

Workforce Needs Assessment

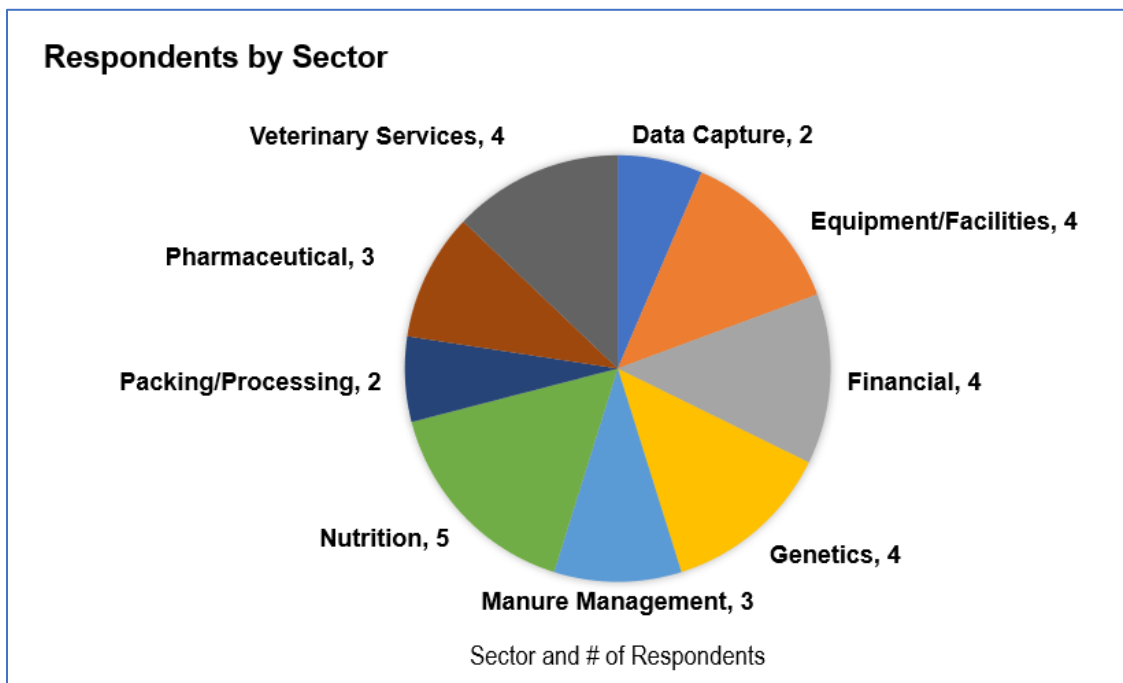
PHASE 3: ALLIED INDUSTRY QUALITATIVE RESEARCH SUMMARY AUGUST 2020 FINAL REPORT

Allied Industry is the focus of this Workforce Needs Assessment Summary. This report is Phase 3 of a three-part assessment of future human capital needs in swine production with a focus on advanced degrees. The research was conducted to assist the National Pork Board (NPB) work group in developing a fellowship program and to facilitate strategic planning to ensure future human capital needs are met for U.S. Pork.

Phase 1 identified workforce needs through the lens of producers, and the expressed production needs were foundational to develop academia interview topics. Phase 2 focused on academia perspectives and identified commonalities and gaps between production needs and academic programs supporting the swine industry. This third and final phase conducted in August 2020 assessed allied industry needs for swine specialists with advanced degrees.

PHASE 3: ALLIED INDUSTRY RESEARCH METHODOLOGY

- The NPB work group identified a cross-section of allied industry businesses in relevant sectors. A targeted number of interviews were established by each sector to ensure broad and relevant representation of the industry.



- Telephone interviews of 30-minutes were conducted in August 2020 with 31* representatives from allied business that responded. In total, 28 interviews were conducted. Appendix A includes a full list of respondents. Each interview followed a standard questionnaire with a combination of quantitative and open-ended questions. (Reference Appendix C for questionnaire).
- *Three members of the Equipment/Facilities sector were contacted but a full interview was not conducted because their organizations do not currently hire advanced degree specialists. Appendix B lists these organizations.
- Data gathered includes current and future employee needs in technical positions, current vacancies (shortfalls) and expected retirements (next 5 years) for:
 - Advanced degrees (MS, MBA, PhD, DVM) represented
 - Area of expertise (Nutrition, Genetics, Reproduction, Computer Science, Bioinformatics, Ag Economics, Ag Engineering, etc.)
 - Institutions of higher education /source for skilled staff
- Qualitative insights include:
 - Emerging fields for skill development to satisfy future needs
 - Areas of expertise most difficult to source
 - Gaps in current academic system for preparing prospective employees
 - Corporate training necessary to compensate for current talent development gaps

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Executive Summary

ALLIED INDUSTRY SUMMARY

Consistent themes emerged from interviews across all sectors of the Allied Industry, in emerging and future needs, expected gaps, and training to enhance skills and abilities of swine specialists with advanced degrees.

The main Allied Industry themes can be categorized in three areas: 1) business acumen and knowledge of the business; 2) communication and the ability to effectively express technical data; and 3) growth in big data, management, integrity, and analysis.

Individuals with advanced degrees will be expected to know more and do more across all sectors of the industry. Additionally, knowing the fundamentals of swine production is an obvious gap and a concern for the future. Positions that interface directly with customers involving nutrition, animal health, pharmaceutical, genetics, and data are those with growing importance for advanced degrees.

This quote summarizes the key themes regarding industry expectations of needs now and into the future. While articulated by a Data/Equipment representative, the sentiment was reflected by others representing nutrition, finance, genetics, pharmaceutical, and manure management.

"You need to know the fundamentals of how to raise pigs along with the technical degree. You get one chance to be a resource, to make a sale, and we need the advanced degree for the technical knowledge and to communicate that input at the level expected of our key customers." (Data/Equipment)

1) Business acumen and knowledge of the business

- Veterinarians with more business acumen are needed in roles that are evolving to include more technical service, sales, and consulting to pork producers; some sectors indicated DVMs are encouraged to pursue an MBA or PhD.
- Business fundamentals such understanding risk management and profit and loss statements were expressed as a deficit in the current candidate pool. The desire for technical experts to have business acumen is currently high, and indications are the need will continue to grow over the next decade.

2) Communication and the ability to effectively express technical data

- Interpersonal communication skill was overwhelmingly emphasized as highly valuable and a requirement for employment. Respondents included a concern that current junior-level candidates lack both the verbal and written communication skills necessary in business.
- Intellect is great; however, the ability to communicate the meaning of the science and data to others is necessary for the advanced degree professional now and in the future.

3) Growth in big data -- management, analysis, and integrity

- Big data is here. The industry needs individuals who can analyze the data and effectively communicate the relevance for pork production. Building and maintaining trust between a company and customers are also essential, which means data integrity and privacy are crucial.

- Data management and analysis is more than statistics. As referenced by one respondent, it is “statistics on steroids.”
- Big data was mentioned across multiple sectors including banking/finance, equipment, and manure as related to sustainability and regenerative agriculture.
- Bioinformatics (the science of collecting and analyzing complex biological data such as genetic codes) was referenced as a growing field relative to genetic improvement.

“This is not accounting for a feedlot or farm business. This is outside the box of what students are being prepared for in academics. We deal in big data. Our chief environmental science officer is writing code as data comes in and data goes out; and it’s about data integrity too.” (Manure/Sustainability)

“The one big gap is looking at data science degrees who can analyze the data and turn it into meaningful information that can be acted upon. I’m trying to fill that right now, but it is challenging.” (Nutrition)

It’s all about the Degree

Allied Industry universally agreed as their pork clients get more sophisticated, the need for people with advanced degrees will increase. One company shared that their current staffing model is to employ only individuals with advanced degrees to serve all needs of their producer-clients. He referenced that it is “old school” to employ a team of employees with bachelor’s degrees to do sales and another team to do technical support.

Another business said it certainly adds credibility to have advanced degree staff from certain academic institutions that are highly respected in the swine industry.

The financial sector expressed that business arrangements have become so complex that it takes a team including attorneys and risk management experts to serve customers.

However, for some sectors it’s about the technical skill.

Advanced degrees were not a priority for all sectors interviewed for this study of the pork industry. Some representatives from equipment/manufacturing and manure management sectors expressed a different perspective worth noting and that was the need to fill skilled trade positions.

“It’s getting harder all the time to find those with the industry background that understand manure application. We have an agronomy division and we lean on them heavily. We have the hardest time finding mechanics for the shop.” (Manure)

“The biggest change for us is going to be moving away from specialized welding (although we also need welders.) The future is in robotics. We need a workforce that is highly skilled. We need better technically trained people with a focus on robotics.” (Equipment)

“The struggle with the labor pool is for welding and robotics. Our biggest need is going to be in mechanical traits for robotics. Most of that can be covered in a bachelors or a trade degree.” (Equipment)

“Auto-CAD-Drawers, it’s a technical drawing program widely used throughout building and contract engineering. We need people skilled at drawing the building around our floors and equipment.” (Equipment)

The nutrition sector highlighted the significance of feed mill management, as it is challenging to find candidates with this technical education and background. According to those interviewed, this field is about feed science and feed mill management, as well as the mechanics of running a mill. Some respondents interviewed do not believe feed mill managers require an advanced degree. Feedback indicates a gap in technical education supporting this key need.

ALLIED COMPARISON WITH PRODUCERS AND ACADEMIA

Areas of Alignment among Allied Industry, Producers, and Academia

Allied Industry, producers and academia generally agree that demand outweighs supply of swine-focused advanced degree specialists and veterinarians, currently and into the next decade.

Allied Industry see growth in the need for advanced degree specialists to support pork producers. As production companies have grown, their technical needs are more complex. This aligns with research with Academia (Phase 2), who stated that larger operations require more technical specialists, and mid-size operations that currently rely on extension or external expertise will likely hire in-house specialists and veterinarians as they grow. Allied Industry articulated that the shift to support their more advanced producer-customers is already happening and will only increase in the years ahead.

All three groups – Producers, Academia and Allied Industry – indicate a future expertise gap for veterinarians, considering retirements at vet colleges and clinics, fewer swine vet students, and the increasing pace of veterinarian hires by production systems and Allied Industry. Although 70% of producers reported availability of veterinarians as “Very Good” or “Excellent” at present, the future availability of veterinarians with swine experience is an area of concern.

Allied Industry reinforced the perspective from producers and academia, in that a more holistic approach is required of technical specialists and veterinarians, compared to the traditional focus on a single specialty. The exception is research, where focus on one discipline is still preferred.

The desire for advanced degree specialists to have strong business skills was consistent between producers and Allied Industry. Science-specialty expertise combined with business was the leading preference by 36% of Allied Industry respondents. Allied Industry respondents stated the need for technical experts to understand the business of raising pigs and cited examples of DVMs that also have an MBA or science researchers that include economics in their study. A disconnect regarding the importance of business expertise is indicated by the academic response, with 14% of academia selecting the combination of specialty expertise with business. Through a different question, nearly half of the academics (48%) support increased emphasis on business management skills, compared to 60% of producers.

Gaps among Allied Industry, Producers and Academia

Producers reported that nutrition and feed mill specialists are currently the most staffed and least available specialists. Allied Industry input representing the field of nutrition and equipment both underscored the need for feed mill specialists with technical knowledge of mill operations and swine nutrition. These specialties do not appear as high on academics’ radar screens; only two university respondents voluntarily mentioned feed mill management.

Academics more frequently referenced precision animal agriculture and data sciences, while these areas were rated as mid-to-low priorities by producers. Allied Industry did reference repeatedly the need for data as well; however, data science is interpreted differently depending on the needs of a specific sector. Precision animal agriculture was reflected by comments that related to manure management and regenerative agriculture. Greater interrelationship between nutrition and manure management was also a need referenced.

The infrequent mention by academia of hands-on experience and communication skills generally signals a lower focus on the practical skills that producers and Allied Industry state as a requirement for success and an existing gap. Hands-on experience, typically referenced as a lack of production knowledge, was consistently mentioned by Allied Industry. Communication and the ability to explain

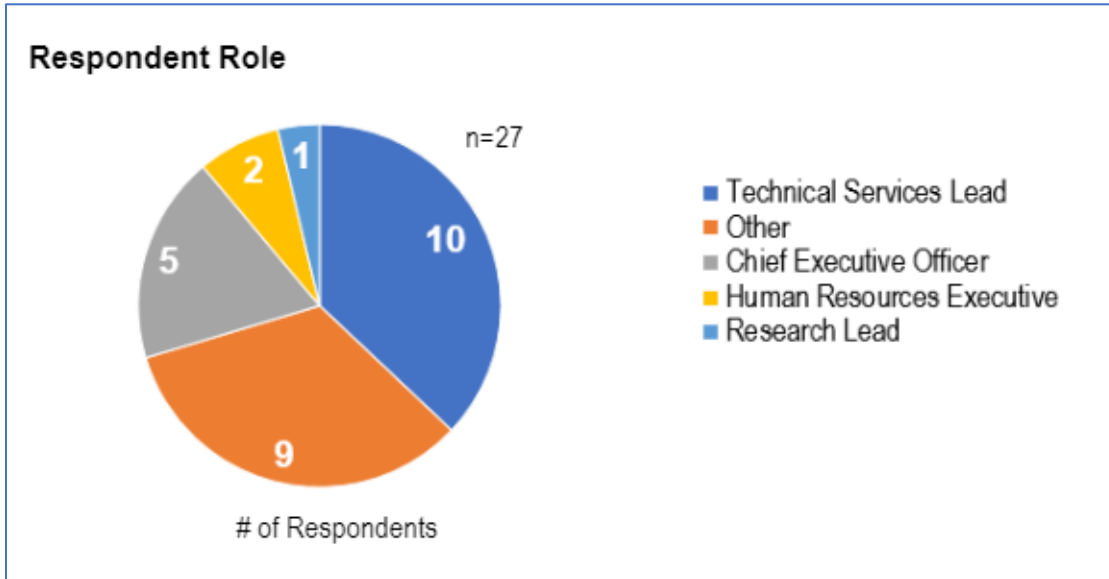
information to others was also a high priority amidst Allied Industry feedback and a noticeable difference from academics.

Foreign language was less commonly referenced as an important skill for Allied Industry, compared to producers. This is likely because technical experts in Allied Industry may be interacting with the production managers and decision-makers expected to be fluent in English. Specialists in production systems with foreign language are especially valued to interact with production employees less fluent in English.

Detailed Allied Industry Findings

RESPONDENT DEMOGRAPHICS

Q1. Which of the following best describes your position? (n=27)



Nine of the respondents indicated their role was “Other,” and those included:

- Chief Development Officer (Sales)
- VP Client Services
- Business Manager
- National Sales Manager
- Commercial Director (operations, sales, tech support)
- Director of Account Veterinarians
- Executive Director for US Pork and Poultry
- Executive VP of Animal Protein Division
- Founder/Owner

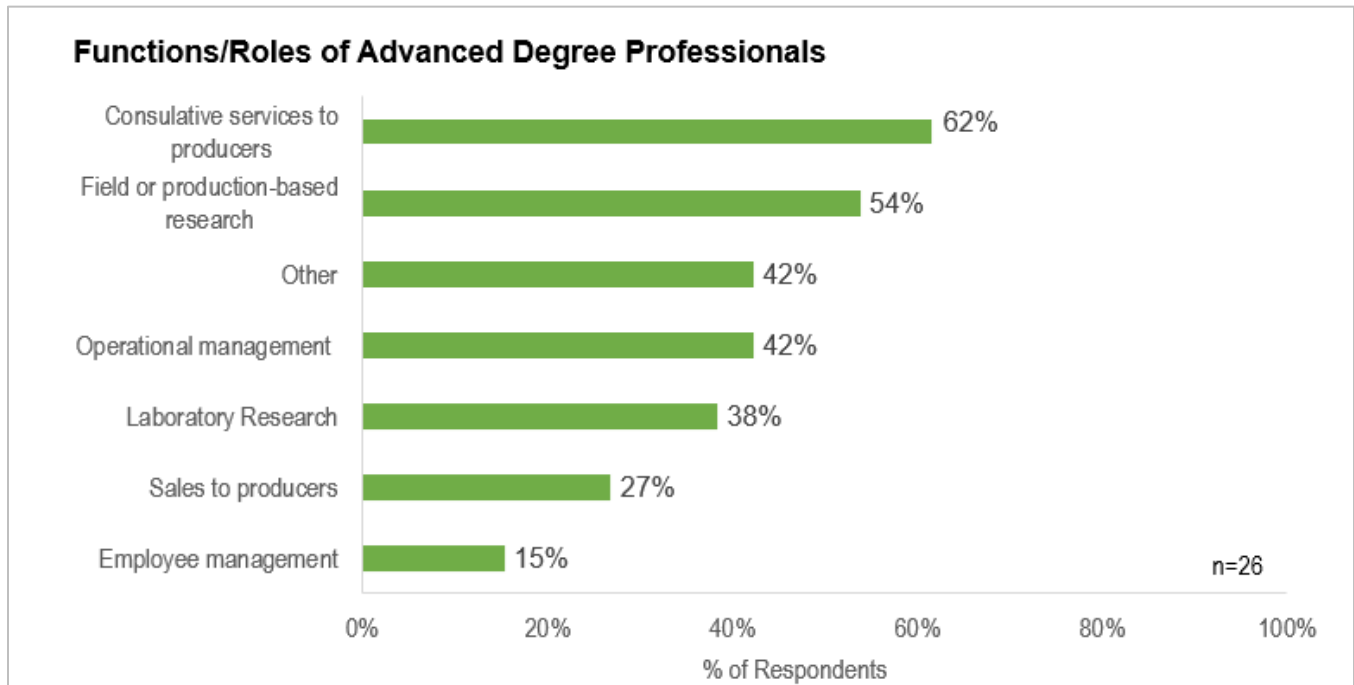
Respondent Demographics (Q2-Q7)

- The companies in this study represented various U.S. geographies and several with global operations. Organizations with headquarters in 13 different states and one Canadian province participated.
- The number of employees represented by responding companies ranged from 14 to 14,000. Estimated total number of employees represented by participating companies is 17,682.*
- Estimated total number of employees with bachelor’s degrees represented is 2,222 (13% of total represented employee workforce).
- Estimated total number of employees with Advanced Degrees represented is 789 (4% of total represented employee workforce).

**There was significant variance in how individuals answered questions about employee numbers. Some individuals addressed their entire company while others shared statistics representing their department or specific team where advanced degrees were employed.*

FUNCTION AND ROLES OF ADVANCED DEGREES

Q8. For what general function / roles do you employ professionals with advanced degrees (MS, PhD or DVM)? (mark all that apply) (n=26)



Across Allied Industry respondents, 62% leverage advanced degree professionals to provide consultative services to producers, with 54% of respondents hiring those professionals for production-based research. While 42% noted advanced degree professionals were managing operations and 15% responded with employee management, respondents said this was a reflection of career advancement and not a requirement for those roles. For instance, PhDs or DVMs hired initially in their career to provide consulting services or do research are now in management level positions.

The “Other” category for functions and roles earned responses from 42% with the following specifics:

- Engineering and equipment design
- Information technology
- Accounting and finance
- Product discovery and development
- Legal counsel
- Economic forecasting
- Capitol development
- Bioinformatics
- Microbiologist

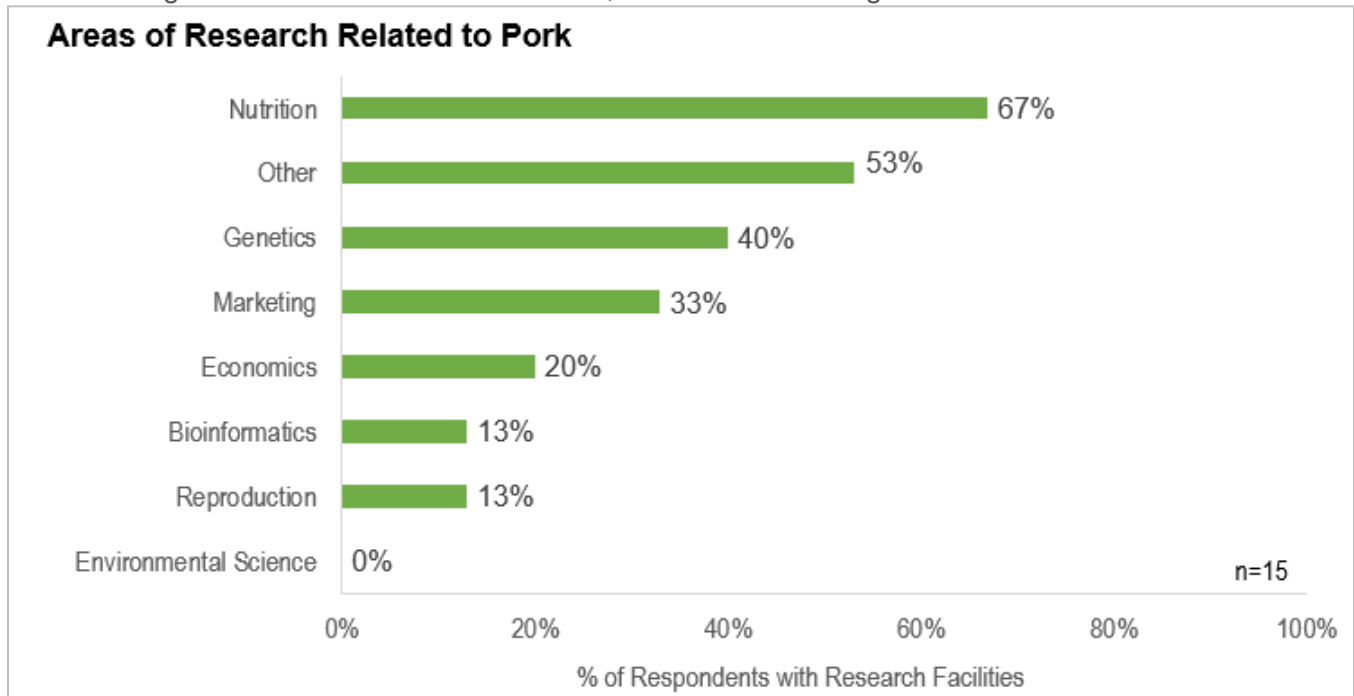
RESEARCH BY ALLIED INDUSTRY

Q9. Does your company own and operate a research facility? (n=28)

Of the 28 interviewees, 18 indicated their company has some form of a research facility, commonly laboratory research facilities owned or contracted and in-field production-based research. Production research by allied industry occurs on company-owned farms and in facilities owned by customers.

Q9a. If yes, what areas of research is your organization currently conducting – relative to pork? (check all that apply) (n=15)

For those organizations with research facilities, 67% are conducting nutrition-related studies.



53% indicated they are conducting other research, which included:

- Vaccines (3)
- Product Development (2)
- Microbials
- Immunology
- Operations Management Trials
- Facility and Space Density
- Meat Science
- Engineering and Equipment Design
- Ventilation

Q9b. How many total employees work in pork research within your business? (n=13)

Q9c. How many specialists with advanced degrees work in pork research? (n=13)

Among participating organizations, a total of 640 employees are at company-owned research facilities. 402 of those employees possess advanced degrees.

IMPORTANCE OF ADVANCED DEGREES

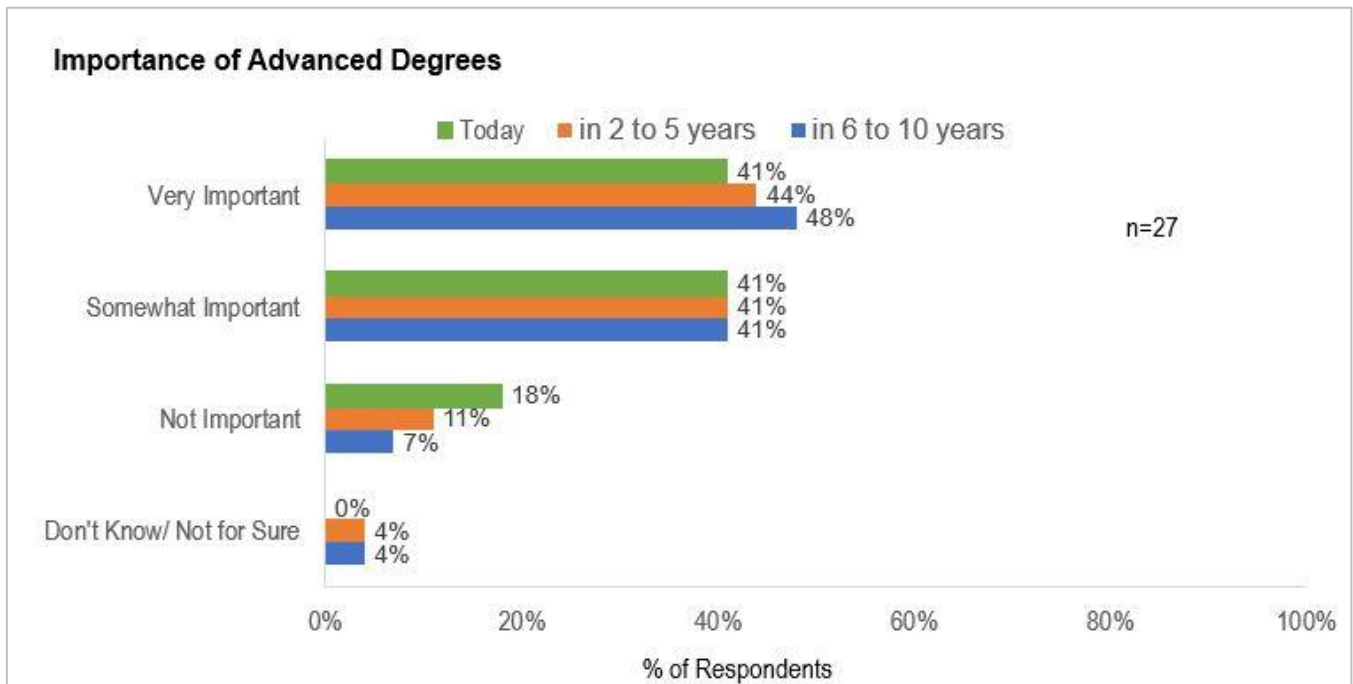
Questions 10 and 11 served to understand the significance that allied industry representatives place on advanced degrees for management level employees today and in the future.

Q10. Today, how important is it to your company that management-level employees have advanced degrees (Education level of MS, PhD or DVM)? (n=27)

Q11. As you look to the future, how important will it be for management-level employees to have advanced degrees (Education level of MS, PhD or DVM)? (n=27)

“Some positions don’t need advanced degrees and then there are others where it remains incredibly important. We live and die on sales and many of the pork producers are such large organizations that the key decision makers have advanced degrees. When you meet with those decision makers – you need to have the advanced degree. It’s imperative. There’s some stigma if you don’t have the advanced degree.” (Data)

“(The advanced degree) is always going to be front and center, and it’s going to be even more important moving forward. We won’t ever water down our standards.” (Pharmaceutical)

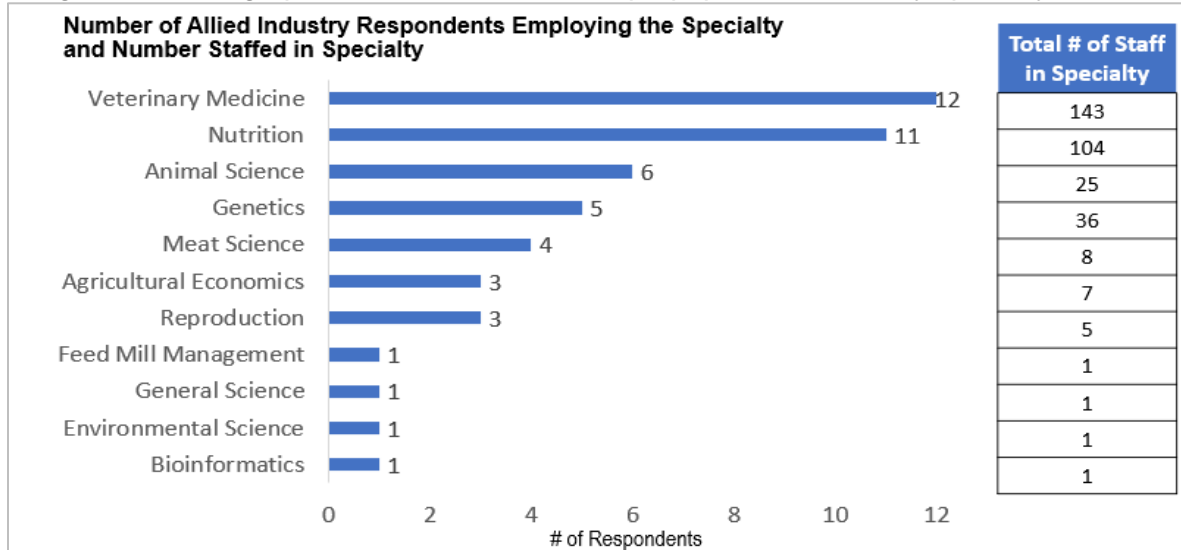


There is growing importance for management-level employees in Allied Industry to have advanced degrees. Those who indicated that advanced degrees were very important (41%) saw that role increasing in the years ahead (48%). Those who indicated an advanced degree was somewhat important showed no change in the years ahead. The responsibility of the role was a factor in responses. Many indicated that an advanced degree is a requirement for conducting research and field studies. Generally, research teams required advanced degrees; however, within the team are often roles for those with bachelor’s degrees to provide technical support. Positions that interface directly with customers involving nutrition, animal health, pharmaceutical, genetics, and data are those with growing importance for advanced degrees.

ADVANCED DEGREE EMPLOYEES, VACANCIES, EXPECTED RETIREMENTS

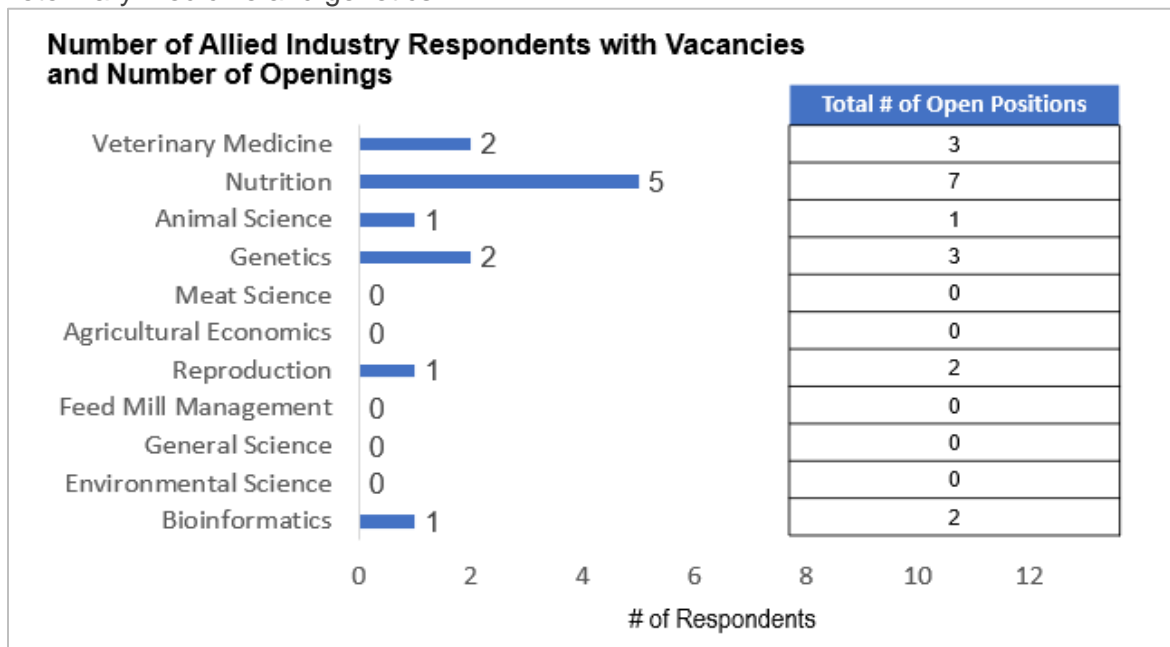
Q12. How many advance degree professionals do you currently employ with these specialties? (n=20)

The Allied Industry interviewed cumulatively employ 332 staff with advanced degrees in the specialties list. Of those 332, three-fourths are veterinarians or nutritionists (147 specialists). Interviewees explained the higher number of these two specialties, because they are field-based positions working directly with producer-customers. In contrast, there are fewer positions for research-focused positions, like genetics. The graph below underscores the proportional need by specialty.



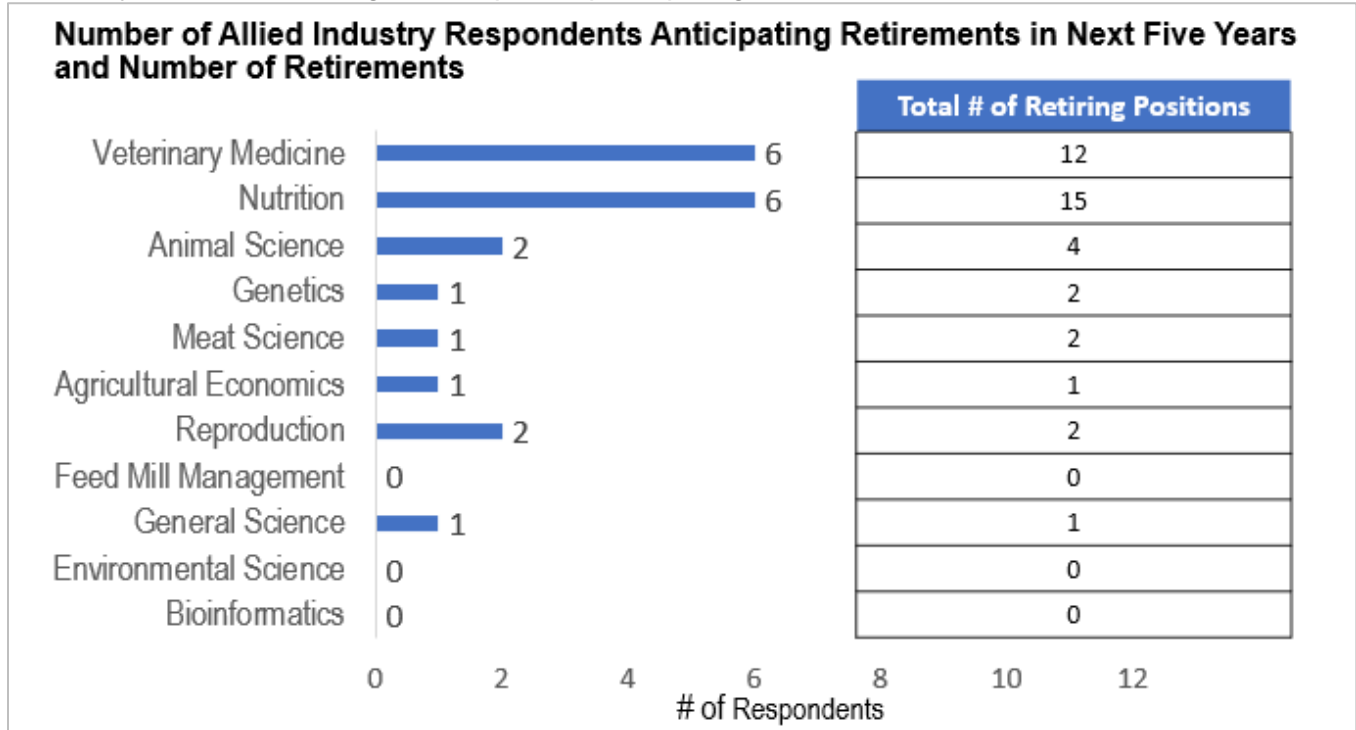
Q13. How many vacancies do you currently have in this specialty? (n=20)

Nutrition leads in the number of vacancies currently reported by study participants, followed by veterinary medicine and genetics.



Q14. How many retirements do you anticipate in this specialty in the next 5 years?
(n=20)

Nutrition leads the number of expected retirements with 15, followed by 12 expected retirements in veterinary medicine – among the companies participating.



One equipment/manufacturing company indicated another specialty field on the list which they hire is engineering. While they anticipate retirements in the next five years, they defined the candidate pool as very good for individuals representing this specialty.

Another specialty field that requires advanced degrees includes lawyers. Some companies, given their size or those in banking/lending, employ attorneys on staff. Other companies retain legal counsel as consultants. Those who employ company lawyers indicated the pool of candidates is very good, however, it is a challenge finding attorneys with a background in agriculture.

Q15. Do you currently employ advanced degree specialists in areas not listed? If so, what are they? (n=20)

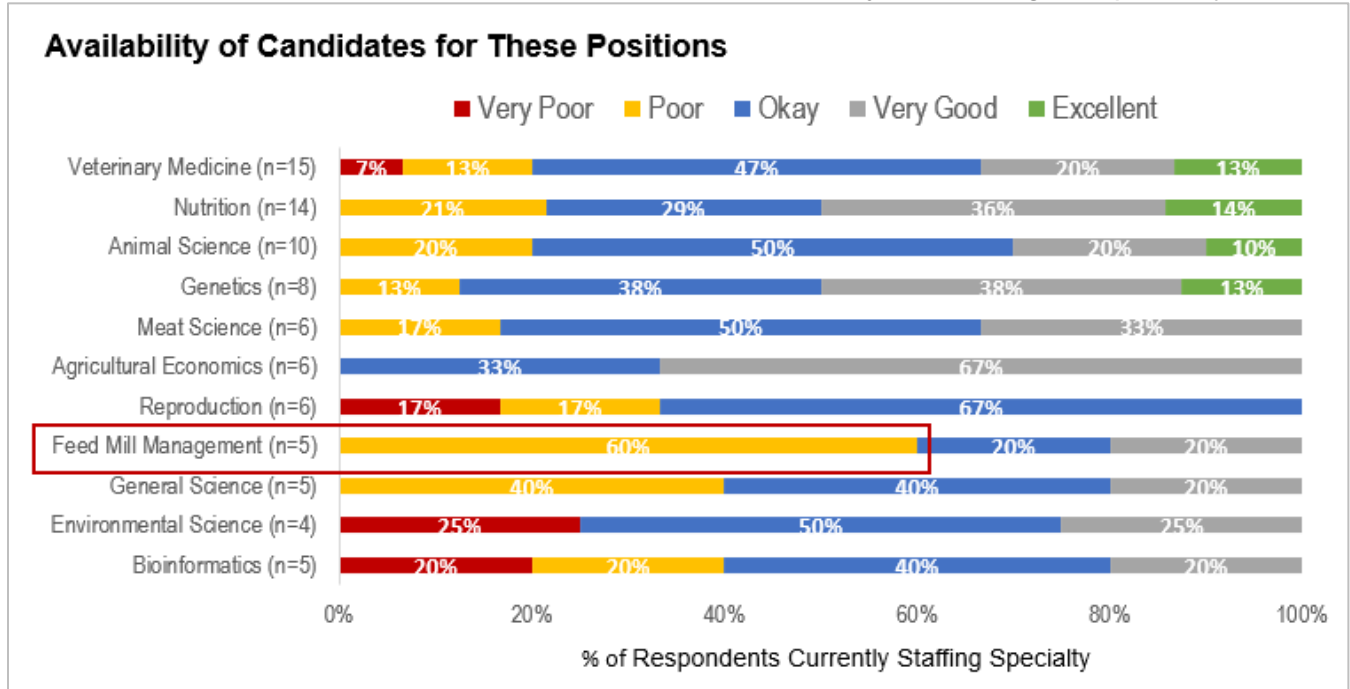
Ten responding organization indicated they are employing advanced degree specialists in areas not included in the survey. Other advanced degree positions include:

- Chemists
- Microbiologists
- Lawyers
- MBA's
- Mechanical engineers
- Software developers
- Data science

AVAILABILITY OF CANDIDATES

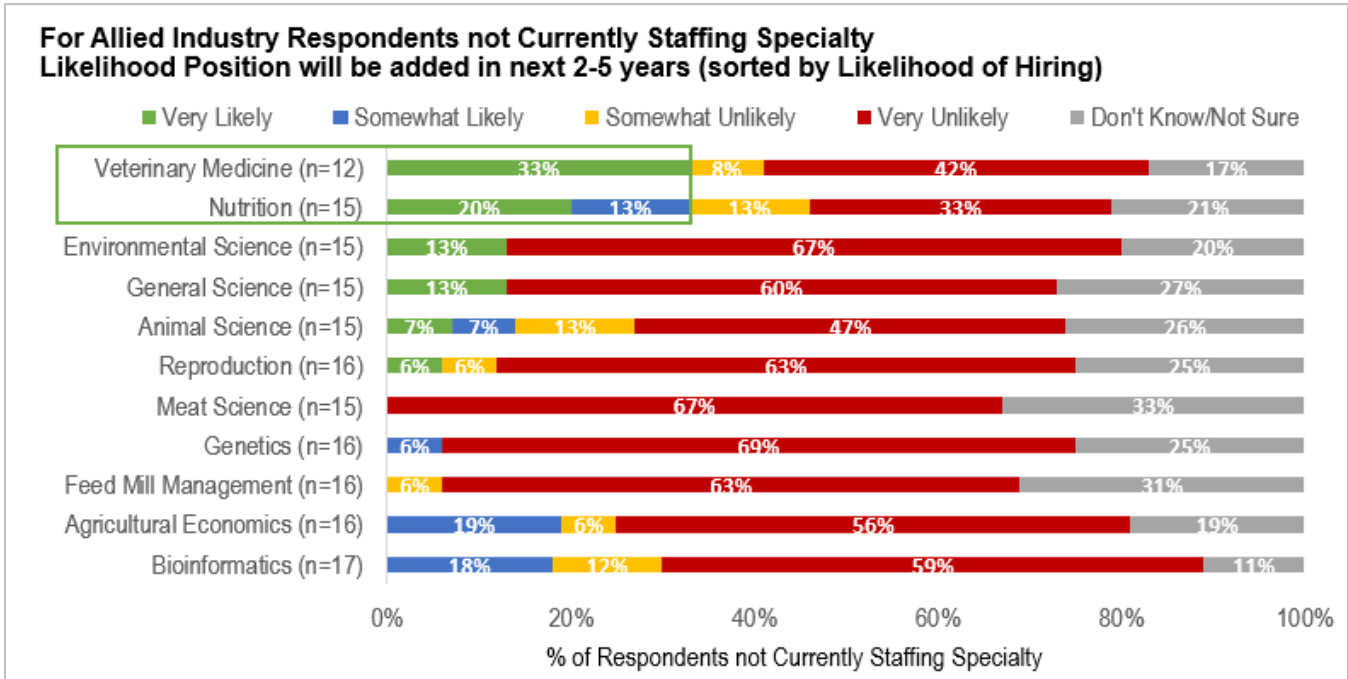
Q16. How would you rate the availability of advance degree professionals for these specialties? (n=4-15) This question was only asked of respondents that indicated they are hiring the specialty.

The three areas employed most often – Veterinary Medicine, Nutrition and Animal Science – show a dichotomy in responses – with a handful rating as “excellent” availability and a handful rating “poor.” It is not clear why this difference exists among responding companies. The challenge in Feed Mill Management is again demonstrated, with 3 of 5 respondents rating as “Poor.” The growing areas of Environmental Science and Bioinformatics had 25% and 20% “Very Poor” ratings, respectively.



Q17. For the specialties you do not currently employ, what do you see as the likelihood you will add the specialty in the next 2-5 years? This was only asked for the specialties that respondents indicated they are not currently staffing. (n=12-17)

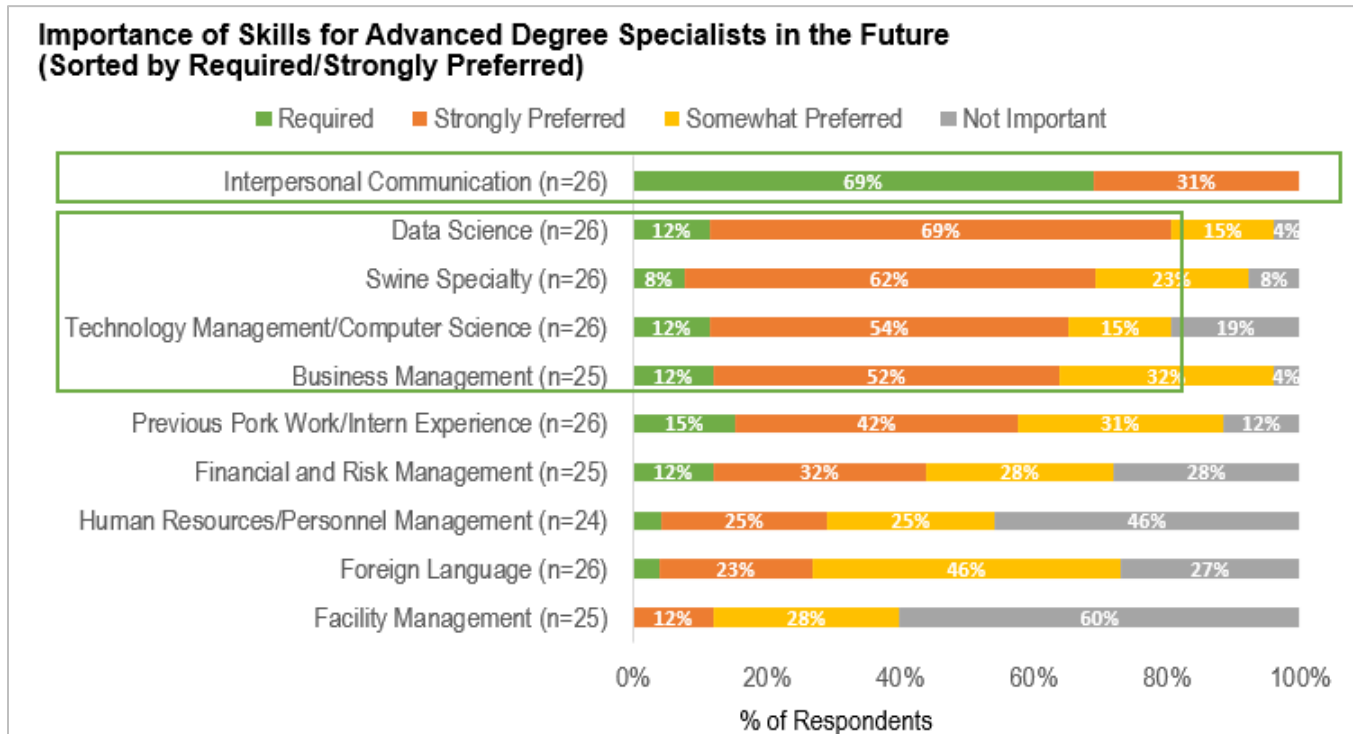
As businesses consider adding specialties that they do not currently staff with advanced degrees, more businesses are likely to hire veterinarians and nutrition specialists in the next two to five years.



DESIRED SKILLS

Q18. As you look to the future, how important will it be for advanced degree specialists to have the following skills as candidates for your company? (n=24-26)

Communication – the ability to express ideas, information and engage with others – overwhelmingly leads the lists of skills. Every respondent rated Interpersonal Communication as “required” (69%) or “strongly preferred” (31%).



Cross functional collaboration was another soft skill volunteered by respondents. Many of the challenges in the pork industry are multi-faceted, and people need to know how to reach out for answers and collaborate with others. Company representatives indicated this should be addressed in educational programs. While they can be enhanced in on-the-job training, those key skills of communication and collaboration are foundational to success.

“Agility and resilience – Our researchers of the future have got to have the ability to adjust more quickly in terms of market shifts to mold themselves to the migration of the market and shifts to larger integrators, personal agility is important. Resiliency – there’s going to be a lot of change coming in the years ahead. What we did for research and tech service in the past is going to change. We need to do things differently in the market and so we need to have stamina. Our approach to the market is not going to be easy. Our team needs to be agile and resilient.” (Nutrition/Pharmaceutical)

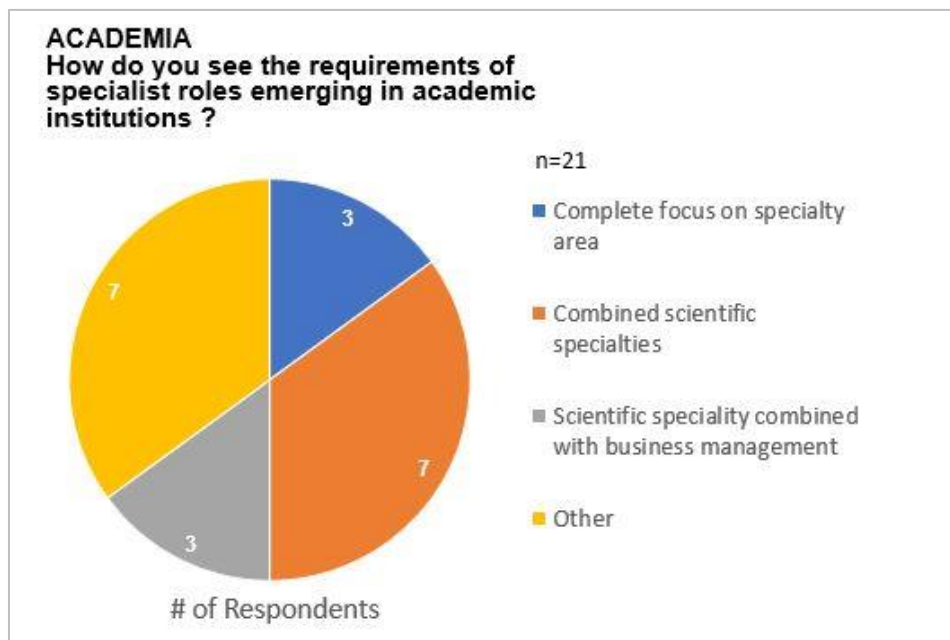
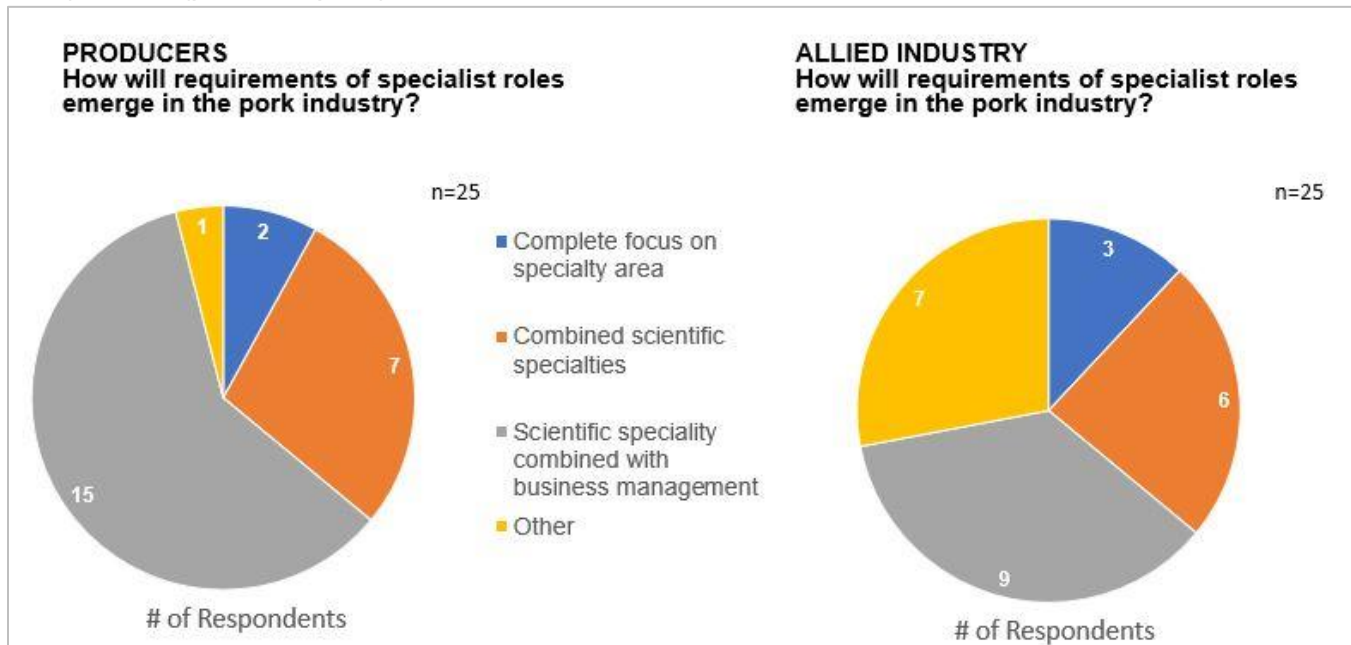
“A concern is people being well versed enough, not only in business but also managing people. There’s a lot of farm kids that went to college and now work in the pork industry. That’s changing. Many of our employees do not have a farm background, but that (lack of industry background) is going to get harder down the road.” (Finance)

“Common sense – we judge that very highly – we deal with live living animals and people, it’s not just about the numbers and science; you need to apply common sense.”(Equipment)

REQUIREMENTS OF SPECIALIST ROLES

Q19. How do you see the requirements of specialist roles emerging in the pork industry (choose one)? (n=25)

- a) Complete focus on one specialty area
- b) More need for combined scientific specialties (for example – genetics and biostatistics, animal science and environmental studies)
- c) More need for scientific specialty expertise and business (for example – animal science and MBA)
- d) Other (please explain)



Consistent with the academic and producer responses, Allied Industry representatives desire more diverse expertise from their workforce and in the candidates they hire. Science-specialty expertise combined with business was the preference by 36% of Allied Industry respondents. Allied Industry indicates they need technical experts to understand the business of raising pigs. Examples cited include wanting DVMs to also have an MBA or researchers including economics in their studies. Some Allied Industry representatives encourage their technical staff, especially if they are producer facing, to pursue an MBA.

The request from Allied Industry for individuals to earn an MBA and a scientific graduate degree is in alignment with some animal science faculty, who suggested this combination in the Phase 2 interviews.

Those responding “Other” (28%) provided various reasons for this selection. For some it was difficult to select just one of the three options. For others, their answer would differ depending on the areas within their business. For example, research will continue to need complete focus on a discipline, while technical support requires a combination of focus and business.

The need for combined scientific specialties was expressed by 24% of Allied Industry respondents, with suggested combinations from animal science and agronomy to biosecurity and disease economics. This aligns with the growing expectations of more complex businesses and their producer-customers.

The testimonials below articulate that a combination of science and business, or a combination of multiple scientific expertise, are the preference for advanced degree professionals across all sectors in the pork industry.

“A lot of the problems we are tackling in pork are multifaceted so we need different sciences – animal health and livability – it combines multiple facets – nutrition and facilities. We are past the days of having subject matter experts because of the dynamics of the issues we are tackling.” (Nutrition)

“We need more cross training. They focus so much on theory; they miss the practical side of teaching about agriculture. Exposure to the industry is very limited. That is the missing piece. Skills are one thing; critical thinking is another and far more valuable.” (Finance)

“We are moving into a phase of using data that drives decisions. The sciences are involved to accumulate data, extract it and then analyze it. A person who has the skills to combine the science in the field, setting up the pilot study and then rolling it up for analysis is very valuable.” (Veterinary Services)

“There will be increasing need for core subject matter experts. That will always be valued. There will also be a need for advanced technical science-based knowledge along with the ability to see the big picture. All three (A,B,C) will need to be increased in the next 5 to 10 years. I do think there is a hole in the pipeline for this.” (Genetics)

“It’s C. Students being trained are not putting economics in their research. That’s a huge gap when they are put out in the industry. That is the number 1 need -- we need economics. They could have the greatest research finding, but if there is not economics in that study, how relevant is it?” (Nutrition)

EXPECTED GAPS IN ADVANCED DEGREE TALENT

Q20. What, in your opinion, are the gaps in advanced degree talent that you would forecast in the next 10 years?

Business acumen and understanding the production process were mentioned most often as gaps in skill sets of those with advanced degrees. Two factors appear to contribute to these gaps: a lack of young people in advanced degrees in agriculture and a lack of exposure to production facilities / business once individuals are focused in their degree program. One participant suggested students complete an internship at a processing plant and/or hog facility between their master's degree and doctoral work. More tenured professionals in today's workforce came from a farm background and brought production knowledge with them; that is not the trend today.

"The main gap is getting people from the business side interested in agriculture....and people in agriculture never focus on the business side. We need business schools to consider agriculture. We don't get other industries bringing their ideas to agriculture or recruiting other viewpoints. We need that." (Data)

"There's a shortage of experienced nutrition individuals. They're knowledgeable in nutrition science. But we have to train them in economics and applying the science." (Nutrition)

"Microbial arena is another area we hire in – the numbers are limited and very competitive for the pool of candidates because some of the people in biotech want to stay on the human side versus animal. We know as we work towards the eradication of antibiotics, we need to have that talent on staff to address this. We have a core group on microbial now, but we will need more. It is growing leaps and bounds. As we look at core nutrition and specialty areas, the specialty piece is going to be the growth area coupled with the microbial." (Nutrition/Pharmaceutical)

"Lack of U.S. citizens to pick from. I can go to Brazil and find a million of them. Our two embryologists are foreign, it is hard to get visas. Their training in other countries is much better than the U.S. I don't think there's a lot of people that go on to advance degrees in life science. They want to focus on human; There's just not a lot of interest in animal." (Genetics)

"Advance degree holders need to be able to apply their degree in a practical manner. Too many have never been out of their cubicle; they need to apply their knowledge to the real world. If we can't excrete any benefits from their knowledge because they can't apply it, then it has no benefit. That's the gap we currently have, and I suspect we will continue to have." (Nutrition)

"There are knowledge gaps between the live animals to fresh meat. People that understand genetics, livestock production and nutrition, but then they do not understand how what they do impacts the product at processing." (Processing)

"The gap that we see for the number of jobs versus the number of applicants is enormous. We need students. We need to make agriculture fun again and make it attractive to get into food animal production. The number of foreign students is growing. At NC State, 70% are foreign students." (Nutrition)

"We need to have a greater effort of advocating for these positions and the need that exists in the industry. There are some challenges at secondary level (high school) that have created this issue where ag programs and ag career awareness have been removed." (Genetics)

"We are concerned that the U.S. based collegial level is not keeping up with the demand needs of the industry and that we are going to have a "drought" for graduates/talent. We may need to look globally and, in some cases, already are." (Genetics)

"Practical in the field production experience– not small animals and not laboratory science – is what we need. We need large scale in the field scientific and technical expertise." (Nutrition)

"We are looking for people with applied science that can make ham or sausage. We have a lot of students that all they know is the fresh meat world. We have a real absence of knowledge and even interest in further processing and the valued added products." (Processing)

CORPORATE TRAINING

Q21: Have you found that corporate training is necessary to compensate for current talent development gaps for the technical specialists you are hiring? If yes: 21a. What specific training or experience is lacking?

The answer to this question was universally YES, but not always because of gaps. It was standard for all new hires and for supporting the continued growth and development of employees.

Responding companies provide a variety of training for employees, from on-boarding process to continuing education. Specific trainings include team dynamics, communication styles, as well as general training about the business, computer systems, policies and procedures. The banking and finance sector indicated their field requires additional training to help employees receive specific licenses for insurance or accreditations to do succession planning. Veterinarians need to attain continuing education credits to retain licenses. Many businesses encourage and support employees to seek out programs and training for professional improvement and some support pursuit of a PhD or MBA.

Most said that company training will always occur to empower their employees to succeed in their roles.

Again, lack of general business accumen and pork business knowledge was raised by multiple sectors.

The testimonials shared to the right underscore the importance for advanced degree professionals to understand the business of raising pigs. Many expressed concerns that as fewer students come from an agriculture background, their college coursework must include some on-farm education. This echoed the gap in barn-level experience expressed by producers in the Phase 1 survey. While several academic institutions noted in Phase 2 that they encourage students to get experience in production facilities, very few require this experience – especially in masters and PhD programs.

General business management is a gap which employers are needing to compensate through training. The banking, pharmaceutical and veterinary services sectors specifically mentioned the pursuit of MBAs by current employees with other advanced degree.

“We’ve had to shore up the technical side – many have not had that field-based experience of working directly with producers. There are significant demands of research. Our technical service (DVMs) require more broad knowledge than how they have been trained.”

“The reason I have the people on staff with advanced degrees in nutrition is they have a good working knowledge of how a farm operates. Nutrition touches all aspects of how to raise a pig. That’s where I find the most high-level people. They understand what it takes to raise pigs.”

“Businesses are becoming more complex and some have multiple businesses. You really must understand production. How it works. How it impacts finances. You need to understand it all. Risk management is a huge piece of that.”

“I don’t see enough financial candidates that have a production background – we have a bunch of financial people making major financial decision about large companies or producers and they don’t know the business.”

“One of them is business management training, they need to get some of that from the education training process – you don’t get much business training in college. They get great science training but not business. They need to know how to run a business.”

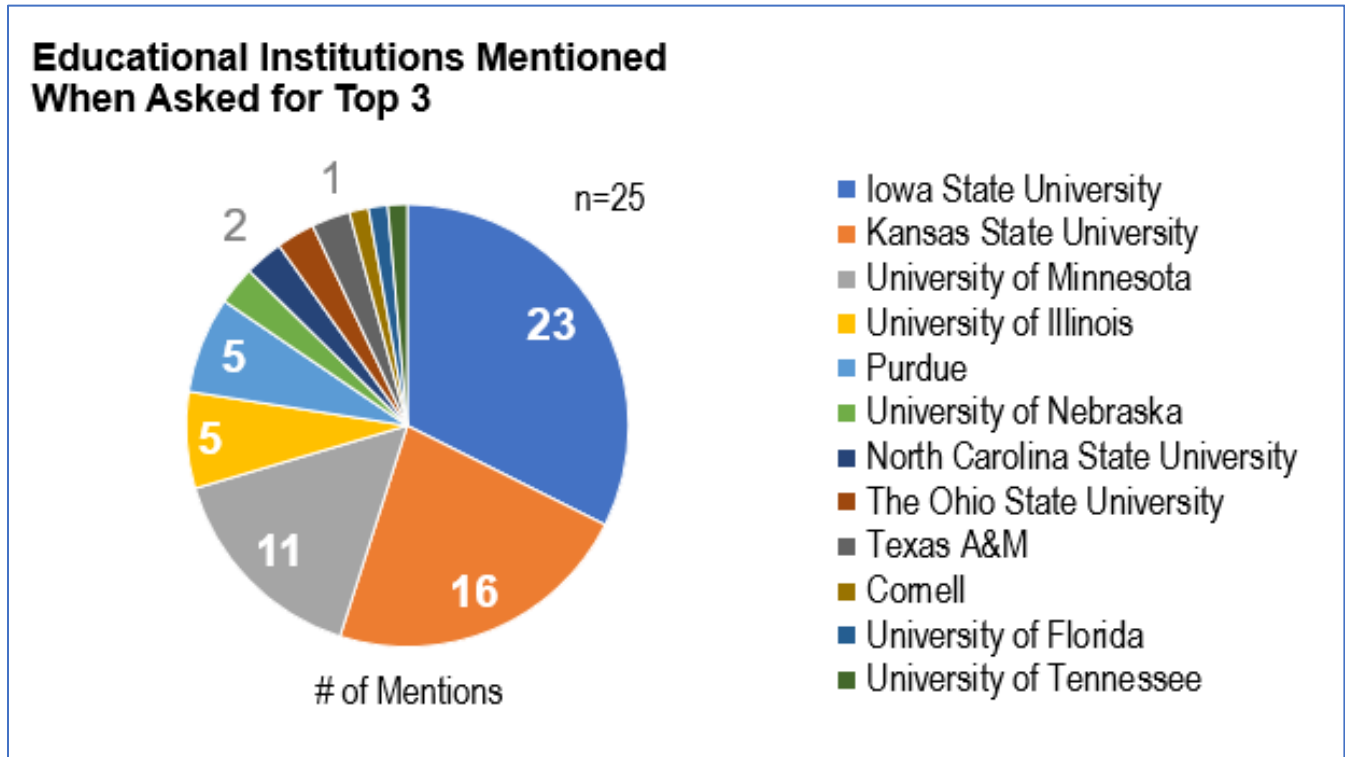
“What is lacking is business management – general things like personal accounting, profit and loss, they need to know that my revenue is more than expenses. This is an area that is lacking.”

“We are producing fewer who have a farm background. Having a farm background is getting more difficult to find. We address this through the onboarding process to provide that on-farm background with new hires.”

“There are ways to improve the land grant universities; they’re wasting their time on some classes they teach. Graduates are finishing college and they can’t write, and they can’t do basic math. They must have the basic skill set of accounting, writing and presentations, and data analytics, but more than statistics; it is statistics on steroids”

EDUCATIONAL INSTITUTIONS

Q22. Name the top 3 educational institutions that you feel are the best source of advanced degree staff or technical expertise for your business. (n=25)



In this open-ended question, Iowa State University easily topped the list as the best source of advanced degree staff or technical expertise including animal science, nutrition, veterinary medicine, genetics, and agriculture economics. In second was Kansas State University, often with the comment, “for nutrition.” The University of Minnesota – with shout-outs to their swine veterinary science program – also secured a spot in the top three educational institutions.

“For individuals who are ready to hit the ground running, those universities offer the most chance at diverse opportunities for students. They are more prominent and the opportunities are there for diversity in knowledge. There’s more funding at those universities therefore students flock to those universities. It is not that you can’t get it at other universities or that good candidates may come from other universities – it’s a numbers game.”
 (Pharmaceuticals)

APPENDIX

APPENDIX A: INTERVIEW PARTICIPANTS

Sector	Organization	Individual	Title
Data Capture	Jyga Technologies	Hyatt Frobose	U.S. Commercial Director
Data Capture	Meta Farms	Brian Parker	CEO
Equipment/Facilities	Hog Slat Inc	Fritz Richards	National Sales Manager
Financial	Rabo Bank	Christine McCracken	Executive VP of Animal Protein Division
Financial	Farm Credit Mid America	Glenda Ames	Human Resources Relationship Manager
Financial	Kerns & Associates	Joe Kerns Mike Porth	Owner CEO
Financial	Compeer Financial	Kent Bang	VP Client Services
Genetics	PIC	Matt Culbertson	Director of Product Development
Genetics	Topigs Norsvin USA	John Eggert	Chief Development Officer
Genetics	Acceligen/Recombinetics	Tad Sontegard	President & Chief Executive Officer
Genetics	DNA Genetics	John Sonderman	Technical Services Manager
Manure Management	Nooyen	Nick Van Roy	General Manager US
Manure Management	Stutsman Corporation	John Yoder	VP of Waste Handling
Manure Management	Sustainable Environmental Consultants	John Harsch	President/COO
Nutrition	Alltech/Hubbard Feeds	Russell Gilliam	National Sales Rep
Nutrition	Provimi North American Cargill Animal Nutrition	Matt Ritter	Director of Swine Technical Services
Nutrition	Zinpro Performance Minerals	Zach Rambo	Global Species Team Leader
Nutrition	United Animal Health	Doug Erla	Director, HR and Organizational Capacity
Nutrition	Seaboard Foods - Nutrition Division	Craig Maloney	Sr. Director of Operation Support
Packing/Processing	Tyson	Steve Goll	Associate Director, Research & Development
Packing/Processing	Seaboard Foods - Processing Division	Roger Johnson	Sr Director of Production, Research and Technology
Pharmaceutical	Boehringer-Ingelheim	John Waddell	Director of Account Veterinarians
Pharmaceutical	Phibro	Dwain Guggenbiller	Lead Swine Technical Manager
Pharmaceutical	Merck Animal Health	Jim Tate	Executive Director for U.S. Pork and Poultry
Veterinary Services	Swine Vet Center	Paul Yeske	DVM and Partner
Veterinary Services	Pipestone Veterinary Center	Hannah Walkes	President
Veterinary Services	Carthage Veterinary Services	Joseph Connor	Founder/Owner

APPENDIX B: ORGANIZATIONS CONTACTED THAT DO NOT HIRE ADVANCED DEGREE PROFESSIONALS

Sector	Organization	Individual	Title
Equipment/Facilities	Farmweld	Aaron Neibrugge	Sales Manager
Equipment/Facilities	Chore-Time	Paula Haines	Human Resources Manager
Equipment/Facilities	Automated Production Systems	Jeff Schoening	Technical Sales Manager

APPENDIX C: SURVEY INSTRUMENT

Respondent Details

Name

Title

Company

Sector(s) Represented

Introduction

Thanks for making time for an interview today about the future human capital needs of the pork industry. This should take about 20 minutes. Your insights will help the National Pork Board's educational work group as they work to develop scholarship and fellowship programs to help fulfill the needs for advanced degree specialists in the future.

Questions

Respondent

1. Which of the following best describes your position?
 - Human Resources Executive
 - Chief Executive Officer
 - Technical Services Lead
 - Research Lead
 - Other (if other, fill in black to identify role)

Organization

2. Company Name
3. Allied Industry Sector
4. Location of Headquarters (city and state)
5. # of total employees
6. # of employees with undergraduate degrees (BS)
7. # of employees with graduate degrees (MS, DVM, PhD)
8. For what general function / roles do you employ professionals with advanced degrees (MS, PhD or DVM)? (mark all that apply)
 - a) Laboratory research
 - b) Field or production-based research
 - c) Consultative services to producers
 - d) Sales to producers
 - e) Employee management
 - f) Operational management
 - g) Other (please specify)



If response to Q8 is research-related ask Q9, otherwise skip:

Research

9. Does your company own and operate a research facility?
 If yes, 9a. What areas of research is your organization currently conducting – relative to pork?
 (state all that apply)
- a) Genetics
 - b) Nutrition
 - c) Reproduction
 - d) Bioinformatics
 - e) Environmental Science
 - f) Economics
 - g) Marketing
 - h) Other (Specify)
- 9b. How many total employees work in pork-related research within your business?
 9c. How many specialists with advanced degrees work in pork-related research?

10. Today, how important is it to your company that management-level employees have advanced degrees (Education level of MS, PhD or DVM)?

	Very Important	Somewhat Important	Not Important	Don't Know/Not sure
Today				

11. As you look to the future, how important will it be for management-level employees to have advanced degrees (Education level of MS, PhD or DVM)?

	Very Important	Somewhat Important	Not Important	Don't Know/Not sure
In the next 2-5 years?				
In the next 6-10 years?				

12-14.

Specialty	How many advance degree professionals do you currently employ with these specialties?	How many vacancies do you currently have in this specialty?	How many retirements do you anticipate in this specialty in the next 5 years?
Nutrition			
Genetics			
Animal Science (general)			
Reproduction			
Veterinary Medicine			
Bioinformatics			
General Science			
Agricultural Economics			
Environmental Science			
Meat Science			
Feed Mill Management			

15. Do you currently employ advanced degree specialists in areas not listed?
 If yes, what are they?



16. How would you rate the availability of advance degree professionals for these specialties?

Specialty	Very Poor	Poor	Okay	Very Good	Excellent	Not currently staffing this specialty
Nutrition						
Genetics						
Animal Science						
Reproduction						
Veterinary Medicine						
Bioinformatics						
General Science						
Agricultural Economics						
Environmental Science / Waste Management						
Engineering or Facilities						
Meat Science						
Feed Mill Management						

17. For the specialties you do not currently employ, what do you see as the likelihood you will add the specialty in the next 2-5 years?

(Only ask for the specialties respondent indicated they are not currently staffing this specialty)

Specialty	Not Likely	Somewhat Likely	Very Likely	Somewhat Likely	Don't Know/Not Sure
Nutrition					
Genetics					
Animal Science					
Reproduction					
Veterinary Medicine					
Bioinformatics					
General Science					
Agricultural Economics					
Environmental Science / Waste Management					
Engineering or Facilities					
Meat Science					
Feed Mill Management					

18. As you look to the future, how important will it be for advanced degree specialists to have the following skills as candidates for your company?

Skills	Required	Strongly Preferred	Somewhat Preferred	Not Important
Swine Specialty				
Prior Pork Work or Intern Experience				
Foreign Language				
Business Management				
Facility Management				
Financial and Risk Management				

Human Resources and Personnel Management				
Technology Management/Computer Science				
Interpersonal Communication				
Data Science				

19. How do you see the requirements of specialist roles emerging in the pork industry (choose one)?
- a) Complete focus on one specialty area
 - b) More need for combined scientific specialties (for example – genetics and biostatistics, animal science and environmental studies)
 - c) More need for scientific specialty expertise and business (for example – animal science and MBA)
 - d) Other (please explain)
- 19a. Capture any comments they make regarding their response.
20. What, in your opinion, are the gaps in advanced degree talent that you forecast in the next 10 years?
21. Have you found that corporate training is necessary to compensate for current talent development gaps for the technical specialists you are hiring?
If yes: 21a. What specific training or experience is lacking?
22. Name the top 3 educational institutions that you feel are the best source of advanced degree staff or technical expertise for your business.
23. Do you have any additional insights to share on the topics we've discussed?