 2019).

CHAPTER IV

RESULTS AND DISCUSSION

4.1 Demographics

To determine the demographic characteristics, the respondents were provided with five questions related to ages, gender, educational status and location. All the demographic characteristics were tested at $\alpha=0.05$, however all the significant results were found below $p<0.05$.

The demographic breakdown from the usable surveys revealed 50.8 percent were female and 48.7 percent were male. The gender makeup for this study is similar to the entire U.S. Census 2020 (United States Census Bureau 2021). The two largest groups of respondents belonged to ages 36+ years (25.5%) and 24-26 years (17%) while the two smaller groups belonged to ages 30-32 years (10%) and the 33-35 years (8%). It is important to note that the nontraditional students (25 years of age or older) are a growing trend in colleges and universities.

According to the Educational Writers Association, nontraditional students account for more than 40% of all college students in the U.S. (Gross and Clark 2018). Overall, the age demographic results provided a suitable sample to move forward with target objective of this study (Table 4.1).

Table 4.1 Frequencies and percentages of survey respondents by age groups.

Age group	N	Percent (%)
18-20	173	12
21-23	243	16
24-26	254	17
27-29	185	12
30-32	146	10
33-35	113	8
36 or above	381	26

*N = Size of the population. ** Percent values are rounded to the nearest whole number.

In terms of race/ethnicity, 76.1 percent of the respondents identified as Caucasian (white), 14.2 percent as African American, 4.1 percent as Asian and 5.6 percent identified as others ethnicity. The racial makeup of this study is on-par with the 2020 U.S. Census that reported 76.3 percent Caucasian, 13.4 percent African American, and 5.9 percent Asian (United States Census Bureau 2021) . The majority of respondents live in the South (46.2%) while 19.7 percent were from the Northeast, 19.3 percent were from the Midwest and 14.8 percent were from the West.

As showed in table 4.2, the questionnaire asked respondents to classify the area where they grew up. The largest percentage of respondents were from urban (50.9%) and suburban areas (36.7%), while the remainder were from rural areas (12.4%). These results are also similar to the 2021 census which should that 82% of the respondents were from urban and suburban areas and 18% were from rural communities (Statista 2020, United States Bureau Census 2021). These data suggest that the areas in which the respondents grew up are similar to those of the nation’s population.

Table 4.2 Frequencies and percentages of survey respondents by grew up area

Area	N	Percent (%)
Urban	761	51
Suburban	548	37
Rural	186	12

* N = Size of the population. ** Percent values are rounded to the nearest whole number.

4.1.1 Information on college and major

To collect information on respondent's colleges and universities, we combined a list of degree programs in forestry, urban forestry, and natural resources accredited by the Society of American (SAF) and a list of Land-Grant colleges and universities according to the United States Department of Agriculture (USDA) (National Institute of Food and Agriculture 2019, Society of American Foresters 2021).

The current college-level degree program in which the respondents are current enrolled or from which they have recently graduated indicated that 38.9 percent held a bachelors' degree, 26.2 percent held a master's degree level, 19.1 percent held an associate degree level, 8.8 percent held a certificate program level, and 7.1 percent held Ph.D. level degree.

The top three major areas reported were Business, Management and Accounting (18.7%), Medical, Health Administration/Sciences, and Technologies (9.7%), and Engineering, Technology and Design (9.6%) (Table 4.3). The three least reported areas were Science: Physical (e.g., Chemistry, Physics) at 1.7%, Philosophy, Religion, and Theology (1.3%), and Area, Ethnic and Multidisciplinary Studies (1.2%).

Table 4.3 Frequencies and percentages of survey respondents by major areas

Major areas	N	Percent (%)
Business, Management and Accounting	279	19%
Medical, Health Administration/Sciences, and Technologies	145	10%
Engineering Technology, and Drafting	144	10%
Computer Science, and Mathematics	117	8%
Other	111	7%
Education	98	7%
Social Science (such as Geography, History, and Sociology)	81	5%
Arts and Humanities	76	5%
Communications	60	4%
Architecture	56	4%
Law	54	4%
English and Foreign Languages	48	3%
Sciences: Biological (e.g., Zoology, Botany)	39	3%
Information Technology	36	2%
Agriculture, Forestry, and Natural Resources	30	2%
Repair, Production, and Construction	30	2%
Community, Family, and Personal Services	27	2%
Science: Physical (e.g., Chemistry, Physics)	26	2%
Philosophy, Religion, and Theology	20	1%
Area, Ethnic, and Multidisciplinary Studies	18	1%

* N = Size of the population. ** Percent values are rounded to the nearest whole number.

4.2 Major decision

Choosing a college major is one of the most complex and crucial decisions each student makes. College graduation can affect a student's career choice, job satisfaction, geographic location, family structure, and lifestyle. When respondents were asked to indicate at what point in their lives did they choose their current majors, a third of respondents (38%) indicated that their initial decision was made during high school, while 29 percent of the individuals indicated their decision was made after their freshman year in college and 21 percent reported their decision was made during their Freshman year of college (Figure 4.1).

Based on the results, the timeline to invest in recruitment strategies to attract those students to forestry and Wood products/science related majors is during high school and

freshman year. During this time period (between high school and the freshman year of college) many students are looking for a course and/or have many questions regarding their future careers (Gati and Saka 2001). In addition, the U.S. Department of Education (2017) reported that about 30 percent of undergraduates in associate's and bachelor's degree programs who had declared a major ended up changing their major at least once.

When breaking down the data within demographic groups, individuals from urban backgrounds (35%) were more likely to have made their initial decision after their freshman year of college as compared to those from rural background (23%) ($\alpha=0.05$).

Pie chart of respondents decision time for college major

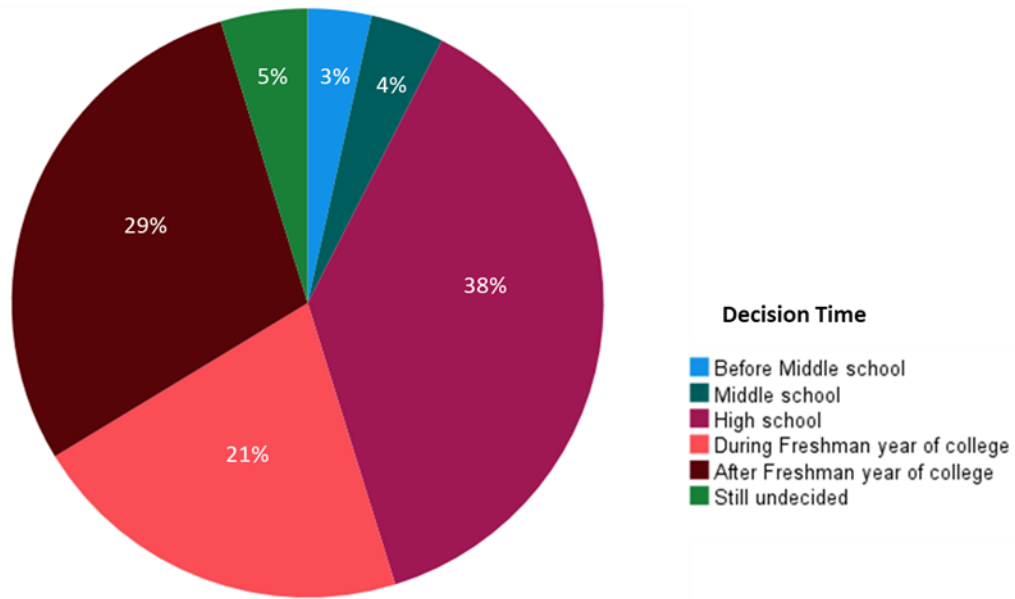


Figure 4.1 Pie chart of the period of time when respondents determined their college major.

After collecting demographical information and basic educational information related to majors, a list of nine factors were provided to the respondents to determine how important a variety of subjects were them when choosing their major. The general ideas revolved around job opportunities, love of the subject, impact of the work on society, family/friend encouragement, and others.

The first point to note is that respondents were likely to rate all the offered factors as "important" (4 or 5 values) in influencing their major choice. Respondents were asked to indicate on a five-point scale (where 1 = not important and 5 = extremely important) their opinion towards factors that may influenced them in choosing a major. The factor "Love of the subject" was rated highest of all the factors ($\mu=4.36$), followed by closely "job opportunities" ($\mu=4.28$) Table 4.1.

There were certain demographic factors for which tests indicated significant difference in terms of factors selected ($\alpha = 0.05$). Individuals from urban backgrounds (85.3%) and individuals that are currently classified as seniors (86.3%) were more likely to consider job opportunities an important factor when choosing a major. Respondents ages 30 or older (92%) and respondents who identified as Caucasian (88.7%) were more likely to determine the factor "love of the subject" important when choosing a major.

Regarding the factor "love of subject", experts agreed that individuals perform better studying a subject that they are passionate about (Venville, et al. 2013, Serin 2017). On the other hand, some individuals used a more rational approach to deciding their major by considering job opportunities. Parents and students view college as an investment, which is often financed with a student loan. Thus, those individuals, seek the best financial return possible and consider job opportunities an extremely important factor in college-related decisions (Koeppel 2004). In

addition, Pew Research Center reported in 2014 that one-third of adults under age 30 have outstanding student loan debt, which is more than twice that of college graduates 20 years ago (Fry 2014, Cilluffo 2019). By achieving a balance between these aspects, the new generation will be able to find the balance of satisfaction and stabilization to avoid significant frustrations in their professional career.

The "family encouragement" factor had the highest number of statistically significant demographic variables, namely age, sex, race, academic classification, and grew up area. When comparing within age groups, respondents ages 33-35 (51.3%) were more likely to consider "family encouragement" a very important factor when choosing a major than ages 27-29 (22.9%). Additionally, males (73.9%), respondents who identify as African Americans (60.1%), respondents from urban backgrounds (39.4%), and recent graduates (71.0%) were more likely to rate this factor as important when choosing their major.

These findings are consistent with a recent study performed by the National Center for Education Statistics (2018), which showed that students' primary influences on career decisions were family members and school exposure. Although, school staff (teachers) was less frequently reported as the main influence (Oymak and Hudson 2018). On the other hand, Rouleau reported that the FRNR students considered family/friends' influence as a neutral factor when choosing FRNR programs (2017). According to Stouts et al. (2020), the general public has a lack of knowledge about the wood products industry and hold a generally negative perception. For this reason, family and friends may be less willing to support careers in this field.

Table 4.4 Chi-square and frequencies of factors that may influence respondents in choosing a major.

Statement	P value (p<0.05)*	Mean	% assigning a rating of				
			1 (not important)	2	3	4	5 (extremely important)
Love of the subject	*	4.36	1	3	10	32	54
Job opportunities	*	4.28	2	4	12	26	56
Impact of the work on society	*	4.13	2	4	16	34	44
Salary range	*	4.13	2	3	16	37	42
Major curriculum	*	4.02	2	5	20	35	38
Career center	*	3.91	5	5	19	33	37
Family encouragement	*	3.89	5	5	22	30	37
School exposure	*	3.80	6	7	22	33	32
Friends encouragement	*	3.72	7	7	23	33	30

* Means are rounded to the nearest hundredth. Proportions are rounded to the nearest whole number. Values are based on a five-point scale where 1=not at all important, 2=slightly important, 3=moderately important, 4=very important, and 5=extremely important. Values are based on a five-point scale where 1=not important, 2=somewhat unimportant, 3=moderately important, 4=very important, and 5=extremely important.

4.3 Respondent's career interests

A career has a big impact on an individual's future. To better understand respondent's attitudes, a list of factors was provided to the respondents to determine how important a variety of subjects were regarding their choice of pursuing a job. Factors included job's income, location, job satisfaction, international opportunities, their attitudes towards gender and diversity equality at the workplace, their attitudes toward job duties.

Respondents were asked to indicate on a five-point rating scale (where 1 = not at all important and 5 = extremely important) their opinion towards a list of factors that may influenced them when choosing a job. The first point to note is that all respondents were more likely to rate all the provided factors as "important" (4 or 5 values) in influencing their

employment choice. The top three factors that influence respondents were job satisfaction ($\mu=4.18$), career growth opportunity ($\mu=4.10$), and income ($\mu=4.07$).

Regarding the factor “job satisfaction”, the variables race, and respondents grew up area were statically significant ($\alpha = 0.05$). Respondents who identify as African American (49.8%) and respondents from urban background (51.6%) were more likely to consider the factor extremely important. Although the factor "career growth opportunity" had a relatively high mean, importance of this factor did not differ among demographic categories. The factor “income” differed ($\alpha = 0.05$) among significance the demographic characteristics age, gender, and grew up area. Respondents ages 33-35 (80.5%), respondents who identified as males (79.1%), and respondents from an urban background (79.9%) were more likely to determine “income” as an important influential factor when choosing a job.

The factor “traveling for work” indicated statistical significance ($\alpha = 0.05$) for four demographic characteristics (age, gender, academic classification, and grew up area). One trend noted when comparing the age groups was that as age increases, respondents’ opinions on traveling for work become more polarized. Only 37.5% of respondents aged 18-20 consider the factor important, respondents aged 27-29 obtained a percentage of 47%, while respondents aged 33-35 polled 69.9%.

In terms of workplace diversity, individuals ages 33-35 (72.6%) and individuals from an urban background (72.7%) were more likely to consider the factor important than individuals ages 18-20 (51.4%) and individuals from rural background (54.8%). Investing in diversity in the workplace is one of the biggest trends in the current market. A workplace with a diverse team can obtain multiple points of view create solutions for different audiences. Although the overall racial diversity is increasing in U.S. rural environments and influencing employment trends,

cultural diversity is still lacking in rural communities resulting in barriers of opportunities for the minority groups (Rowlands and Love 2022).

Table 4.5 Chi-square and frequencies of factors that may influence in the job choice.

Statement	P value (p<0.05)*	Mean	% assigning a rating of				
			1	2	3	4	5
Job satisfaction	*	4.18	1	5	14	32	47
Career growth opportunity	-	4.10	2	6	17	32	44
Income	*	4.07	1	8	17	28	45
Gender equality	*	3.87	6	8	18	29	39
Location	*	3.86	2	7	23	38	30
Having a variety of work responsibilities	*	3.76	4	9	23	35	29
Workplace diversity	*	3.74	7	9	22	27	35
International opportunities	*	3.44	12	13	20	27	28
Traveling for work	*	3.44	12	13	22	25	28
Staying in an office	*	3.22	17	12	25	24	22

* Means are rounded to the nearest hundredth. Proportions are rounded to the nearest whole number. Values are based on a five-point scale where 1=not at all important, 2=slightly important, 3=moderately important, 4=very important, and 5=extremely important.

After assessing the factors that influence respondents in job choice, a question about respondent’s willingness toward job relocation was presented in the questionnaire (Figure 4.2). Respondents were asked to indicate on a list of five options (<less than 100 miles, <500 miles, anywhere in the U.S., to another country, and not willing to relocate) how far they would be willing to relocate for a job position.

Respondents who recently graduated (38.0%), were more likely to consider a job relocation anywhere in the United States versus freshmen respondents that were only willing to relocate less than 100 miles from their current residence (36.1%). The fact that recent college graduates are more willing to consider a job relocation is due the fact that they are entering the workforce and are seeking for opportunities that provide a competitive salary, which can be far

from their hometowns and family (Maurer 2017). On the other hand, the younger individuals (ages 18-20) are in the process of building their expertise, since the market has demanding higher levels of education in the fastest growing occupations (U.S. Bureau of Labor Statistics 2017) .

The results showed that the demographic characteristics age, gender, race, grew up area , and academic classification were statically significant for this question ($\alpha = 0.05$). When breaking down the data within each variable, individuals who identified as African American (39.4%), respondents who identified as Caucasians (33.6%), and respondents who identified as multi-ethnicity (34.5%) followed the same trend and would consider a job relocation anywhere in the United States versus individuals who identify as Asian American that rather relocate less than 100 miles from their current residence (32.3%).

Job relocation can bring many benefits for professionals (higher paying job, career advancement, new job opportunities) and for the company (better use of labor, more specialized professionals); on the other hand, it can induce stress and thereby increase performance at work (Munton and Forster 1990, Riemer 2010). According to Ng (2010), there is some evidence suggesting that job relocation is increasing in industrialized countries. Regarding the U.S. wood products industries, it is important to understand how willing the new generation of students/professionals are to relocate, in order to create recruitment strategies. This is important considering the current wood products workforce is in a period of high retirement rates (Stout, Montague and Shmulsky 2020).

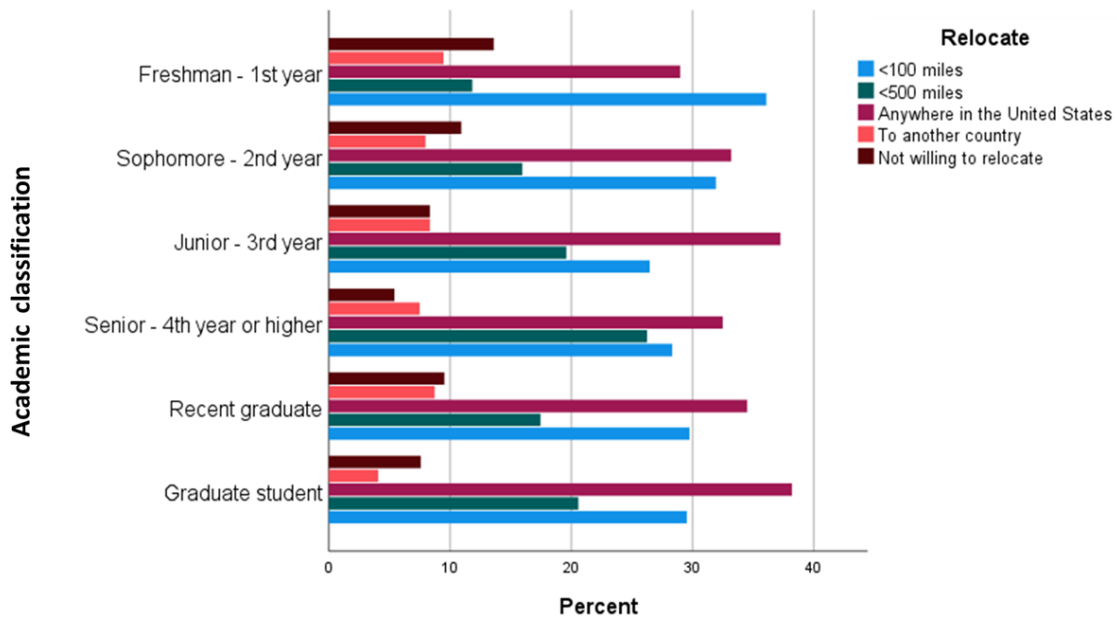


Figure 4.2 Simple bar chart of percent of respondents' frequencies of job relocation by academic classification.

4.4 Knowledge about Forestry and Wood Science professions

Specific questions about the forestry and wood products/science sector focused on five primary themes: professions in the area, respondents' willingness to work in the industry, economic impact, and stereotypes about the sector. Respondents were asked to indicate on a five-point rating scale (where 1 = not knowledgeable at all and 5 = extremely knowledgeable) their level of knowledge about the professions associated with the industry (Table 4.5).

As shown in table 4.5, the majority of the respondents have no to moderate knowledge of the industry (1, 2 and 3 value) (56%). Forty-six percent of the respondents reported to be very knowledgeable or extremely knowledgeable about professions related to the sector. This question also was statistically significant among all demographic variables tested ($\alpha = 0.05$). Males (35.3%), respondents who identify as Caucasians (28.1%), and respondents from urban background (37.3%) were more likely to select "Extremely knowledgeable" while females (29.0%), respondents who identify as multiple ethnicity (41.8%), and respondents from suburban

background were more likely to select the option “Not knowledgeable at all” about professions related to forestry and wood products/science.

This lack of knowledge is also reflected in the under-representation of women in the sector at only 18% of the sector's workforce (T. L. Sharik 2015). Furthermore, multiple studies have discovered that women are hesitant to pursue careers in science and technology, which have been traditionally male-dominated; other factors related to their hesitancy include a lack of knowledge about certain professions, concerns about career, family misrepresentation, and sexual role stereotypes (Luzzo and McWhirter 2001, Whitmarsh and Wentworth 2012).

Table 4.6 Chi-square and frequencies respondent’s level of knowledge about professions related to forestry and wood science

Statement	P value (p<0.05)*	Mean	% assigning a rating of				
			1	2	3	4	5
In your opinion, what level of knowledge do you have about the professions related to Forestry and Wood Products/Science?	*	3.17	19	16	19	21	25

* Means are rounded to the nearest hundredth. Proportions are rounded to the nearest whole number. Values are based on a five-point scale where 1=not knowledgeable at all, 2=slightly knowledgeable, 3=moderately knowledgeable, 4=very knowledgeable, and 5=extremely knowledgeable.

To further measure the level of knowledge related to the sector, respondents were given a list of predetermined professions and asked to select the first profession that came to their minds when they thought of forestry and wood products/science. Figure 4.2 illustrates their classification by the two dominant genders (*N* = 1484) . When breaking down the data within each variable, the option forest management employee was the most likely to be connected to the

sector by both females and males (27% each) ($\alpha = 0.05$). However, there is a difference in the second most popular alternative between genders. Males (25%) were more likely to choose the engineer profession as an industry-related career than females (26%) who were more likely to choose the park ranger profession.

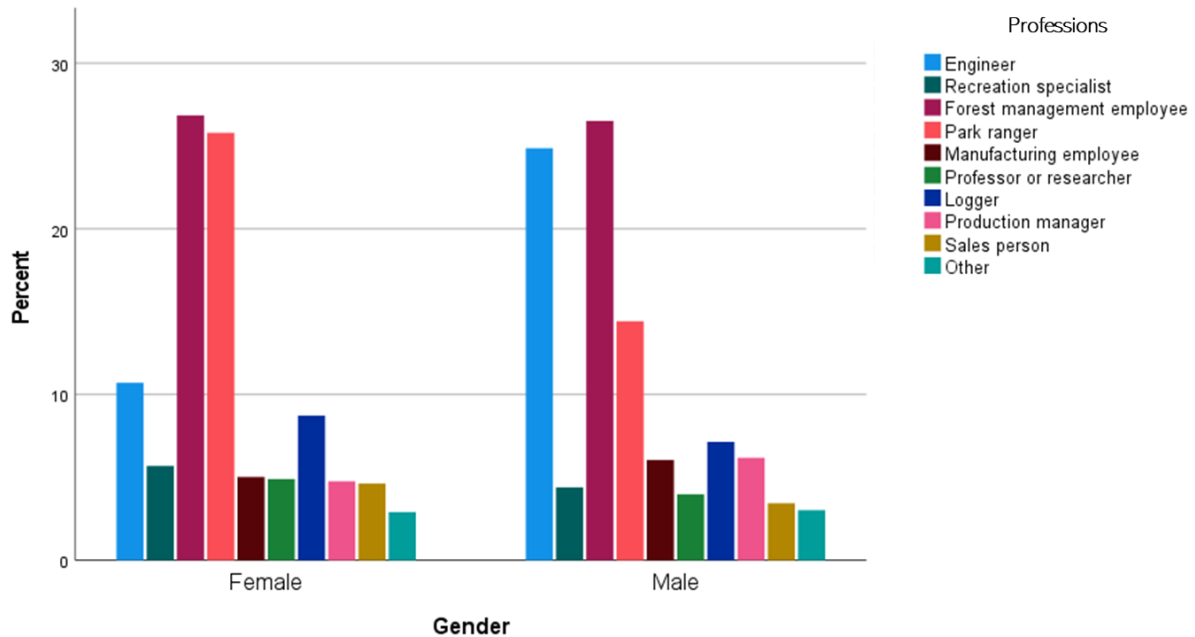


Figure 4.3 Simple bar chart of percent of respondent’s gender regarding the first profession related to forestry and wood products/science.

4.4.1 Forestry specialty professions

The forestry and wood products/science sector represent a wide range of specialty areas, such as forest products operation and general labor jobs (environmental supervisors, forestry technologists, silviculturists, etc.), forest products skilled trades jobs (process engineers, industrial electricians, saw filers, etc.), forest products science and engineering jobs (bio-sciences, chemical engineers, mechanical engineers, etc.), and forest products corporate and on-

site offices jobs (lawyer, architects, economists, human resources professionals, IT specialists, occupational health nurses, etc.) (Kentucky Division of Forestry 2020, Idaho Forest Products Commission 2021).

However, based on the previous results and research it is not clear if the public fully understands the variety of career choices in the sector. In an attempt to understand respondents' perceptions of this relationship, respondents were asked to consider a list of professions related to the forestry and wood science and select on a three-point scale (where 1 = No, it is not related, 2 = Unsure, and 3 = Yes, it's related) whether it was related to forestry/wood science. The results give a clearer picture of the respondents view of which professions are related.

The top three professions that respondents considered to be related to the sector were researcher ($\mu=2.40$), biologist ($\mu=2.31$), and engineer ($\mu=2.24$). The profession "researcher" indicated statistical significance ($\alpha = 0.05$) for one demographic characteristic (gender). When breaking down the frequencies within groups, the majority of females (68%) and males (61%) were more likely to connect the researcher profession to the sector.

Regarding the profession "biologist", the variables, namely gender, academic classification, and grew up area showed statistical significance ($\alpha = 0.05$). Even though the chi-squared test showed statistical significance on the demographic academic classification for the profession biologist, the variation within the choice "Yes, it is related" was 5.3% (63.1% freshmen and 57.8% junior) whereas for the choice "No, it is not related" was 5.7% (31.7% senior year and 26.0% freshmen). These variations (5.3% and 5.7% within the groups) have minimal implications in decision-making while holding chi-squared statistical differences.

The three professions that were rated as not being linked to the sector were social media manager ($\mu=1.79$), computer science ($\mu=1.86$), and marketing manager ($\mu=1.88$). Regarding the

profession “social media manager”, the variables, namely age, gender, academic classification, and grew up area showed statistical significance ($\alpha = 0.05$). When breaking down the frequencies within groups, individuals ages 33-35 (38.9%) were more likely to choose the option “Yes, it is related” than individuals ages 18-20 (23.1%).

According to Montague (2011), many companies in the U.S. forest products sector used to not be sure about the benefits of e-commerce. That notion indicates that it is reasonable that the respondents herein did not relate the industry to the professions of social media manager and marketing. There were no statistical significances for economist and professor options related to the demographics.

Table 4.7 Chi-square and frequencies of specialties professions

Statement	P value (p<0.05)*	Mean	% assigning a rating of		
			1 (No, it is not related)	2	3 (Yes, it is related.)
Researcher	*	2.40	24	12	64
Biologist	*	2.31	13	9	78
Engineer	*	2.24	31	14	55
Architect	*	2.21	32	15	53
Economist	-	2.13	37	14	50
Professor	-	2.03	41	16	43
Business Coordinator	*	2.00	41	18	41
Sawyer	*	1.93	39	29	32
Marketing Manager	*	1.88	47	19	35
Computer Scientist	*	1.86	49	16	35
Social Media Manager	*	1.79	51	18	31

* Means are rounded to the nearest hundredth. Proportions are rounded to the nearest whole number. Values are based on a three-point scale where 1=No, it is not related, 2=Unsure, and 3=Yes, it is related.

Developing an early career plan can make the professional career more successful. One of the first steps is considering the disciplinary field. After respondents provided their perceptions of which professions were or were not related to the sector, they were informed that all the specialties listed in the previous question were related to forestry and wood science/products. Respondents were asked to indicate on a five-point rating scale (where 1 = extremely unlikely and 5 = extremely likely) their attitudes on working in an industry/company related to these areas (Table 4.8). Results showed how respondents felt about working in a company that had these job areas such as ones in the forestry and/or wood products industry ($\mu=3.86$).

Approximately, 69.8 percent would consider working in forestry and/or wood products companies (4 or 5 value). Within demographics groups, the highest percentages that considered

somewhat or extremely likely to work in Forestry and/or Wood Products industry/company came from individuals ages 33-35 (86.7%), males (79.8%), individuals who identified as Caucasians (76.2%), graduate students (75.6%), and individuals from urban areas (81.9%) ($\alpha = 0.05$). In comparison, the smallest percentages came from respondents ages 18-20 (54.3%) and individuals from a suburban background (56.8%) ($\alpha = 0.05$).

Table 4.8 Chi-square and frequencies of how likely respondents considered a career in a forestry and wood products/science industry/company.

Statement	P value ($p < 0.05$)*	Mean	% assigning a rating of				
			1 (extremely unlikely)	2	3	4	5 (extremely likely)
How likely would you consider working in a Forestry and/or Wood Products companies as an attractive option for a career?	*	3.86	5	6	19	37	33

* P value abbreviations are A=age, G=gender, R=race, AC= academic classification, GA=grew up area, and RR=region currently reside. Means are rounded to the nearest hundredth. Proportions are rounded to the nearest whole number. Values are based on a five-point scale where 1=extremely unlikely, 2=somewhat unlikely, 3=neither likely nor unlikely, 4=somewhat likely 5 = extremely likely.

A question also was provided listing general ideas of how forestry and wood products/science can become more attractive to young professionals. The top three ideas selected by the respondents were “Market the career/job opportunities” (28.8%), “Market the salary ranges” (20.9%), and “Market the sustainability aspects” (18.5%). Statistical analysis showed that the demographic variables age and area in which the respondent’s grew up area were statistically significant for this question ($\alpha = 0.05$).

Figure 4.4 illustrates the frequencies of the strategies ranked by the types of background areas where the respondents were raised. It was possible to notice a trend between all areas, rural (30.6%), suburban (29.0%), and urban (28.3%) in relation to the most selected strategy (“Market the career/job opportunities”). Regarding age groups, respondents ages 27-29 (35.1%) and ages 33-35 (34.5%) were more likely to select the strategy “Market the career/job opportunities” versus respondents in the 18-20 age group (26.6%) that was more likely to select the strategy “Market the salary ranges”.

In relation to the option “Market the sustainability aspects”, respondents from urban background (22.6%) were more likely to select the idea than suburban background (13.5%). A reason for this is the increased demand from urban individuals for more sustainability. The rapid urban growth has aggravated environmental issues related to inefficient transport, housing, waste, and often misuse of natural resources (Torrey 2004). As long as urban areas are centers of policy and technological innovation, it is usual for sustainable technologies and solutions to be developed and implemented initially in these settings, as demand dictates (Vardoulakis and Kinney 2019). This fact is in line with the data that respondents from urban backgrounds tend to demand more sustainable aspects from the industries in general.

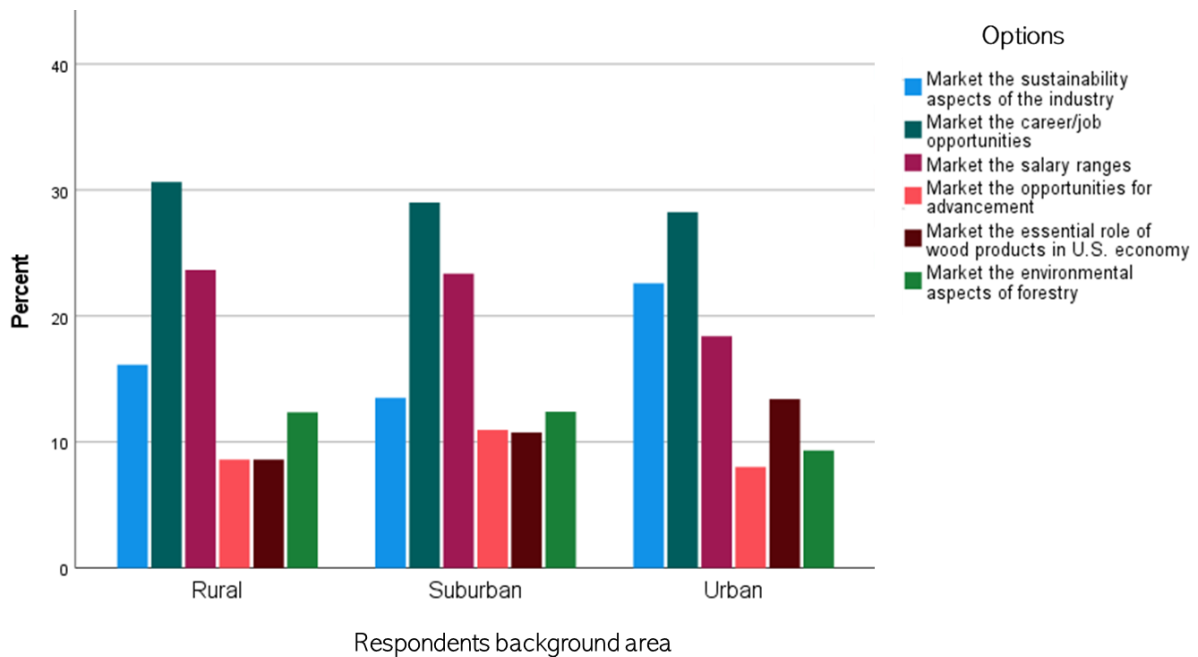


Figure 4.4 Simple bar chart of percent of respondents’ perceptions about how to turn Forestry and wood products/science sector more attractive areas.

4.5 Perception about the industry/company that are related to forestry and wood products/science.

Understanding respondents first perceptions of the industry is an important step in understanding why individuals may/may not choose a degree in that field. Also, assessing respondents’ attitudes and perceptions towards the industry can help bridge the gap in communication between U.S. forestry and wood science and technology programs and the new generation of professionals. Respondents were asked to indicate on a five-point rating scale (where 1 = strongly negative perception and 5 = very positive perception) their attitudes towards the sector (Table 4.9).

Approximately, forty percent of the total respondents held a very positive perception about Wood Products industries. When the data is broken down into demographic groups, males (82.4%) were more likely to hold a positive perception about the industry ($\alpha = 0.05$) than females

(63.1%). Other demographics also were statistically significant ($\alpha = 0.05$). Respondents ages 33-35(63.7%) and respondents who identify as Caucasian (43.9%) were more likely to hold a strong positive perception than respondents in the 18-20 (14.5%) age group, and respondents who identify as Asian Americans (22.6%).

Regarding area in which respondents grew up, individuals from an urban background (55.5%) were more inclined to have a strongly positive perception about the industry while 33.8 percent of all individuals with a suburban background were more likely to hold a neutral attitude about the sector.

Table 4.9 Chi-square and frequencies of the respondents’ first perception about forestry and wood products industry.

Statement	P value (p<0.05)*	Mean	% assigning a rating of				
			1 (strongly negative perception)	2	3	4	5 (very positive perception)
What is your first perception when you hear about the “forestry and wood products industry”?	*	4.08	1	3	23	32	40

* Means are rounded to the nearest hundredth. Proportions are rounded to the nearest whole number. Values are based on a five-point scale where 1=strongly negative perception, 2=somewhat negative perception, 3=neither positive nor negative perception, 4=somewhat positive perception, and 5=very positive perception.

The U.S. wood products industry is a major contributor to the U.S. economy, accounting for approximately 4 percent of total US industrial GDP (Fourth 2018, American Forest & Paper Association 2021). In 2020, the American Forest & Paper Association reported a total of 937,800 people in the U.S. were employed in the forest, paper, and packaging industry (American Forest & Paper Association 2021). In order to assess respondents’ views and perception on the industry

and its contribution to the economy, respondents were asked how much they agreed with the statement “I think the forestry and wood products industry contributes to improving the economy of the U.S.?”. Respondents were given a 5-point scale where 1= strongly disagree and 5=strongly agree.

A little over half (51%) of the respondents agreed with the statement and the mean for the statement was 4.25 (Table 4.10). When the results were analyzed by demographic groups, individuals ages 33-35 (64.4%), male respondents(54.3%), graduate students (56.6%), and respondents from urban areas (58.2%) ($\alpha = 0.05$)were more likely to strongly agree with the statement than those individuals ages 18-20 (22.5%), female respondents (39.2%), respondents classified as sophomores (35.7%), and respondents from suburban areas (31.8%) .

Table 4.10 Chi-square and frequencies of respondent’s perceptions of the forestry and wood products contributions to the U.S. economy.

Statement	P value (p<0.05)*	Mean	% assigning a rating of				
			1 (strongly disagree)	2	3	4	5 (strongly agree)
I think the forestry and wood products industry contributes to improving the economy of the U.S.?	*	4.25	1	2	16	35	46

* Means are rounded to the nearest hundredth. Proportions are rounded to the nearest whole number. Values are based on a five-point scale where 1=strongly disagree, 2=somewhat disagree, 3=neither agree nor disagree, 4=somewhat agree, and 5=strongly agree.

There are several reasons for pursuing workforce diversity. According to the existing literature on the subject, a more diversified atmosphere improves the organization by increasing creativity, productivity, and quality services (De Dreu and West 2001, Aggarwal and Woolley 2019). Organizations of all types are increasingly looking to diversify their team of collaborators

(Scarborough, Lambouths and Holbrook 2019). Traditionally the U.S. forestry and wood products industry have had difficulties maintaining a diverse workforce. To determine if this was a deterrent in attracting young professionals, respondents were asked about diversity in the industry. Frequencies and Chi square statistical analyses also were performed for this question and showed that the demographics age, gender, race, grew up area, and academic classification were statically significant ($\alpha = 0.05$).

Figure 4.5 illustrates the frequencies ranked by respondent's race. There were two types of trends when comparing the data within each variable. The first trend recognized was between the groups gender and race. Males (53.6%) and respondents who identify as Caucasians (46.4%) were more likely to select "I think there is plenty of diversity in the industry". On the other hand, females (34.3%) and respondents who identify as African American (40.4%) that were more inclined to select the statement "I have not considered how much diversity is present in the industry" (47.2%).

The second trend noted was when comparing academic classification groups. Freshmen (53.3%), sophomores (51.7), and juniors (45.1%) were more likely to select the statement "I have not considered how much diversity is present in the industry". On the other hand, seniors (47.9%), graduate students (53.1%), and recent graduates (49.2%) were more likely to select the statement "I think there is plenty of diversity in the industry".

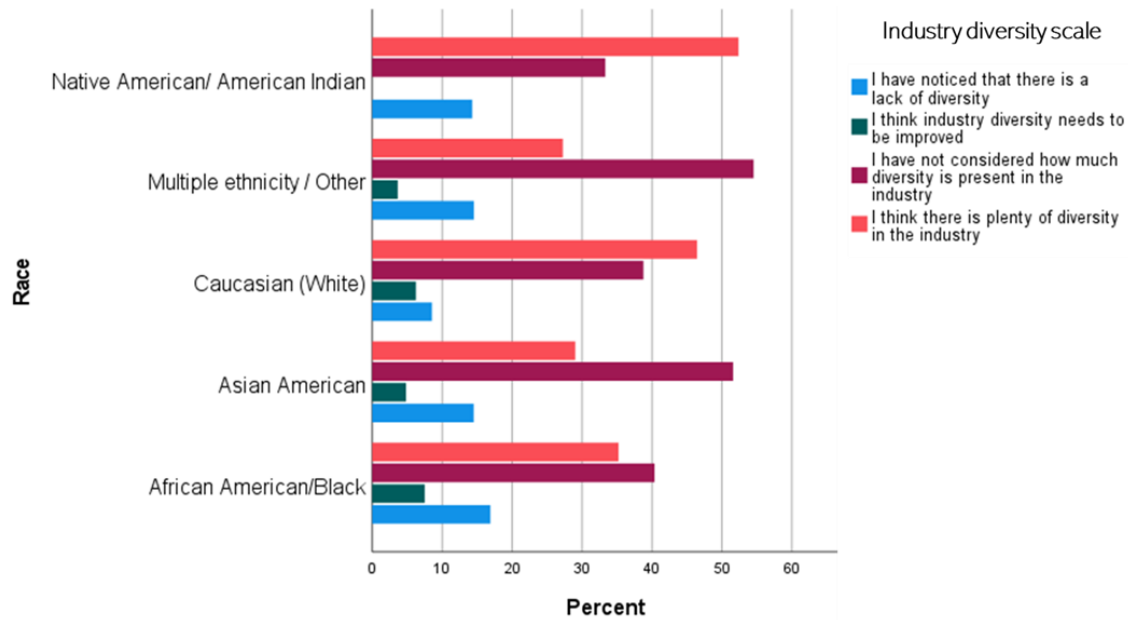


Figure 4.5 Simple bar chart of percent of respondents’ perceptions on the level of cultural diversity in forestry and wood products professions.

Understanding the public's attitudes and perceptions of these stereotypes is the first step for academic programs and the forestry sector to start creating marketing strategies that can reach the population to demystify these concepts. The stereotypes surrounding the wood products industries have been broken down into six statements (Table 4.11). The topics approached were professionals’ ages, level of education, salaries, political ideology, gender diversity, and the industry’s environmental concerns.

Respondents were asked to indicate on a five-point rating scale (where 1 = strongly disagree and 5 = strongly agree) their perceptions towards the stereotypes surrounding the forestry and wood products industry and professions related to the sector. Results show just how strongly respondents felt about the list of stereotype related statements were provided. The highest overall mean was for the statement “Professionals in forestry and wood products sector are generally considered young people (new generation)” $\bar{x} = 3.80$. More than half of the general population (60.4%) agreed that professionals in forestry and wood products sector are generally

considered young people. When breaking down the data by demographics groups, males' respondents (41.8%) and respondents that grew up in an urban background (46.0%) were more likely to strongly agree with that statement in contrast to females (34.3%) and rural background (40.9%) that were more likely to hold a neutral attitude towards the statement (3 value) ($\alpha = 0.05$).

Following with the statement with the second highest mean ($\bar{x} = 3.79$), approximately 63 percent of the respondents agreed that professionals in the forestry and wood products sector are predominantly male (4 or 5 values). When breaking down the data by demographics groups, individuals ages 33-35 (51.3%), respondents who identified as males (41.8%), respondents who identified as Caucasians (36.1%), and respondents from urban areas (46.0%) were more likely to strongly agree with the statement than those individuals ages 18-20 (12.7%), females (25.5%), and respondents from suburban area (19.0%) ($\alpha = 0.05$).

When asked about salaries in the industry ($\bar{x} = 3.72$), 57.7 percent of the respondents agreed that professionals in the forestry and wood products sector generally receive above average salaries. Respondents ages 18-20 (50.3%) were more likely hold a neutral attitude towards the statement (3 value) versus respondents ages 33-35 (20.4%) that were more likely to strongly agree (5 value) with the statement (39.8%) ($\alpha = 0.05$).

The fourth factor approached a topic related to the professional's political ideology ($\bar{x} = 3.68$). There were 57.1 percent of the respondents that agreed to the statement "Professionals in the forestry and wood products sector generally have more conservative views than professionals in other sectors". Within groups, graduate students (33.1%) were more likely to strongly agree with that statement. On the other hand, sophomores (44.4%) were more likely to neither agree or disagree with the statement ($\alpha = 0.05$).

When an education statement as provided in this question, 51.8 percent somewhat agreed that “professionals in the forestry and wood products sector generally have less education than professionals in other areas ($\bar{x} = 3.44$).” Within groups, male (63.8%) and female (40.5%) respondents agreed (“4” and “5” values) with the statement. Respondents ages 33-35 (66.4%), ages 36 or older (63.5%), and all respondents who grew up in an urban area (66.5%) were more likely to agree with that statement ($\alpha = 0.05$).

Given the prevalence of blue-collar (manual labor) jobs in the production sector of the wood products industry (Leschinsky and Michael 2004), the new generation seemed to have formed a stereotype concerning the industry professionals. The new professionals are hesitant to fill these positions because their parents perceive these jobs as requiring manual hard work (Wilkie 2019). However, what often goes unnoticed is that the workers who occupy these positions require more technical and technological skills than in previous years, thus requiring a higher level of education (Wilkie 2019). Another concept that helps spread this stereotype is the lack of covered material about the industry in the U.S. school’s system (Stout, Montague and Shmulsky 2020). Improving and adding to information on forestry and forest products that is covered in schools could help mitigate stereotypes and increase positive perceptions about the sector (Mater 2005).

Finally, in the sixth and last statement, less than half of the respondents (47.7%) agreed that professionals in the forestry and wood products sector are not very environmentally oriented. According to the Food and Agriculture organization of the U.S. (2007), the forest industry needs to improve their communication strategies to show their efforts in conserving forest resources and using them sustainably to their public. In addition, they need to change the public perception

about their work on rehabilitating degraded lands and converting them into planted forests (Advisory Committee on Paper and Wood Products 2007).

Individuals who identify as Caucasians (50.4%) and individuals who identify as African Americans (46.5%) were most likely to agree with that statement “Professionals in the forestry and wood products sector are not very environmentally oriented” (4 or 5 values). All respondents ages 18-20 (42.8%) were more likely to hold a neutral attitude (3 value) towards the statement compared to all those ages 33-35 (15.0%), that tended to agree with the statement. In comparison, Seniors (30.3%) were more likely to somewhat agree with the statement than Freshmen (17.2%) ($\alpha = 0.05$).

Table 4.11 Chi-square and frequencies of respondents' perceptions and attitudes towards the stereotypes surrounding the forestry and wood products industry and professions related to the sector.

Statement	P value (p<0.05)*	Mean	% assigning a rating of				
			1 (strongly disagree)	2	3	4	5 (strongly agree)
Professionals in forestry and wood products sector are generally considered young people (new generation).	*	3.80	2	10	27	27	33
Professionals in the forestry and wood products sector are predominantly male.	*	3.79	3	7	27	35	28
Professionals in the forestry and wood products sector generally receive above average salaries.	*	3.72	1	8	33	32	25
Professionals in the forestry and wood products sector generally have more conservative views than professionals in other sectors.	*	3.68	3	9	32	32	25
Professionals in the forestry and wood products sector generally have less education than professionals in other areas.	*	3.44	8	13	26	29	22
Professionals in the forestry and wood products sector are not very environmentally oriented.	*	3.32	12	12	28	27	21

* Means are rounded to the nearest hundredth. Proportions are rounded to the nearest whole number. Values are based on a five-point scale where 1=strongly disagree, 2=somewhat disagree, 3=neither agree nor disagree, 4=somewhat agree, and 5=strongly agree.

CHAPTER V

CONCLUSION AND RECOMENDATIONS

Some professions are more obviously linked to the forestry and wood science/products sector (engineer, sawyer) than others (chemist, computer scientist). However, the production and management of forests, timber, parks, and wood products require a variety of specialists to work together. The current generation of students and professionals appear to have basic knowledge surrounding the forestry and wood products/science industries. On the other hand, the respondents of this study appear to have a lack of awareness of the available careers linked to the sector. Information gathered in this study suggests the wood products industry should work to educate and improve awareness of those careers towards this new generation of those during the high school and college time frame, since that it is the period that people usually choose which major pursue.

Based on the results of this study, there are potential audiences that forestry and wood science/products programs and related industries should consider for future marketing and recruitment campaigns. The first audience is current college female students and professionals. Because the majority of female respondents consider themselves to have a lack knowledge about the careers linked to the sector, designing ads and structuring campaigns for female students and professionals can open a new path for the industry in terms of recruitment and diversity inclusion.

The second audience the industry may consider targeting is students/professionals aged between 18-20 and 21-23 (Generation Z). This age group also had more emphatic opinions of the industry as a career option in this study. Generation Z can be a great audience to interact with as they are starting college and/other professional careers. Communicating with them between the ages of 18-20 and 21-23 may aid in improving their future perceptions and opinions towards majors and careers related to the wood products industry.

According to this study, respondents believe that there is lack of diversity in this area (predominant male), hence measures aimed at equalizing opportunities are important in the perception of the younger generation of professionals. Through this study, academic programs and related industries will have in their hands rich material to develop their recruitment strategies and change the perception of the new generation. These study results can be used to guide the wood products industry improving relations with millennials and subsequent generations. They can also serve as a foundation for future academic research

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APPENDIX A
THE QUESTIONNAIRE

****Opening Screen Statement****

****Thank you for choosing to take this survey! Before you begin, it is important to understand that this is a research study. You will be asked to complete a 10-minute online survey. Please understand that your participation is voluntary. Your refusal to participate will invoke no penalty or loss of benefits. You may choose not to answer a question or completely discontinue your participation at any time during the survey. Please note that the data you provide may be collected and used by Qualtrics as per its privacy agreement. You should be aware that these web services may be able to link your responses to your ID in ways that are not bound by this consent form and the data confidentiality procedures used in this study. If you have concerns, you should consult these web services directly. If you have questions about the research project, please feel free to contact Rubin Shmulsky at rs26@msstate.edu.****

A.1 Section 1: Demographics / quota

DEFINITION: The question below asks about the education level of the respondents. This study defines college students as undergraduate students and graduate students who are currently enrolled in a certificate, associate, bachelor's, and graduate degree program at a U.S. college/university. It also defines a recent graduate as anyone who has successfully completed a certificate, associate, bachelor's, and graduate degree program within the **last 8 years.**

1. Are you a current undergraduate student, graduate student or a recent graduate from a U.S. college/university?
 - Yes = 1
 - No = 2

2. What is your age group?
(Please select one).
 - 18-20 = 1
 - 21-23 = 2
 - 24-26 = 3
 - 27-29 = 4
 - 30-32 = 5
 - 33-35 = 6
 - 36 or above = 7

3. With which **gender** do you identify?
(Please select one).

- Female = 1
- Male = 2
- Non-conforming gender identity = 3
- Other = 4

4. Which **category** best describes your race/ethnicity?
(Please select one).

- African American / Black = 1
- Asian American = 2
- Caucasian (White) = 3
- Multiple ethnicity / Other = 4
- Native American/ American Indian = 5
- Prefer not to answer = 6

5. Are you of Hispanic or Latino origin?
(Please select one).

- No, not Hispanic or Latino = 1
- Prefer not to answer = 2
- Yes, Hispanic or Latino = 3

6. What country are you **originally** from?
(Please select one).

- Afghanistan = 1
- Algeria = 2
- Angola = 3
- Argentina = 4
- Armenia = 5
- Australia = 6
- Austria = 7
- Bahamas = 8
- Bangladesh = 9
- Belarus = 10

- Belize = 11
- Bolivia = 12
- Brazil = 13
- Canada = 14
- Cape Verde = 15
- China = 16
- Colombia = 17
- Costa Rica = 18
- Cuba = 19
- Democratic Republic of the Congo = 20
- Denmark = 21
- Dominican Republic = 22
- Egypt = 23
- El Salvador = 24
- Georgia = 25
- Greece = 26
- Guyana = 27
- Honduras = 28
- Hong Kong (S.A.R.) = 29
- India = 30
- Iran, Islamic Republic of... = 31
- Iraq = 32
- Italy = 33
- Jamaica = 34
- Japan = 35
- Jordan = 36
- Lebanon = 37
- Malaysia = 38
- Mexico = 39
- Nepal = 40
- New Zealand = 41
- Nigeria = 42
- North Korea = 43
- Pakistan = 44
- Panama = 45
- Peru = 46
- Philippines = 47
- Portugal = 48
- Republic of Moldova = 49
- Romania = 50
- Russian Federation = 51
- Sao Tome and Principe = 52

- Singapore = 53
- South Africa = 54
- South Korea = 55
- Swaziland = 56
- Thailand = 57
- Tonga = 58
- Trinidad and Tobago = 59
- Turkey = 60
- United Arab Emirates = 61
- United Kingdom of Great Britain and Northern Ireland = 62
- United Republic of Tanzania = 63
- United States of America = 64
- Uruguay = 65
- Venezuela, Bolivarian Republic of... = 66

IF “UNITED STATES OF AMERICA” IS SELECTED TO QUESTION 6,
CONTINUE TO QUESTION 7.

IF ANY OTHER COUNTRY IS SELECTED, CONTINUE TO QUESTION 8.

7. (If United States of America is selected in Q6) In which state have you spent a majority time of your life?
(Please select one).

- Alabama = 1
- Arizona = 2
- Arkansas = 3
- California = 4
- Colorado = 5
- Connecticut = 6
- Delaware = 7
- District of Columbia = 8
- Florida = 9
- Georgia = 10
- Hawaii = 11
- Idaho = 12
- Illinois = 13
- Indiana = 14
- Iowa = 15
- Kansas = 16
- Kentucky = 17

- Louisiana = 18
- Maine = 19
- Maryland = 20
- Massachusetts = 21
- Michigan = 22
- Minnesota = 23
- Mississippi = 24
- Missouri = 25
- Montana = 26
- NA (No Applicable) = 27
- Nebraska = 28
- Nevada = 29
- New Hampshire = 30
- New Jersey = 31
- New Mexico = 32
- New York = 33
- North Carolina = 34
- North Dakota = 35
- Ohio = 36
- Oklahoma = 37
- Oregon = 38
- Pennsylvania = 39
- Puerto Rico = 40
- Rhode Island = 41
- South Carolina = 42
- South Dakota = 43
- Tennessee = 44
- Texas = 45
- Utah = 46
- Vermont = 47
- Virginia = 48
- Washington = 49
- West Virginia = 50
- Wisconsin = 51
- Wyoming = 52

8. (If United States of America is not selected in Q6) In which state do you **currently** reside?
(Please select one).

- Alabama = 1
- Alaska = 2
- Arizona = 3
- Arkansas = 4
- California = 5
- Colorado = 6
- Connecticut = 7
- Delaware = 8
- District of Columbia = 9
- Florida = 10
- Georgia = 11
- Hawaii = 12
- Idaho = 13
- Illinois = 14
- Indiana = 15
- Iowa = 16
- Kansas = 17
- Kentucky = 18
- Louisiana = 19
- Maine = 20
- Maryland = 21
- Massachusetts = 22
- Michigan = 23
- Minnesota = 24
- Mississippi = 25
- Missouri = 26
- Montana = 27
- Nebraska = 28
- Nevada = 29
- New Hampshire = 30
- New Jersey = 31
- New Mexico = 32
- New York = 33
- North Carolina = 34
- North Dakota = 35
- Ohio = 36
- Oklahoma = 37

- Oregon = 38
- Pennsylvania = 39
- Rhode Island = 40
- South Carolina = 41
- South Dakota = 42
- Tennessee = 43
- Texas = 44
- Utah = 45
- Vermont = 46
- Virginia = 47
- Washington = 48
- West Virginia = 49
- Wisconsin = 50
- Wyoming = 51

9. How would you classify the **area** in which you grew up?
(Please select one).

- Rural = 1
- Suburban = 2
- Urban = 3

A.2 Section 2: Information on college and major

10. What college/university are you currently enrolled in?
(Please select one)

- Aaniiih Nakoda College = 1
- Abraham Baldwin Agricultural College = 2
- Alabama A&M University = 3
- Alcorn State University = 4
- American Samoa Community College = 5
- Auburn University = 6
- Bay Mills Community College = 7
- Blackfeet Community College = 8
- California Polytechnic State University = 9
- Cankdeska Cikana Community College = 10
- Central State University = 11
- Clemson University = 12
- College of Menominee Nation = 13
- College of Micronesia = 14

- College of the Muscogee Nation = 15
- Colorado State University = 16
- D-Q University = 17
- Delaware State University = 18
- Diné College = 19
- Duke University = 20
- Florida A&M University = 21
- Fond du Lac Tribal & Community College = 22
- Fort Peck Community College = 23
- Fort Valley State University = 24
- Haskell Indian Nations University = 25
- Humboldt State University = 26
- Institute of American Indian and Alaska Native Culture and Arts = 27
- Iowa State University = 28
- Kansas State University = 30
- Langston University = 31
- Lincoln University = 32
- Little Priest Tribal College = 33
- Louisiana State University = 34
- Louisiana Tech University = 35
- Michigan State University = 36
- Michigan Technological University = 37
- Mississippi State University = 38
- Montana State University = 39
- New Mexico Highlands University = 40
- New Mexico State University = 41
- North Carolina A&T State University = 42
- North Carolina State University = 43
- North Dakota State University = 44
- Northern Arizona University = 45
- Northern Marianas College = 46
- Ohio State University = 47
- Oklahoma State University = 48
- Oregon State University = 49
- Other = 50
- Paul Smith's College of Arts and Sciences = 51
- Pennsylvania State University = 52
- Prairie View A&M University = 53
- Purdue University = 54
- Red Lake Nation College = 55
- Rutgers University – New Brunswick = 56
- Saginaw Chippewa Tribal College = 57

- Sitting Bull College = 58
- South Carolina State University = 59
- South Dakota State University = 60
- Southern Illinois University = 61
- Southern University and A&M College = 62
- Southwestern Indian Polytechnic Institute = 63
- State University of New York = 64
- Stephen F. Austin State University = 65
- Tennessee State University = 66
- Texas A&M University = 67
- The University of Southern Mississippi = 68
- Turtle Mountain Community College = 69
- University of Alaska = 70
- University of Arizona = 71
- University of Arkansas = 72
- University of British Columbia = 73
- University of California = 74
- University of Connecticut = 75
- University of Delaware = 76
- University of Florida = 77
- University of Georgia = 78
- University of Guam = 79
- University of Hawaii = 80
- University of Illinois = 81
- University of Kentucky = 82
- University of Maryland = 83
- University of Maryland Eastern Shore = 84
- University of Massachusetts = 85
- University of Minnesota = 86
- University of Missouri = 87
- University of Nebraska = 88
- University of Nevada = 89
- University of New Hampshire = 90
- University of Rhode Island = 91
- University of Tennessee = 92
- University of the District of Columbia = 93
- University of Vermont = 94
- University of Washington = 95
- University of Wisconsin = 96
- Utah State University = 97
- Virginia Polytechnic Institute and State University = 98
- Virginia State University = 99

- Virginia Tech = 100
- Washington State University = 101
- West Virginia State University = 102
- West Virginia University = 103
- White Earth Tribal and Community College = 104
- Yale University = 105

IF “OTHER” IS SELECTED TO QUESTION 10, CONTINUE TO QUESTION
11.
IF ANY OTHER OPTION SELECTED GO TO QUESTION 12.

11. (If “OTHER” to Q10, continue here) Please specify the college/university you are currently enrolled.

12. (If any other option selected to Q10, continue here) What college-level degree program are you currently enrolled in or have recently graduated from?
(Please select one).

- Certificate program = 1
- Associate degree (2-year) = 2
- Bachelor’s degree (4-year) = 3
- Master’s degree = 4
- Profession degree (PhD, MD, DDS, etc.) = 5

13. What college-level degree program are you currently enrolled in or have recently graduated from?
(Please select one)

- Freshman - 1st year = 1
- Sophomore - 2nd year = 2
- Junior - 3rd year = 3
- Senior - 4th year or higher = 4
- Graduate student = 5
- Recent graduate = 6
- Other = 7

14. Which of the following areas **aligns best** with your major? If you haven't declared your major, which area do you prefer?
(Please select one).

- Agriculture and Natural Resources = 1
- Architecture = 2
- Area, Ethnic, and Multidisciplinary Studies = 3
- Arts and Humanities = 4
- Business, Management and Accounting = 5
- Communications = 6
- Community, Family, and Personal Services = 7
- Computer Science and Mathematics = 8
- Education = 9
- Engineering Technology and Drafting = 10
- English and Foreign Languages = 11
- Information Technology = 12
- Law = 13
- Medical, Health Administration/Sciences, and Technologies = 14
- Other = 15
- Philosophy, Religion, and Theology = 16
- Repair, Production, and Construction = 17
- Science: Physical (e.g., Chemistry, Physics) = 18
- Science: Physical (e.g., Chemistry, Physics) = 19
- Social Science (such as Geography, History, and Sociology) = 20

15. Approximately when did you **initially decided** upon your current major?

- Before Middle school = 1
- Middle school = 2
- High school = 3
- During Freshman year of college = 4
- After college freshman year = 5
- Still undecided = 6

16. Does the college/university you attend **have degree programs** in Forestry (also called Natural Resources) and/or Wood Products/Science (may also be called Biomaterials, Sustainable Bioproducts, etc.)?

- No = 1
- Unsure = 2
- Yes = 3

17. How important to you were the following factors in choosing your current major?
(Please mark one option for each statement)

	Not important = 1	Somewhat unimportant = 2	Neutral = 3	Somewhat important = 4	Very important = 5
Job opportunities					
Love of the subject					
Impact of the work on society					
Salary range					
Major curriculum					
Family encouragement					
Friends encouragement					
School exposure (such as a career fair, internship fair, campus wide presentation, and/or guidance counselor)					
Career center					

18. In terms of **cultural diversity**, how much contact do you currently have or have had with people in the groups listed below during your **major classes**?
(Mark one option for each group of people).

	No contact at all = 1	Rarely = 2	Occasionally = 3	A moderate amount of contact = 4	A great deal of contact = 5
African American/Blacks					
American Indians/Alaskans/Aleuts					
Asians/Pacific Islanders					
Chicanos/Latinos/Hispanics					
Whites/Caucasians					

A.3 Validation question

19. There are hundreds of majors to choose. Please select the option **"Slightly important"** for this question.

- Not knowledgeable at all
- Slightly knowledgeable
- Moderately knowledgeable
- Very knowledgeable
- Extremely knowledgeable

A.4 Section 3: General questions

20. When determining your future career path, how important are each of the following **factors in influencing your job choice**?
(Please mark one option for each statement).

	No at all important	Slightly important	Moderately important	Very important	Extremely important
Income					
Location					
Job satisfaction					
International opportunities					
Workplace diversity					
Gender equality					

Career growth opportunity					
Staying in an office setting all day					
Traveling for work					
Having a variety of work responsibilities					

21. How far would you be **willing** to relocate for a job?

- <100 miles = 1
- <500 miles = 2
- Anywhere in the United States = 3
- To another country = 4
- Not willing to relocate = 5

IF “ANYWHERE IN THE UNITED STATES” IS NOT SELECTED TO QUESTION 21, CONTINUE TO QUESTION 22.
IF “ANYWHERE IN THE UNITED STATES” OPTION SELECTED GO TO QUESTION 23.

22. (If “Anywhere in the United States” is not selected to Q21, continue here) What is your **ideal** job location in the United States?
(Please select one answer in each column).

Area	Region
Urban = 1	Northeast = 1
Suburban = 2	Southwest = 2
Rural = 3	West = 3
No preference = 4	Southeast = 4
NA = 5	Midwest = 5
	No preference = 6
	NA = 7

A.5 Section 4: Natural Resources

23. (If “Anywhere in the United States” selected to Q21, continue here) In your opinion, what level of **knowledge do you have** about the professions related to Forestry and Wood Products/Science?
(Please select one).

- Not knowledgeable at all = 1
- Slightly knowledgeable = 2
- Moderately knowledgeable = 3
- Very knowledgeable = 4
- Extremely knowledgeable = 5

24. When you consider Forestry and Wood Products/Science professions, which of these **first** comes to mind?
(Please select one).

- Engineer = 1
- Recreation specialist = 2
- Forest management employee = 3
- Park ranger = 4
- Manufacturing employee = 5
- Professor or researcher = 6
- Logger = 7
- Production manager = 8
- Sales person = 9
- Other (Please specify below) = 10

25. At present, would you consider working in a Forestry and/or Wood Products companies as an attractive **option** for a career?

- No = 1
- Unsure = 2
- Yes = 3

26. Forestry and Wood Products/Science represent a **wide-range of specialty areas**. From the professions below, select the ones that you believe are related to Forestry and Wood Products/Science.

(Please mark one option for each profession).

	No, it is not related =1	Unsure =2	Yes, it is related = 3
Architect			
Biologist			
Business Coordinator			
Computer Scientist			
Economist			
Engineer			
Professor			
Sawyer			
Researcher			
Social Media Manager			
Marketing Manager			

27. **All careers** listed in the previous question are careers related to the areas of Forestry and Wood Products/Science. Knowing this, how likely would you **consider** working in an industry/company related to these areas?

- Extremely unlikely = 1
- Somewhat unlikely = 2
- Neither likely nor unlikely = 3
- Somewhat likely = 4
- Extremely likely = 5

28. In order to become **more attractive** to young professionals, the number one thing the Forestry and Wood Products/Science sector should do is:

(Please select one).

- Market the sustainability aspects = 1
- Market the career/job opportunities = 2
- Market the salary ranges = 3
- Market the opportunities for advancement = 4
- Market the essential role of wood products in U.S. economy = 5
- Market the environmental aspects of forestry = 6

A.6 Section 5: Perception about wood products industry

29. What is your **first** perception when you hear about the “Forestry and Wood Products industry”?

(Please select one).

- Strongly negative perception = 1
- Somewhat negative perception = 2
- Neither positive nor negative perception = 3
- Somewhat positive perception = 4
- Very positive perception = 5

30. How strongly you agree or disagree with the following statements: “**I think the Forestry and Wood Products industry contributes to improving the economy of the U.S.?**”

(Please select one).

- Strongly disagree = 1
- Somewhat disagree = 2
- Neither agree nor disagree = 3
- Somewhat agree = 4
- Strongly agree = 5

31. Which of the following statements best represents **your thoughts/observations** on the level of cultural diversity in Forestry and Wood Products professions?

(Please select one).

- I have noticed that there is a lack of diversity = 1
- I think industry diversity needs to be improved = 2
- I have not considered how much diversity is present in the industry = 3
- I think there is plenty of diversity in the industry = 4

32. Based on your **current knowledge** of professions related to Forestry and Wood Products, to what level do you agree or disagree with the following statements?
(Please mark one option for each statement).

	Strongly disagree = 1	Somewhat disagree = 2	Neither agree nor disagree = 3	Somewhat agree = 4	Strongly agree = 5
Professionals in Forestry and Wood Products sector are generally considered young people (new generation).					
Professionals in the Forestry and Wood Products sector generally have less education than professionals in other areas.					
Professionals in the Forestry and Wood Products sector generally receive above average salaries .					
Professionals in the Forestry and Wood Products sector generally have more conservative views than professionals in other sectors.					
Professionals in the Forestry and Wood Products sector are predominantly male .					
Professionals in the Forestry and Wood Products sector are not very					

environmentally oriented.					
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33. Do you have any [additional comments](#) to add to help us understand your thoughts or impressions about the majors of forestry and/or wood products?

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