What does the Modern Day Business Owner Look Like?

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Executive Summary

Team 3 wanted to investigate what a modern business owner looks like. We analyzed the data from the 2019 Annual Business Survey (ABS) APIs: Characteristics of Business Owners (United States Census Bureau, 2021)and 2019 Annual Business Survey (ABS) APIs: Technology Characteristics of Businesses. (United States Census Bureau., 2021) using our API keys we pulled a broad set of data. Then, individually we investigated the following questions to illustrate what the modern business owner looks like:

- What is the modern viewpoint on work life balance?
- How does the age of business owners affect the technologies being sold by firms?
- What is the sex of the modern business owner?
- What motivates business owners? What technologies are used today and how have they affected employment of workers?

In our Business Owner Characteristics section below, we identify how we discovered the answer to these questions and what that answer is.

Overall, what we found is that the modern business owner places an emphasis on work life balance, but how strong that emphasis is changes by geographic location. The modern business owner is also far more likely to be older than 35 if their firms are selling technology, they are most commonly selling specialized equipment or cloud-based services. Overall, about ⅔ of modern business owners are male and ⅓ is female. Males are the majority business owners in almost all industries except “Educational Services.” Lastly, modern business owners prefer to start out on their own; specialized software is the most frequently cited technology; and artificial intelligence, specialized software, and robotics have ramped up employment.

Data Sets

United States Census Bureau. (2021, OCTOBER 28). *2019 Annual Business Survey (ABS) APIs: Characteristics of Business Owners*. Retrieved September 02, 2022, from https://api.census.gov/data/2018/abscbo.html

United States Census Bureau. (2021, OCTOBER 28). *2019 Annual Business Survey (ABS) APIs: Technology Characteristics of Businesses.* Retrieved SEPTEMBER 02, 2022, from https://api.census.gov/data/2018/abstcb.html

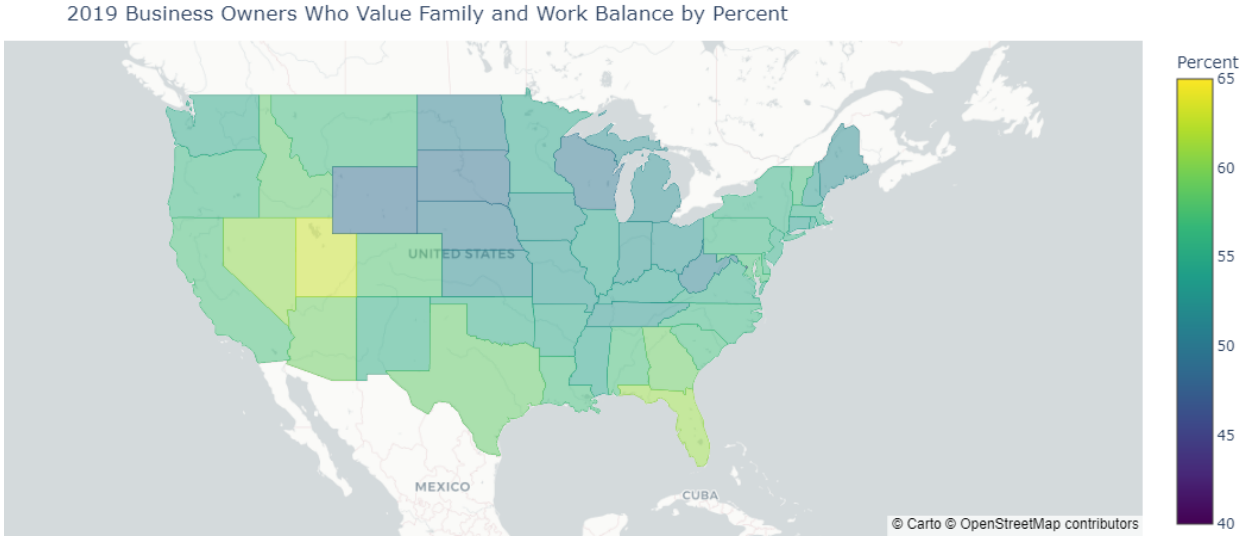
Business Owner Characteristics

The two data sets Team 3 investigated are from the Annual Business Survey (ABS) of 2018; Characteristics of Business Owners and Technology Characteristics of Businesses. From there, the Team investigated business owner characteristics of interest. The following are their findings.

Work and Life Balance

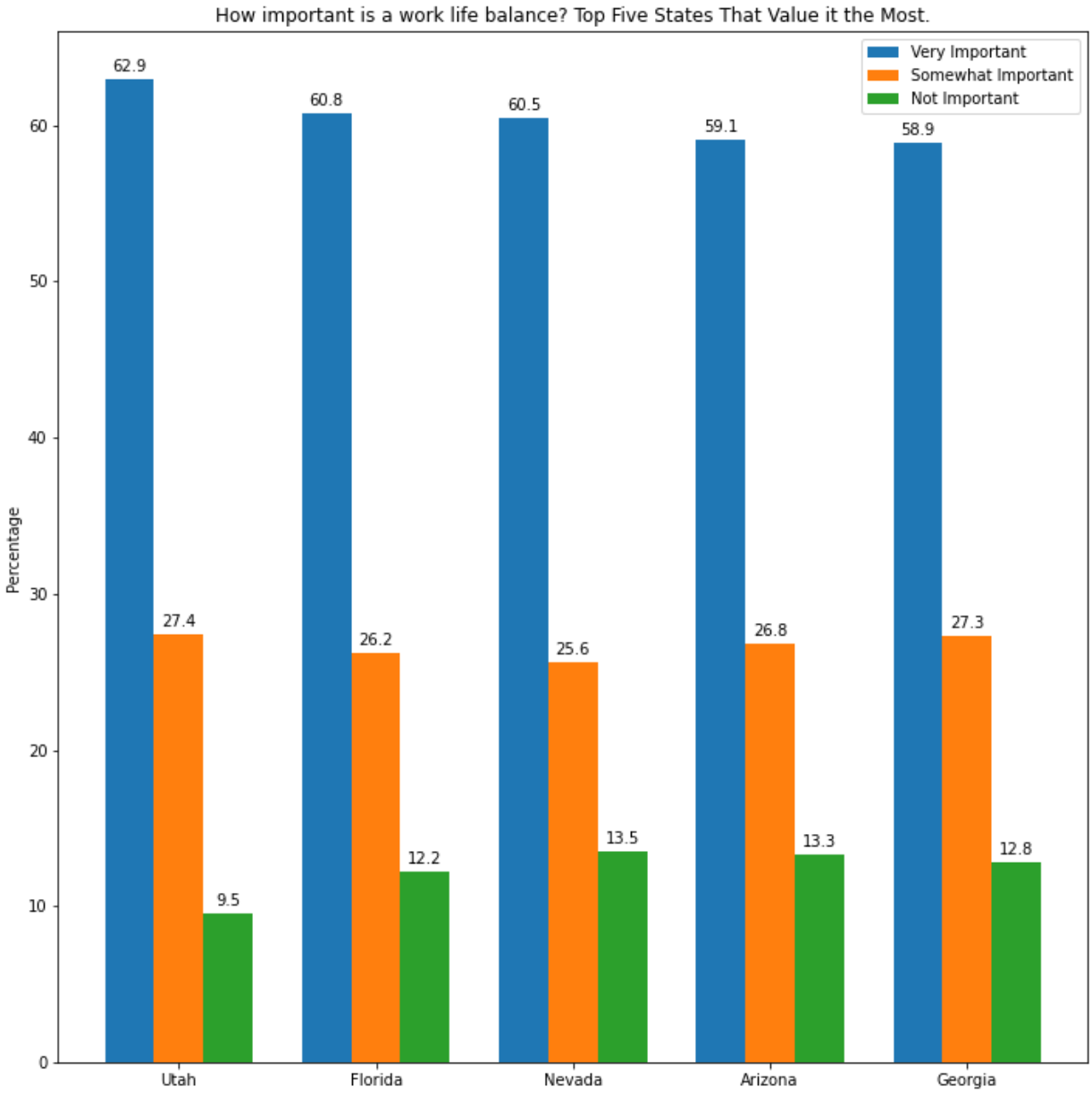
Work, sleep, eat, repeat. The mantra of the modern person can get very repetitive and difficult to deal with. That's why a lot of people put a strong emphasis on those around them and their hobbies, but what about business owners? How important is this work-life balance to the modern day business owner?

In order to answer this, we chose to look at the 2019 Annual Business survey from the United States Census Bureau. There we focus on the specific responses relative to each state. With this we hope to identify the general responses of modern business owners and any potential geographic trends.



From the above graph we can see some interesting trends. For one the west and especially Utah has this relatively stronger emphasis on family and work balance. Similarly the south-east has a stronger emphasis on being family focused. This can lead to some interesting research into the reasons why, like is it just the impact of the social influence from things like the Mormons in Utah, or the more conservative thought process in the south.

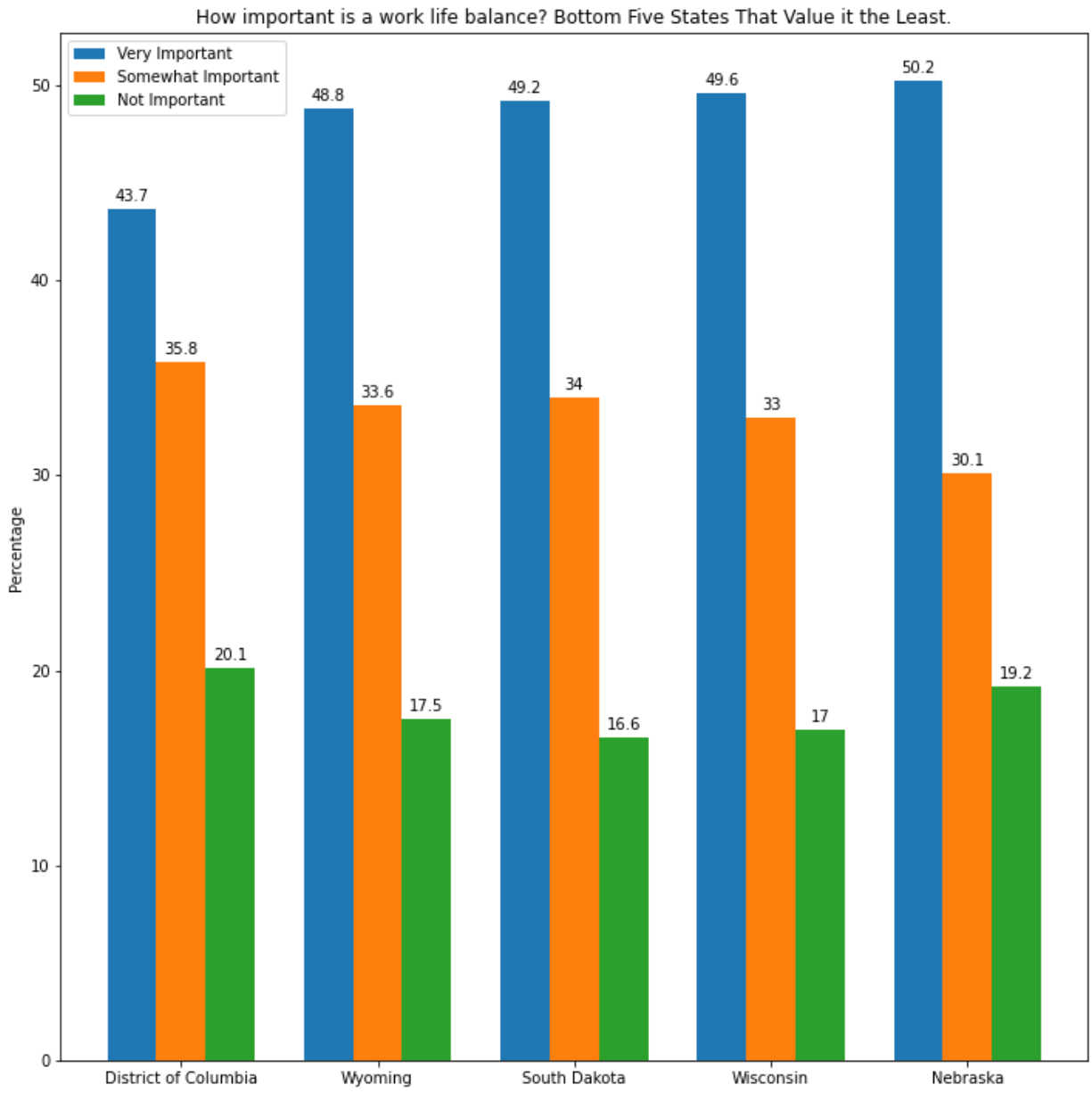
What are the top five states that value a work life balance?



We see kind of what we expected from the top five states; Utah, Nevada, and Arizona are right next to each other and have potentially a similar situation. While Florida and Georgia, represent the southern part of the states and the culture that is there.

Interestingly enough, it appears as though Utah has an incredibly strong belief in work life balance. More so than any other state by far. Especially with the percent of business owners that don't think it's important to have a work life balance below ten percent.

What are the five states that have the least interest in work-life balance?

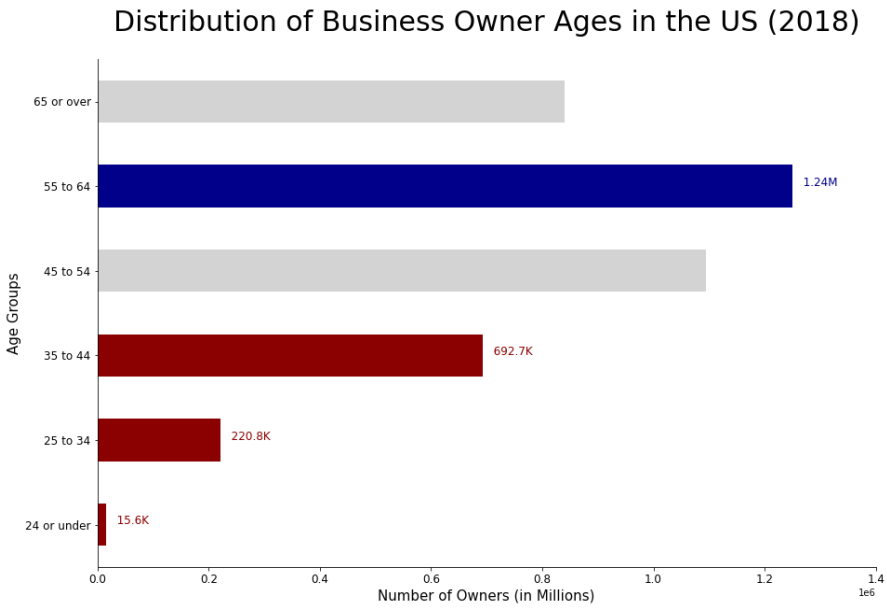


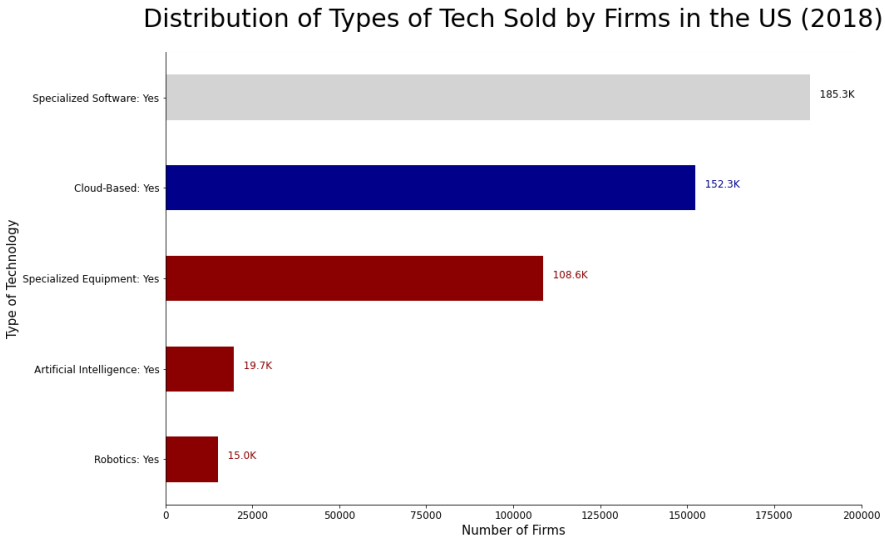
The most interesting thing we see in these visualizations are born of two distinct observations. One, the District of Columbia has the closest thing to balanced percentages across all states. As well as having the least emphasis on a work-life balance. This may be because the District of Columbia is more focused on political work and being able to work at any minute. Secondly, the remaining four states are all midwestern states that don't place this work life balance emphasis. Without any other research, a potential answer could be because that area is more focused on farming and that the business owners in that area may be more small business owners. This could indicate a different trend where small business owners are more focused on their businesses and not the work-life balance.

How do business owner ages affect the technologies sold by firms?

My initial questions were “What does the distribution of data look like?”

I started by looking at the data, then when I found the columns that were the best match for my question, I aggregated them and made some bar charts to visualize the trends in the distribution.



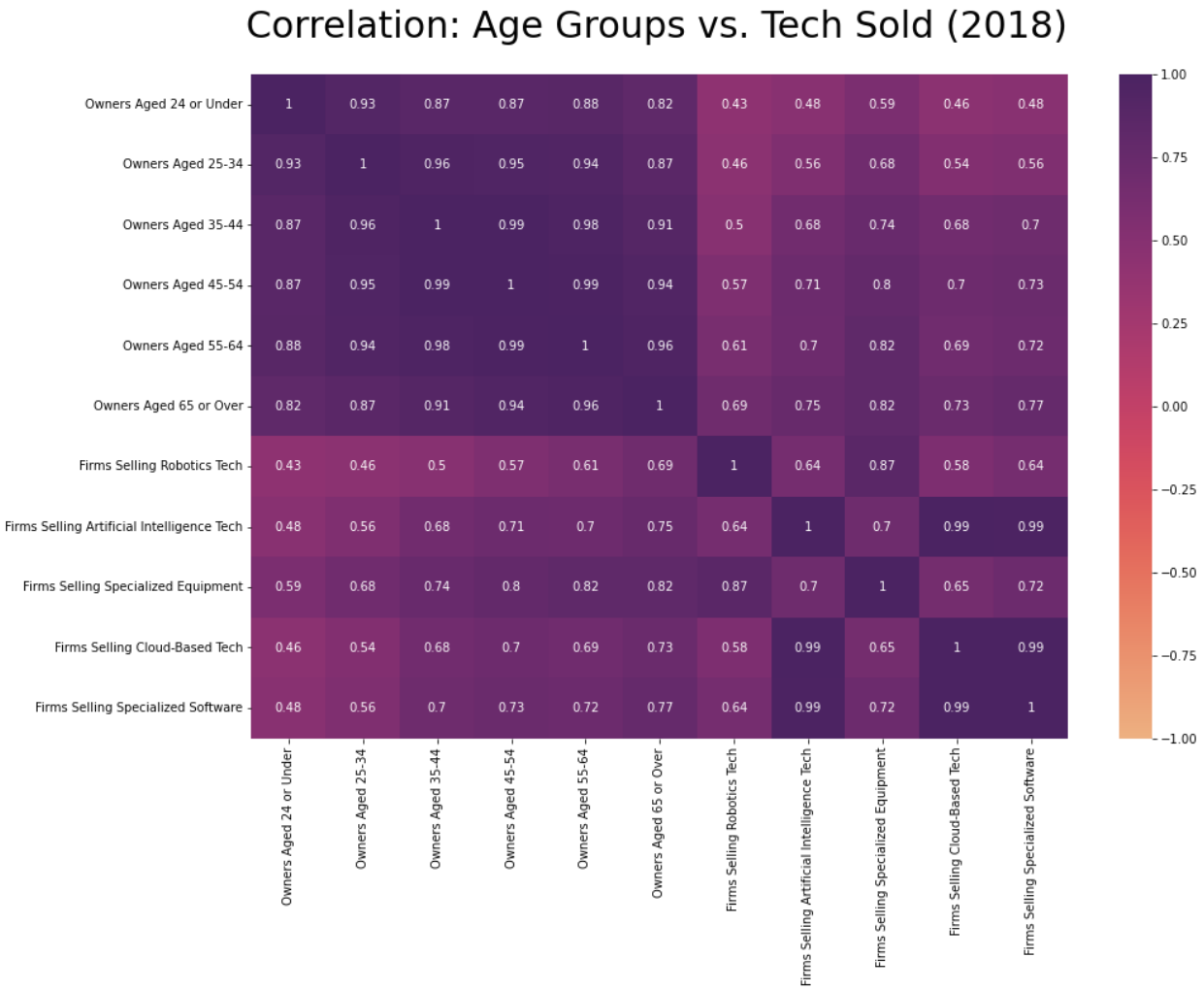


My visualization shows how many respondents answered the ABS’s questions with the answers listed. For the top visualization, it shows how many owners answered certain age groups. For the bottom, it shows how many firms answered yes to selling certain technologies. An interesting point of data is that the highest values (blue) for both charts beat out the bottom three values (red) combined!

These visualizations show that the majority of owners are in the older age ranges, the absolute highest bin being the 55 to 64 age group. For the second visualization, it shows the most popular technologies are specialized equipment and cloud services.

“How do the numbers of owners in age groups and the numbers of firms selling technologies compare to each other?”

I merged data from both of the datasets we worked with to make a master table from which I could create a correlation matrix, this allowed me to find points that trended similarly.



This heatmap takes the number of owners/firms that gave the answers listed when taking the survey and compares them to each other to see if there are noticeable trends.

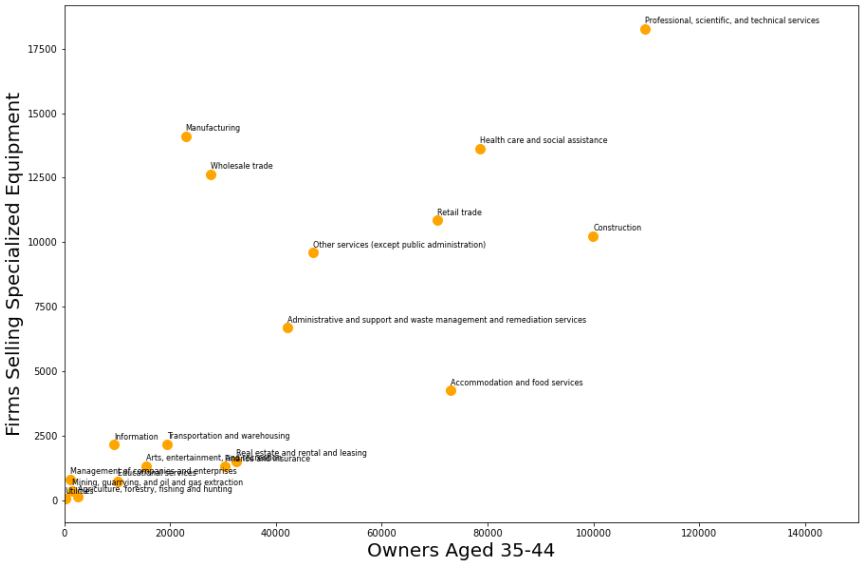
There were several points that indicated positive correlation, primarily between older age groups and specialized equipment, and older age groups and cloud-based technology. Surprisingly, the younger

owner age groups tended to trend less similarly with the number of firms selling the technologies they were matched to. I followed up on this visualization to find out more.

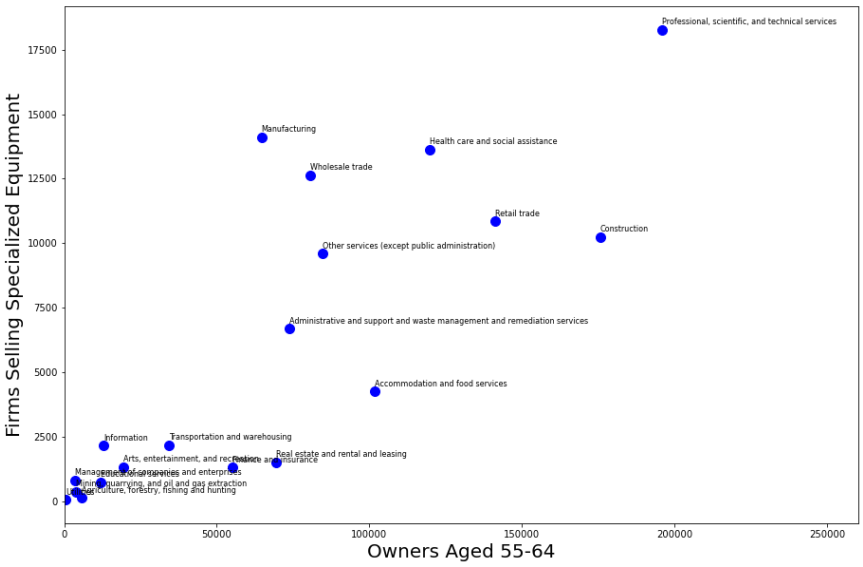
“How do the numbers of owners in age groups and the numbers of firms selling technologies compare to each other?”

I took the correlation matrix I made and created a few scatter plot graphs from key points.

Number of Owners Aged 35-44 vs. Number of Firms Selling Specialized Equipment -- by Industry (2018)



Number of Owners Aged 55-64 vs. Number of Firms Selling Specialized Equipment -- by Industry (2018)



The first scatter plot shows the relationship between the number of owners in the 35-44 age group and the number of firms selling specialized equipment. The second visualization shows the same comparison but with an owner age group of people aged 55-64 instead.

The correlation between the number of owners in the younger age group and the number of firms selling specialized equipment trends more sharply than that of the older age group. It also shows that certain industries are more likely to have older owners and firms selling equipment, like the Professional, scientific and technical services. The are also certain industries like manufacturing that have higher numbers of firms selling proportionately to the number of older owners.

What is the sex of business owners?

My initial question I wanted to investigate as a female with a degree in entrepreneurship is, how many businesses are owned by females?

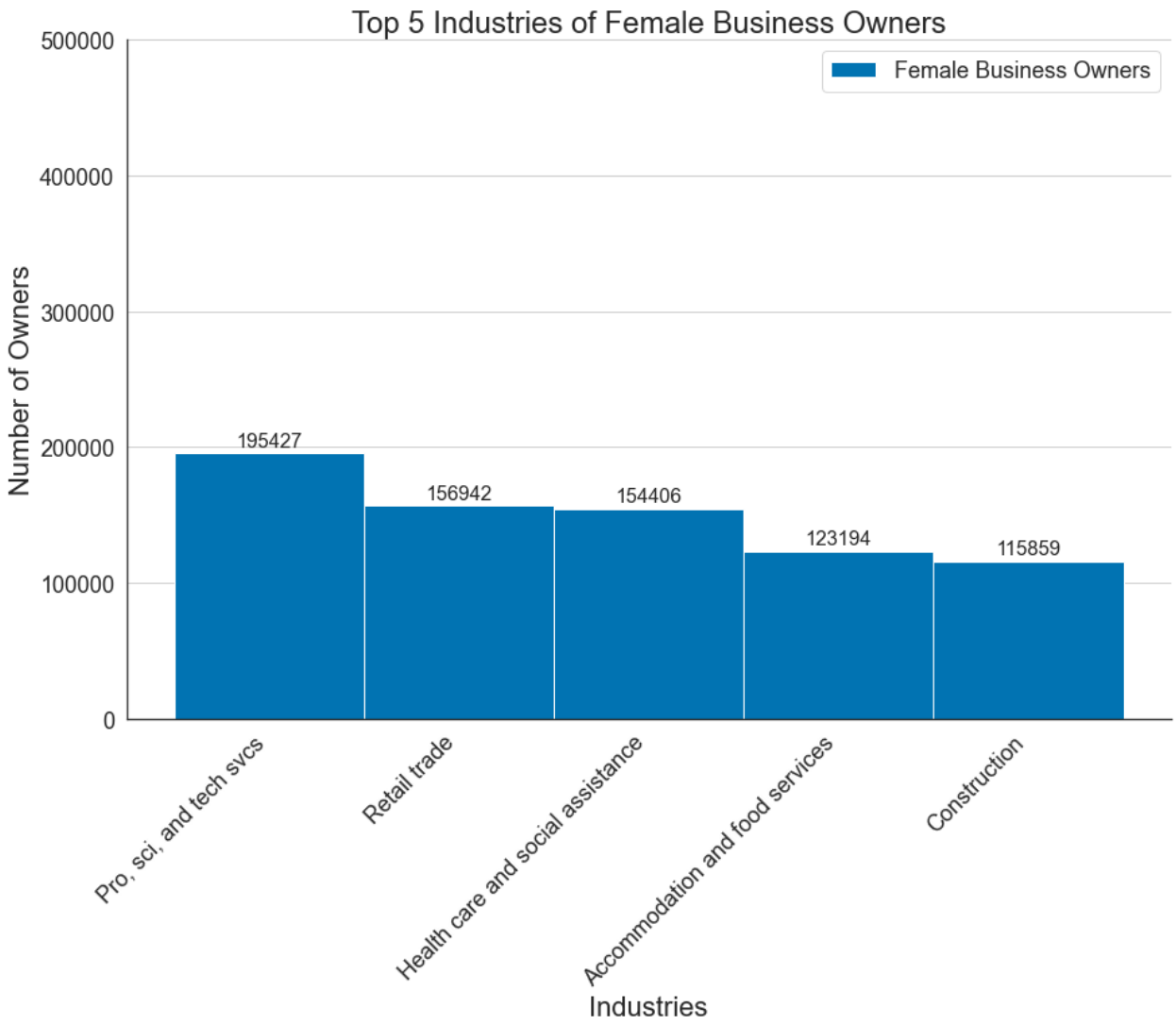
To answer this question I created the following series of visualizations. The visuals are based on data in the 2019 Annual Business Survey (ABS) APIs: Characteristics of Business Owners. (United States Census Bureau, 2021). For all of my visuals, I reduced the data to just the NAICS2017, which stands for North American Industry Classification System, to identify the industries, OWNER_SEX which identifies the sex of the business owner, and OWNPDEMP which is the number of owners of respondent employer firms.

Top Industries for Female Business Owners

The first idea I wanted to visualize is where are the females in business? What are the most popular industries of business for females?

To answer this, I created a table with only female sex represented. Then, I grouped the OWNPDEMP, which would therefore, be all female, by their industry as reported in NAICS2017. I reorganized the table so the top five rows would be the industries with the most females.

This is the result:



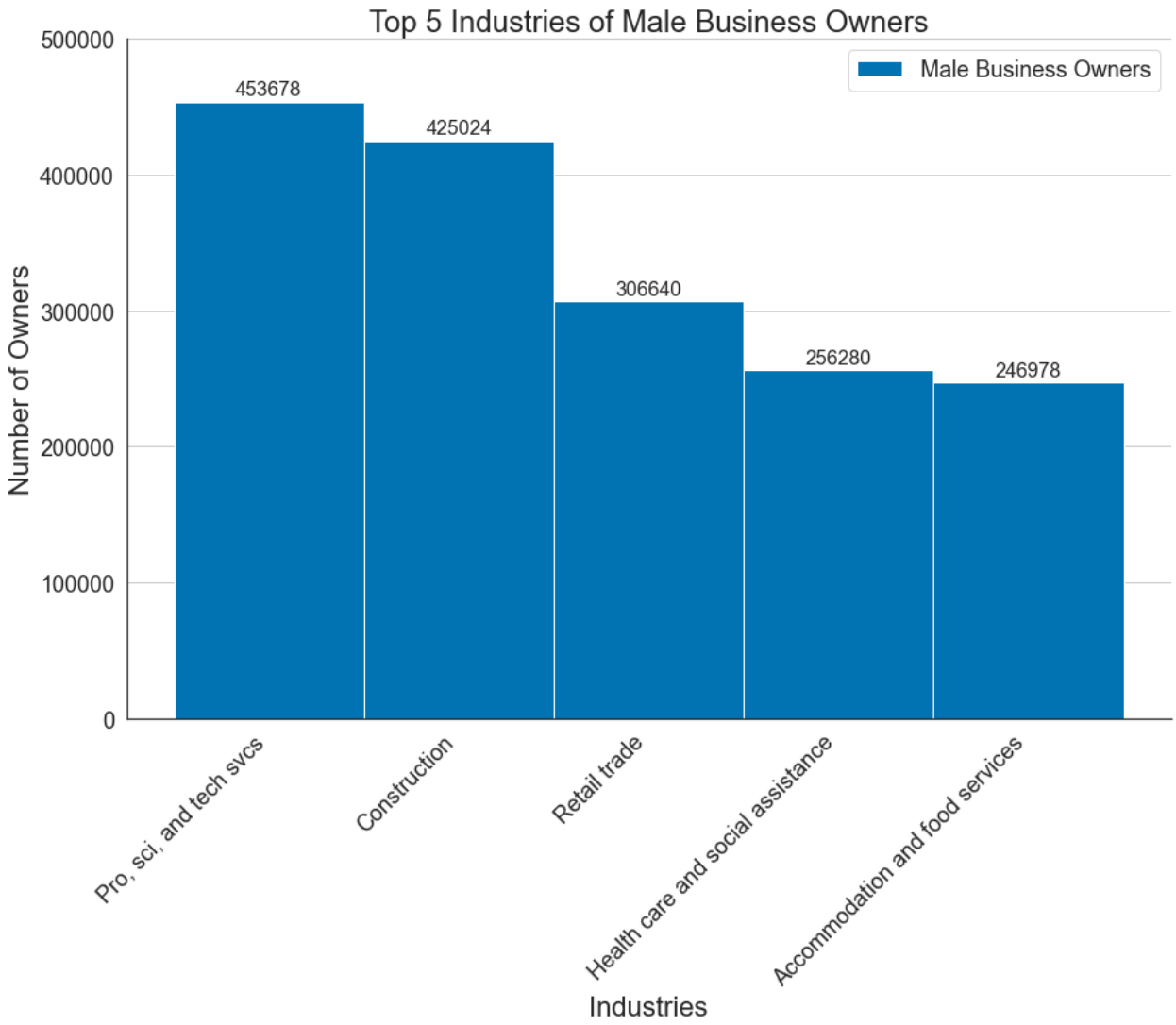
This table indicates that the top industry for females in 2018 was “Professional, scientific, and technical services,” represented on the bar chart by “Pro, sci, and tech svcs,” with 195,427 female business owners. Following “Professional, scientific, and technical services,” the next four industries with the most female owned businesses are “Retail trade”, “Health care and social assistance”, “Accommodation and food services”, and lastly “Construction”.

Well, if these are the top industries for females, what are the top industries for males? Are they different? That takes us to the next visualization.

Top Industries for Male Business Owners

To answer if males have different top industries than females, I created a table with only male sex represented. Then, I grouped the OWNPDEMP, which would be all male business owners, by their industry as reported in NAICS2017. I reorganized the table so the top five rows would be the industries with the most males.

This is the result:

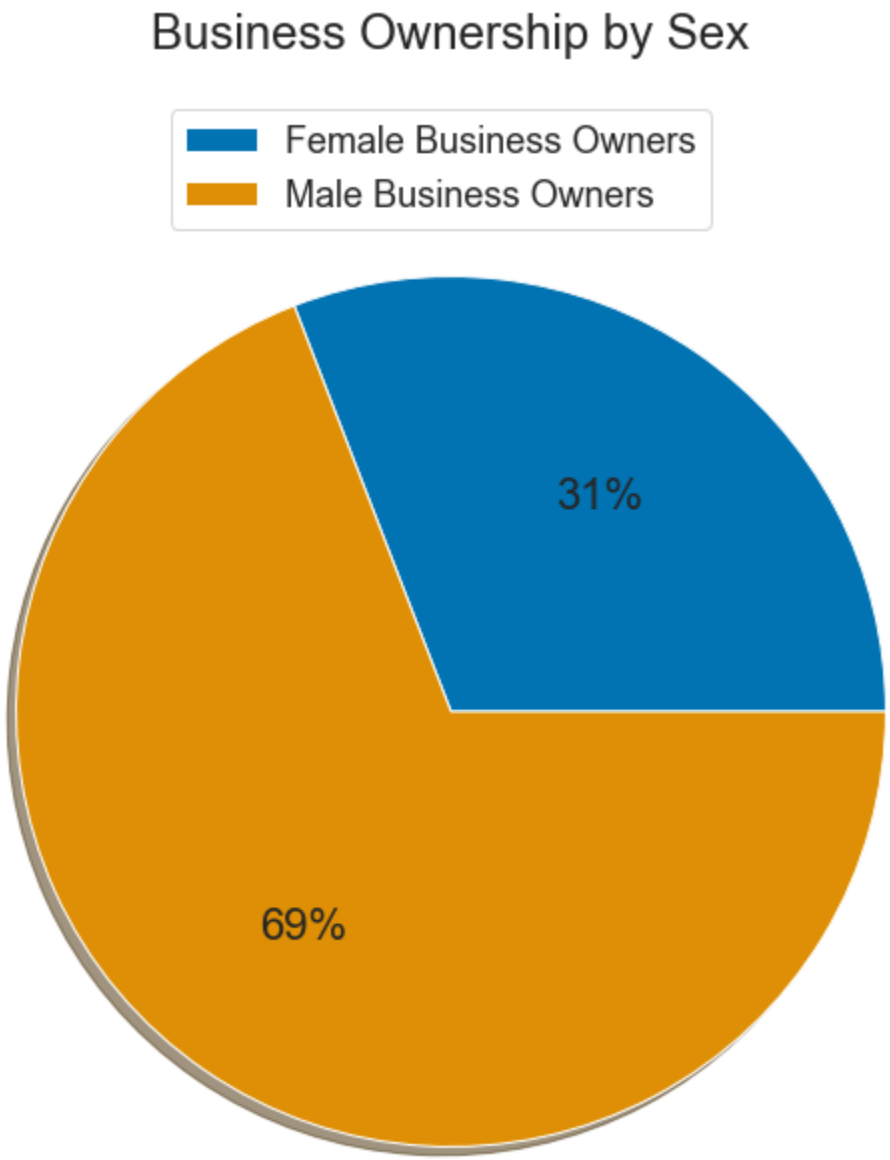


It turns out that males have the same top five industries as females but in a different order and in different total business owner quantities. Where females had 195,427 female business owners in the "Professional, scientific, and technical services," represented on the bar chart as "Pro, sci, and tech svcs," males also have "Professional, scientific, and technical services" as their top industry but have 453,678 business owners. That is more than double the amount of female business owners in that industry.

This got me thinking, if male and female businesses owners have the same industries as their top 5, there are just less female business owners, is it true in general that there are just less female business owners?

Percent Business Ownership by Sex

To find the total business ownership by sex, I merged the business ownership of females with the business ownership of males, then pivoted it. This resulted in the following following visualization:



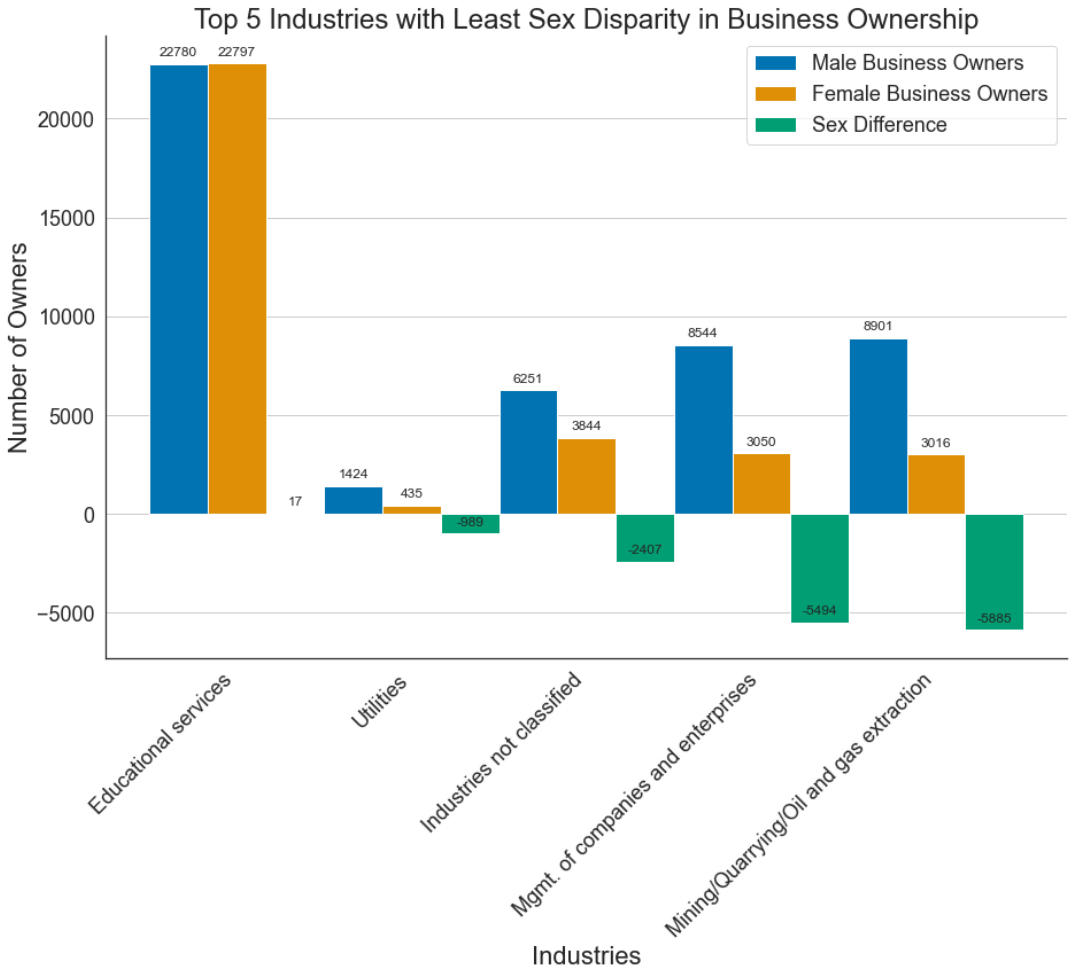
Overall, females account for about ⅓ of business owners and males account for about ⅔ of business owners. This sparked the question, are there any industries in which there are more female business owners than males? This is illustrated in my final visual.

Industries with Least Sex Disparity in Business Ownership

Are there any industries where females have more business owners than males? If so, what are those industries?

To find this out I merged my table of male business owners grouped by industry with my female business owners grouped by industry. Then, I added an additional "Sex Difference" column where I could subtract male business ownership from female business ownership. If there are any positive numbers in the "Sex Difference" column it would indicate more females are in that industry than males.

This is the result:



Females have one industry in which they have slightly more business owners and that is "Educational Service." In "Educational Service", females have 22,780 business owners, 17 more than males who have 22,797 business owners. It is interesting to note that this is the 14th largest industry out of 20 reported for females and 15th for males. This makes it not a very large industry and 0.8% of males business owners are in this industry vs 1.8% of female business owners.

Other industries with the least disparity in business ownership in 2018 were “Utilities”, “Industries not classified”, “Management of companies and enterprises”, and “Mining, Quarrying and Oil and gas extraction”. It is interesting to note that these are relatively small industries overall which may account for the fact that males still dominate the industry but because they are small, report smaller difference in male vs female business ownership.

In summary, the industry with the most female business owners in 2018 was “Professional, scientific, and technical services”. The industry with the most male business owners in 2018 was also “Professional, scientific, and technical services” and males have more than twice the number business owners as females. All industries reported in NAICS2017 had more male business owners than female business owners except “Educational services” where females were in the majority by 17 owners.

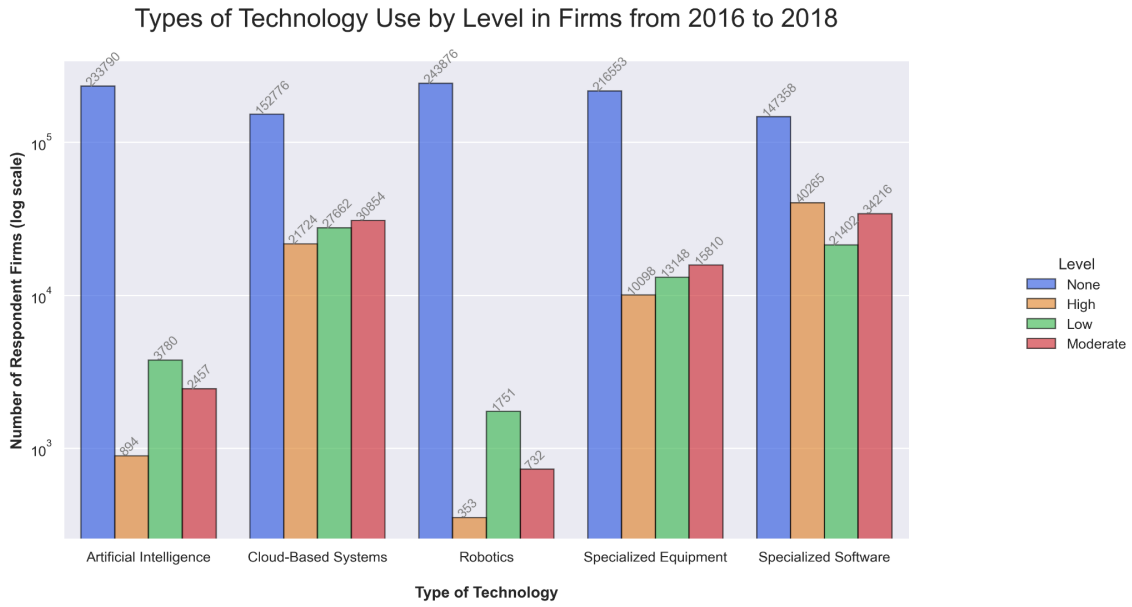
More research to be performed to further analyze this data would including looking at the sex gap in industries over time. Has the ratio of female business owners to male business owners increased or decreased since 2018? What about during COVID? Did more females have to leave their business or not start a business because of lack of childcare during COVID? Or maybe more people were laid off from work and did start businesses? As of 2022, are there any industries in which there are more females than males?

Question 4 - Peter

Listing your initial question(s): I am exploring the technologies and levels of usage in firms at the national level.

Explaining the process to answer those questions

Visualization 1



By and large, firms across the U.S. have not totally embraced the five families of technologies surveyed by the Census Bureau. However, one can see differing levels of usage and the relative popularity of such technological options. Of the firms that did not say they lack these technologies, specialized software represents the most popular option, followed by cloud-based systems, specialized equipment, and artificial intelligence. The fewest number of firms rely on robotics for their productivity. Looking at the same question in the post-COVID, work-from-home, white-collar world would lend insight to changes in the technology usage levels, and whether “Zoom” or “Microsoft Teams” would count as a specialized software or cloud-based system should be clearly defined.

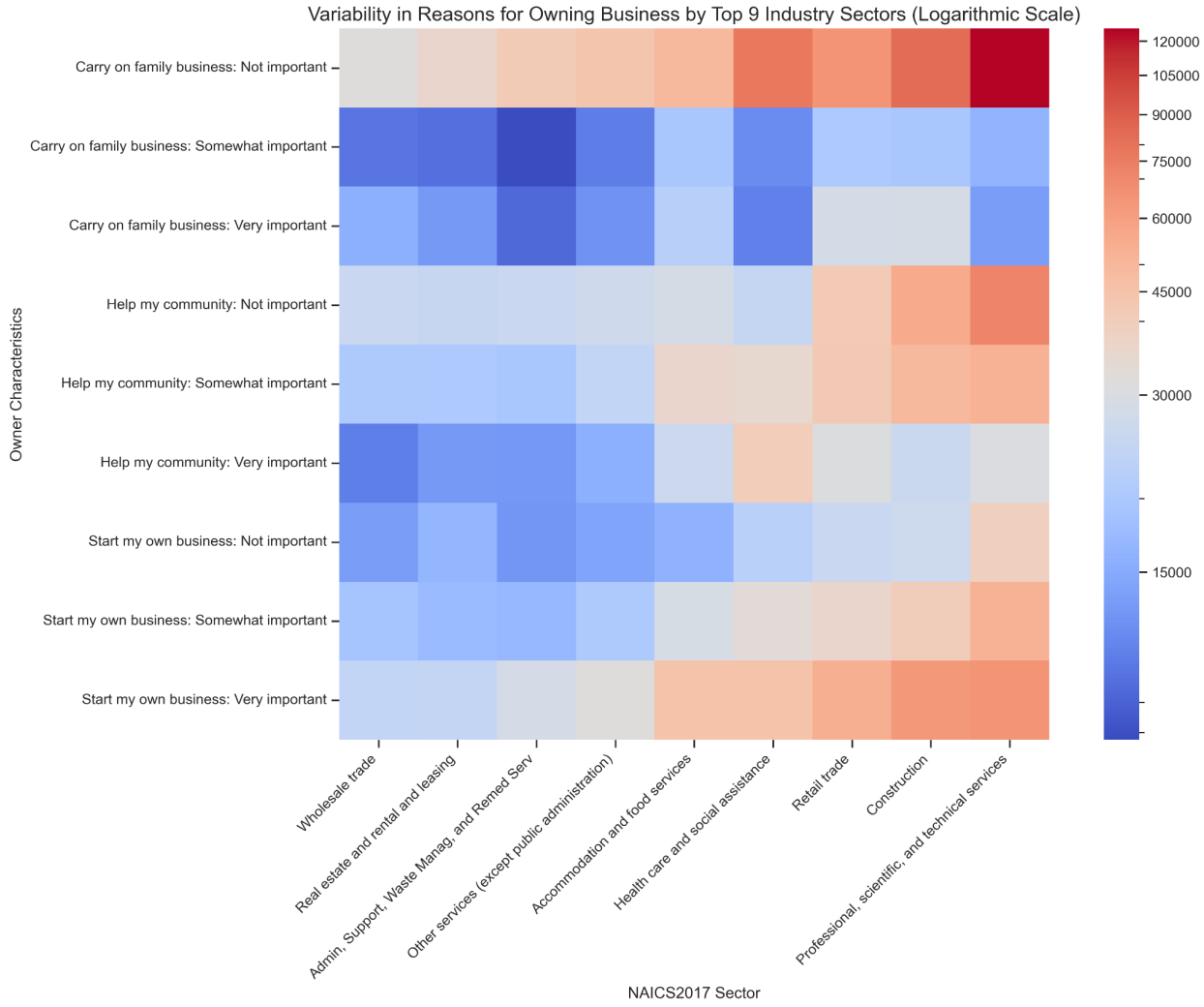
Explain what the visualization says

Answering those questions or indicating if more research may be needed. If more research is needed, suggest what research may need to be done.

Listing your initial question(s): The next graph highlights how the business owners in the most populous industry sectors deemed their reasons for owning a business from not to somewhat to very important, in particular those of carrying on the family business, starting out on one’s own, and helping the community. and lastly the owners’ perceptions as to the effect of different technologies on the types of workers employed by their businesses.

Explaining the process to answer those questions

Visualization2



What strikes me about this visual is that owners are evidently more likely to respond to what does *not* motivate them among the three characteristics than to view any one of them as fitting their experience. Since the U.S. education system and pathways to professions are generally part of a meritocracy, it should not surprise anyone that most industries would rate “Carrying on family business” as “not important.” The most selected of the three categories in the “very important” rating is “start my own business,” which reflects the trait of taking charge from the ground up. It is logical that the industry whose owners state “Help my community: Very important” the most is healthcare and social assistance.

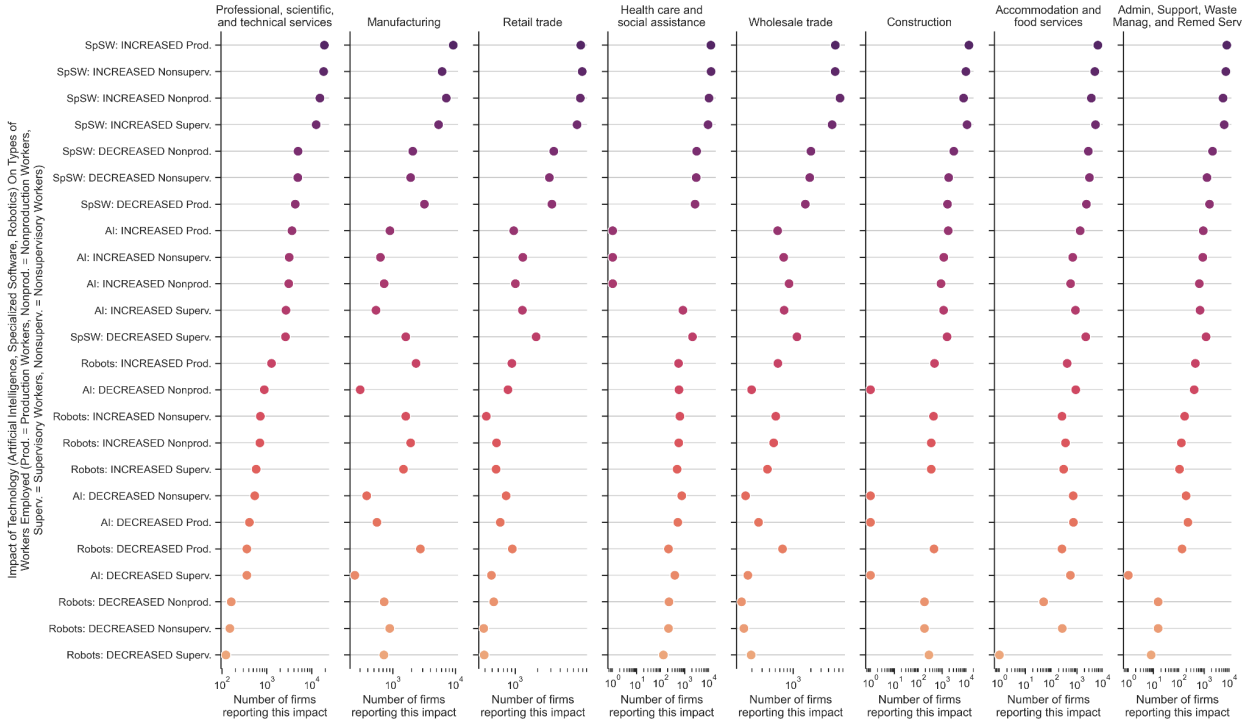
Explain what the visualization says

Answering those questions or indicating if more research may be needed. If more research is needed, suggest what research may need to be done.

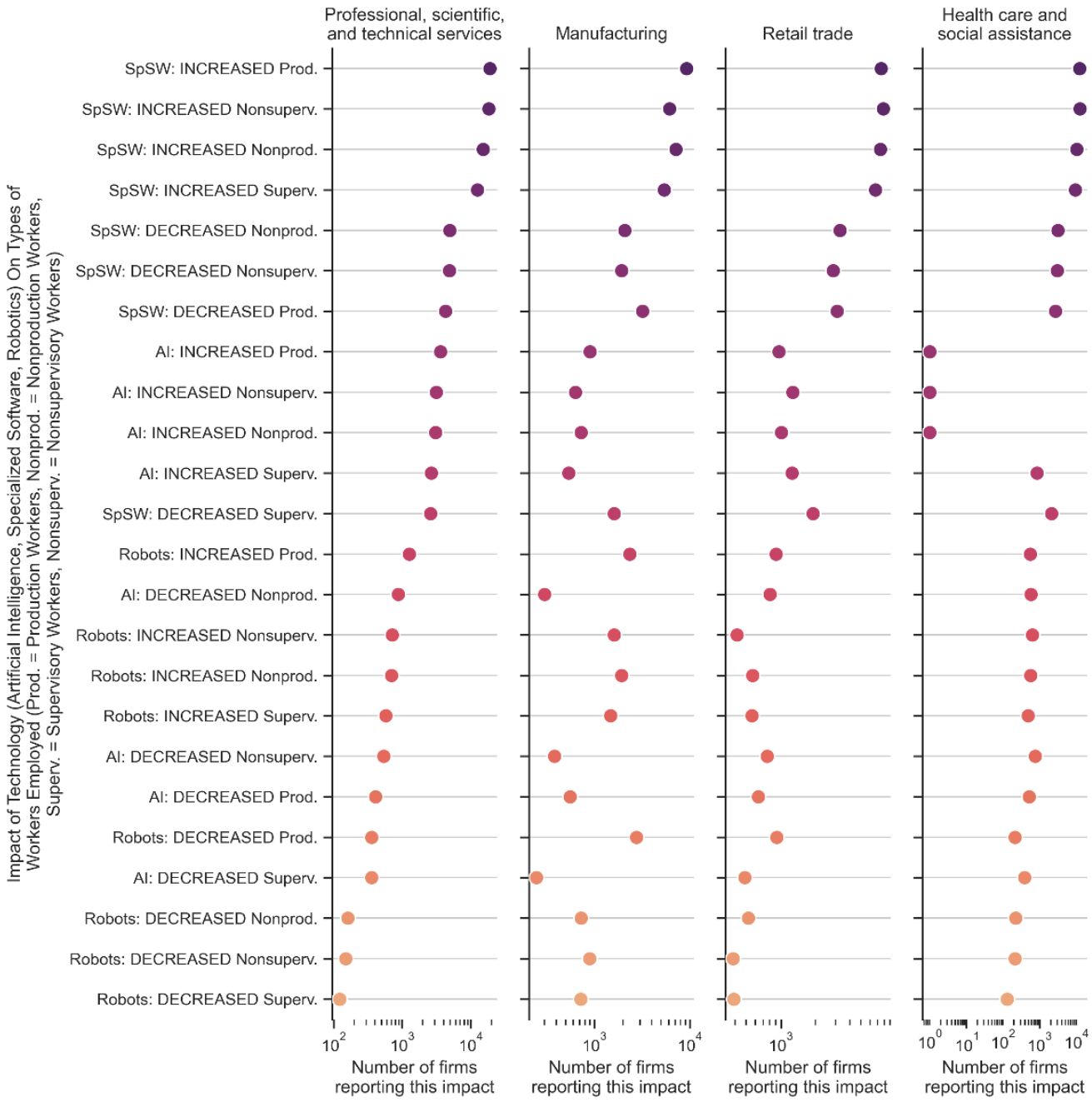
Visualization 3

Listing your initial question(s): Lastly I inspect the firms' perceptions as to the effect of different technologies on the types of workers employed by their businesses. In this notion I slice through specialized software, artificial intelligence, and robotics, trying to compare firms who noticed either an increase or decrease in production workers, nonproduction workers, supervisory workers, and nonsupervisory workers, as surveyed by labor statisticians in the U.S. Census Bureau.

Explaining the process to answer those questions



I zoom in on the graphic for readability on the following two pages.


Professional, scientific, and technical services
Manufacturing
Retail trade
Health care and social assistance
Impact of Technology (Artificial Intelligence, Specialized Software, Robotics) On Types of Workers Employed (Prod. = Production Workers, Nonprod. = Nonproduction Workers, Superv. = Supervisory Workers, Nonsuperv. = Nonsupervisory Workers)
SpSW: INCREASED Prod.
SpSW: INCREASED Nonsuperv.
SpSW: INCREASED Nonprod.
SpSW: INCREASED Superv.
SpSW: DECREASED Nonprod.
SpSW: DECREASED Nonsuperv.
SpSW: DECREASED Prod.
AI: INCREASED Prod.
AI: INCREASED Nonsuperv.
AI: INCREASED Nonprod.
AI: INCREASED Superv.
SpSW: DECREASED Superv.
Robots: INCREASED Prod.
AI: DECREASED Nonprod.
Robots: INCREASED Nonsuperv.
Robots: INCREASED Nonprod.
Robots: INCREASED Superv.
AI: DECREASED Nonsuperv.
AI: DECREASED Prod.
Robots: DECREASED Prod.
AI: DECREASED Superv.
Robots: DECREASED Nonprod.
Robots: DECREASED Nonsuperv.
Robots: DECREASED Superv.
10^2 10^3 10^4
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Number of firms reporting this impact
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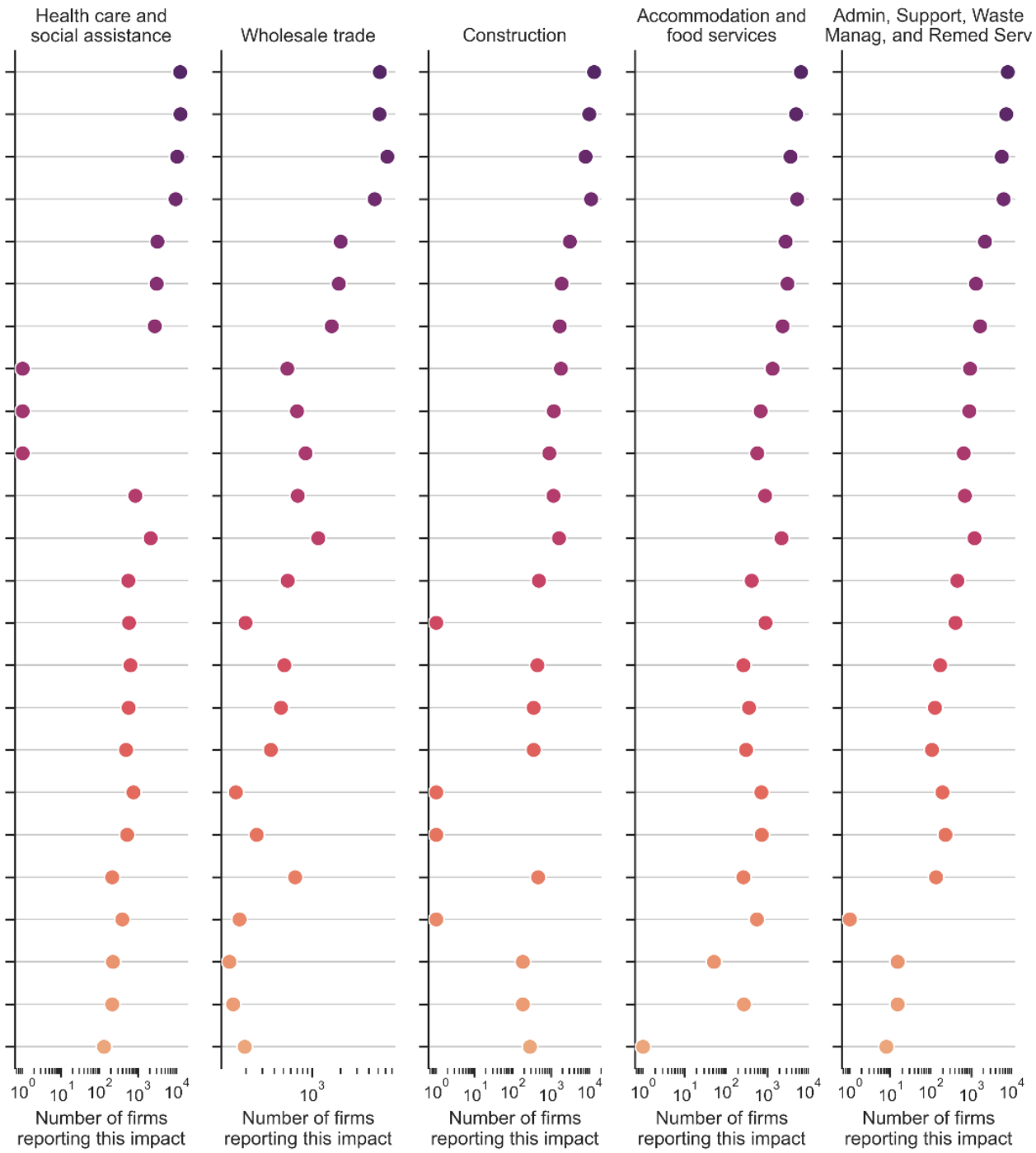

The chief takeaway from the above graphic lies in the patterns of reported impacts due to the advancement of technology on the firms surveyed in each industry. The y-axis refers to a dichotomy of positive and negative changes in labor taking place during 2016 to 2018. Professional, scientific, and technical services have the most respondents; therefore, I sorted the impacted values by this sector and placed it as the leftmost plot. Thus, at first glance, the order of tick marks for the y-axis could seem irregular. The reader should note that the graph describes three technologies: Artificial intelligence,

Specialized software, and Robotics. Each one is broken out into whether its introduction increased or decreased the number of workers of a specific type, namely production, nonproduction, supervisory, and nonsupervisory workers. On the whole, the change in the number of workers in each sector is positively associated with artificial intelligence, specialized software, and robotics, as reported by U.S. firms in the industries shown, with the exception of the decrease in manufacturing production workers resulting from robotics.

Explain what the visualization says

Answering those questions or indicating if more research may be needed. If more research is needed, suggest what research may need to be done.

Conclusion

Team 3 investigated what a modern business owner looks like. We analyzed the data from the 2019 Annual Business Survey (ABS) APIs: Characteristics of Business Owners (United States Census Bureau, 2021)and 2019 Annual Business Survey (ABS) APIs: Technology Characteristics of Businesses. (United States Census Bureau., 2021).

We found that the modern business owner with the least priority placed on work balance resides in the capital and then the midwest. The top reasons business owners own a business is to start their own business and to help their community. The modern business owner is also far more likely to be older than 35 if their firms are selling technology, they are most commonly selling specialized equipment or cloud-based services. Overall, we found that about ⅔ of modern business owners are male and ⅓ is female. Males are the majority business owners in almost all industries except “Educational Services.” Additional research we would be interested in investigating related to sex of business owner includes how the ratio and quantity of business owners of each sex change over time, specifically in regards to the COVID pandemic which began in 2020. About a third of modern business owners prefer not to integrate technological solutions into their business models, and for the remaining two-thirds, specialized software is king. Among the top industries, business owners are primarily driven by the idea of starting out ahead on their own as contributing to their professional success, followed by helping the community, and these two are more much more heavily weighted than carrying on the family business. Lastly, the advancement of technologies has brought about greater employment opportunities for different worker types in almost all sectors.