Cluster Analysis and Population Density Theories: An Exploratory Study of Indigenous Female Entrepreneurship

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The last twenty years have seen significant contributions in the literature on women entrepreneurship. This has been augmented with studies that are engaged in comparative analyses across gender, borders, and industries. While these studies provide insights into the status of women entrepreneurs, what is often missing and what has not emerged are niche studies that look at women entrepreneurs from a particular group, a particular ethnicity, a particular genre - going deep in any of these directions, with rigorous statistical analyses while focusing on and deriving conclusions from said in-depth focus. In essence, studies asking questions that call for comprehensive, multiple layer analyses with statistically backed answers that produce substantial conclusions in terms of their contribution to the forum of women entrepreneurs in general and specific niche groups of women entrepreneurs in particular. With this in mind, we turn our attention to the world of Native American entrepreneurs and specifically Native American female-owned enterprises and examine these questions as we consider the context on female entrepreneurship from the setting of the Indigenous community.

Keywords: cluster analysis, entrepreneurship, Native American females

INTRODUCTION

The literature on Native American or Indigenous women entrepreneurs traces back to 1991 (Goreham et al, 1991). Subsequent research, such as Birzer's work in 1999, continued to explore this subject. However, until 2006, there was no shift in focus toward Native American women entrepreneurs. This shift finally occurred when Neill et al (2006) focused on this demographic. Nearly a decade later, much-needed additional research emerged on Native American women entrepreneurs by Barr (2015), Gouvea and Francis (2017), Mason et al (2008), and finally, Scott (2020). Available literature on Native American entrepreneurs, both comprehensive and specific, is extremely limited, lacking both depth and focus. Even more concerning is the stark absence of substantial literature on Native American women entrepreneurs. These studies have shown that… It is evident that a significant rectification of this glaring oversight is long

overdue—a problem persisting for an unacceptable duration and still profoundly undermined. The troubling aspect is the enduring nature of this oversight. One factor that has/has not received significant endorsement/attention is the grounding of what is taking place with Indigenous women entrepreneurs vis a vis a theoretical foundation.

This paper seeks to look at Indigenous entrepreneurs in the context of a theoretical framework, but doing so exclusively just for Indigenous women entrepreneurs: An area that has largely been overlooked by mainstream entrepreneurship and gender entrepreneurship studies. The existing literature in this area mainly consists of anecdotal stories. While these are appreciated and important, they leave room for statistical analyses that provide solid, indisputable evidence and offer concrete answers that are organized logically and constructively. These perspectives if done rigorously will be especially notable as a means to allow all stakeholders to become apprised of the status of Indigenous women entrepreneurs.

The modern literature on Native American or Indigenous entrepreneurs is marked by a series of very significant studies by Pascal et al (2008) and this is where it is best to begin. The authors initially looked at the relationship between the location of Indigenous firms and their relations to clusters of Indigenous communities which is said to enhance said Indigenous businesses. The concept of clusters and its tributary, cluster analysis is sometimes poorly understood but consists of two key perspectives. The first approach involves identifying clusters of businesses in a particular region to decipher the strengths and weaknesses vis a vis the surrounding geographic landscape. The second groups entrepreneurs together based on like traits such as motivations, personality (Pascal et al, 2008) and original perspectives and develop competitive advantages, albeit together, to achieve competitive advantages for their businesses (Pascal et al, 2008). The authors used data from states such as Washington, Idaho, Oregon and Montana in their study and investigated the relationship between indigenous entrepreneurship and the location of indigenous firms near economic clusters which allowed for competitive advantages for the Indigenous women entrepreneurs (Pascal et al, 2008).

Another relevant theory is population density theory, which posits that entrepreneurs who operate close to a heavily populated area where they can cater to will be more successful (Di Addario et al, 2010). As the authors concluded that the higher the population density, the larger the potential market in each area (Di Addario et al, 2010). Both sets of authors contend that while multiple factors from different perspectives are alleged to have contributed to success for various classes of entrepreneurs; for Indigenous women entrepreneurs, it is the aggregated location of heavily populated areas that are particularly relevant. It is critical to note that in the preceding examples, the researchers did not hold gender constant, nor did they focus only on Indigenous women entrepreneurs. The preceding sections present a landscape of how the Native American or Indigenous female-owned enterprises remain an underexplored domain, warranting attention to highlight their contributions and challenges.

In this current study, we conducted an exploratory data analysis, encompassing 4,296 Native American female entrepreneurs. The aim was to illuminate distinctive findings and potential pathways for future investigation. We studied over ten variables, seeking to associate the success of Indigenous women entrepreneurs; businesses with a specific variable and found that only population density and to a lesser extent culture theory kept being relevant. Moreover, we delved into discernible patterns and trends to elucidate factors contributing to sustained entrepreneurial endeavors. The paper employs a number of statistical analyses, specifically correlation analysis and other processes that allow us to pragmatically shed light on the current landscape for Native American women entrepreneurs. This study advocates for the exploration of specific areas deserving deeper scrutiny. Addressing what leads to the success of Indigenous women entrepreneurs is important as success underpins longevity, sustainability, and subsistence. By highlighting noteworthy observations and suggesting prospective research avenues, this research aims to catalyze further exploration and understanding of Native American female entrepreneurship. We consider this in the context of a multiple-layer data analysis that folds in data from Dun and Bradstreet, the United States Census Bureau and business climate data from Forbes. We then discuss the implications of why the businesses of Indigenous women entrepreneurs are important to their communities and their country's economy.

LITERATURE REVIEW

Importance and Historical Perspectives

Though sparse, the literature on Native American women entrepreneurs does exist. In the same vein, there is also applicable literature in related areas of Native American entrepreneurs in general (which includes a focus on males) and Indigenous American and Non-American entrepreneurs - both males and females - which provides a relevant and substantial source of information. A historical look at the literature speaks to a quandary of sorts for Native American entrepreneurs, who were traders as early entrepreneurs in what is now Alaska and California, but through a later violent history with some trading partners, came to see such trading and thus entrepreneurship as a less than desirable form of income (Gladstone et al, 2017). These deep historical roots in entrepreneurship that has also been marred by systematic barriers, discrimination and systematic unfairness, has nonetheless propelled Indigenous entrepreneurs to thrive, restore their cultural pride (Goswami, 2021; Birzer, 1999) and provided their modern-day descendants with the opportunity to provide for their families and build generational wealth (Weir, 2007).

This strong push to generate interest in entrepreneurship among all Native Americans has been an arduous, deliberate and hopeful process. Many scholars argue that entrepreneurship provides a viable source of income, freedom and independence, and this is also true for Native American entrepreneurs (Adamson et al, 2002; Tingey et al, 2020; Goreham et al, 1991; Lofthouse, 2020; Deweese et al, 2007; Lituchy, 2007). More specifically Adamson et al's (2002) research for the Native American Entrepreneurship Report was conducted to examine the extent of entrepreneurial activity in Native communities and to identify ways to increase such activity. In this report, a survey was sent to 70 diverse institutions that were identified as providing services to Native entrepreneurs. These included community-based financial institutions, tribal business information centers, Native American Business Development Centers, and tribal credit programs. While Deweese et al (2007), Goreham et al (1991) and Tingey et al (2020) found that various forms of education had contributed positively to the development and sustenance of Native American entrepreneurship. Tingey et al (2020) found specifically that entrepreneurship education has demonstrated positive impacts in low-resource contexts. However, there is limited evidence of such programs evaluated among Native American (NA) youth in a rural reservation. In a similar vein, Scott (2020) found that training and education is desperately needed and though the women entrepreneurs learned about money at an early age of 12, their other training wasn't necessarily directly business related, but more general mentorship such as general hard work, saving and spending wisely (Scott, 2020).

Motivations and Comparative Analyses Indigenous Versus Non-Indigenous

The push to get Indigenous women entrepreneurs involved in entrepreneurship attests to the push to get this particular group of entrepreneurs involved in this sector because of its propensity to increase wealth, income and overall financial freedom and stability. Seymour (2003) stated that Native Americans are the group least likely to start a business - but contend that starting a business is a viable means for alleviating their poverty. States that have tribes - more so than individuals - are apt to have a strong entrepreneurial presence that serves their communities (Birzer, 1999; Lindsey, 2005). The barriers for businesses by Native American entrepreneurs include poverty, lack of startup capital, poor access to business education, technical assistance, low educational attainment, few role models, poor infrastructure, tribal regulations and a tendency towards collectivism which is not conducive to entrepreneurship (Garsombke et al, 2000; Bolin, 2015; Cunningham, 2017). These barriers were also explored by the prior studies and five key barriers identified - including geographic location (often away from other traffic), poor physical infrastructures, political barriers, especially tribal elections and who is in charge, social and cultural implications with the US federal government, lack of education and training related to entrepreneurship. Other barriers include lack of education, lack of entrepreneurial education and training. The location of the businesses often suffers from high crime, unemployment, lack of capital access and lack of revolving loan funds. Anderson (2005) made the argument that entrepreneurship broadens and deepens the financial prosperity of Native Americans but says this is still difficult given the lack of prosperity of Native Americans and the tendency for entrepreneurial ventures to be located at or near reservations.

Swinney et al (2007) performed a study that looked at the influence of locating near clusters of Native American populations for Native American entrepreneurs. In this instance the authors did a comparative analysis of Native American entrepreneurs and majority or Non- Native American entrepreneurs and found no significant differences between the profitability of the two groups. What was interesting and unique is that the two groups of entrepreneurs also had similar echoing of entrepreneurial spirit, values, risk taking and productiveness (Swinney et al, 2007). Scott (2020) from the Oklahoma Native Assets Coalition looked at a hundred Native

American women entrepreneurs across the United States, namely Oklahoma, California, Texas, Arizona, Montana, North Carolina, New Mexico, Oregon and Washington. The author initially found that most (69%) were raised in families with other business owners. Aspaas (2004) looked at Native American women entrepreneurs in the rural areas of Virginia and acknowledged that clusters were important, but also found that despite their location, they were savvy in procuring an online presence for their businesses that allowed them to engage a more diverse clientele than other women minority entrepreneurial groups. This proposition of clusters is not germane to the Indigenous entrepreneurs of the United States, as its relevance and positive influence has been witnessed in other countries such as Canada (Anderson, 2002), Australia (Collins, 2016), Nigeria (Koko, 2017), Mexico and Panama (Stephen, 1991).

Challenges and Success Factors

Lofthouse (2020) advanced this analysis and explored how culture affects economic development on Native American reservations, examining how culture directs the attention of entrepreneurs and interacts with formal governance institutions. Lofthouse (2020) specifically combined theoretical insights from economic sociology, market process economics and institutional economics as a basis to evaluate entrepreneurship and economic development on Native American reservations. Lofthouse (2020) felt that culture, as a web of social meanings, shapes what opportunities entrepreneurs are alert to, influences how they perceive transaction costs and determines whether institutions achieve the intended ends. Lofthouse (2020) concluded that the federal government has imposed many formal institutions on reservations, which have disrupted traditional governance and property rights structures, and thus do not facilitate positive entrepreneurship and economic growth. This sentiment was echoed by Harrington (2017) and Lofthouse (2019) but not by Bressler et al (2014), with the latter expressing that the government provided more help for Indigenous entrepreneurs than their tribes. The author concluded that the "entrepreneurs across several reservations have leveraged their cultural and social ties to create robust informal economies despite the barriers. The author further states that in some cases, imposed institutions have fostered rent-seeking and given rise to a culture of rent-seeking" (Lofthouse 2019: 1).

Scott (2020) assessed the related research from a different perspective and found that 42% of the women entrepreneurs had community teaching that focused on behaviors, caring for others and this increased to 62% stating that they felt they hadn't received enough formal business training before starting their businesses, with 57% stating that they didn't have a business mentor (Scott, 2020). Other studies have taken a different approach and looked internally at the assistance received from tribal organizations and organizations definitively set up to support Native American businesses. Colbourne (2017) found that Native American businesses were most successful when their rights were supported, respected and adhered to both by their own tribal organizations and by outside government agencies that were entrusted to support them. To that end, Colbourne (2017) spoke of a "quadruple bottom line" that not only focuses on financial rewards, but also embraces their rich history, their traditions and culture and language and how these latter elements lay a solid foundation that strengthens their resolve to persevere in times of struggle. In a related study, Bressler et al (2014) supported the preceding finding. They found that Native American businesses were most successful when they embraced and maximized the tribal and government resources available to them. The authors further found that the genre of entrepreneurship was vital to Native Americans' growth and survival, even though statistics showed that they occupied the lowest numbers as entrepreneurs - this remains true for both for Native American male entrepreneurs and Native American female entrepreneurs, whose numbers stand at 0.3% and 0.6% respectively of all the entrepreneurs in the United States (U.S. Census Bureau, 2020).

Other studies have veered their focus to the concept of culture and sustainability as key factors in the continuous existence of the Native American women entrepreneurs' businesses by O'Neill et al (2006) and Gouvea and Francis (2017) ten years later. More strategically O'Neill et al (2006) examined cultural influences on sustainability in a Navajo Nation, showing how the intersectionality of culture and sustainability aids and abets the sustenance of entrepreneurship for the Native American entrepreneurs. Gouvea and Francis (2017) expanded this perspective by looking at Indigenous Women entrepreneurs in New Mexico. They used a qualitative interview documenting and displaying how the connection to the land aided the Indigenous women entrepreneurs (Gouvea and Francis, 2017). The previously mentioned article by Colbourne (2017) also spoke of sustainability in the Native American entrepreneurs' entrepreneurial journal, along with spirituality and community as key factors to the success of their "quadruple bottom line."

The level of support needed to enhance the businesses for Indigenous women entrepreneurs and the broader overarching group of minority women entrepreneurs was explored by Barr (2015) who started a Hamilton project to investigate and support definitive methods that will help minority women entrepreneurs in general and Indigenous women entrepreneurs in particular to start and maintain their businesses. The author further felt this support system was critical to their survival. This was reinforced by Goreham et al (1991) in an earlier study decades ago which looked at several factors including: family origin, reasons for entrepreneurial activity, impact of education on entrepreneurial activity, factors that impact success, financial and technical resources available, difficulties faced and value systems. The authors noted that the entrepreneurs used funding primarily from organizations and institutions that helped small businesses but attributed the bulk of their success to hard work, their value system and help from their family (Goreham et al., 1991). The research study also demonstrated that the entrepreneurs felt the wider community did not always support their entrepreneurial activity and saw it as a "white" activity. The said entrepreneurs felt more could be done by their own tribal communities and organizations to assist them (Goreham et al., 1991). This idea of support and its critical importance was reinforced in studies by Teller (2010) and the Native American Entrepreneurial Report, which was completed in 2002. This was even further reinforced by Scott (2020) and Mason et al. (2008) who stated that Native American women entrepreneurs would benefit from mentorship, financial literacy and overall business education programs during the business startup and maintenance phases.

Theoretical Perspectives

To explore theories on Native American women entrepreneurs or Indigenous American women entrepreneurs one has to tap into the theories from the closely related areas of Native American entrepreneurship in general and Indigenous entrepreneurship in general. This move from a general to a specific scope allows the current research to be grounded into previously confirmed areas and thus helps with the validity of what has been done and the results that have been found. Colbourne (2017) makes a very solid point by stating that "Native American entrepreneurship is not just about money, it is about history, tradition, culture and language embedded in time and traditional territory. It is the creation, management and development of entrepreneurial ventures by Native American peoples for the benefit of Native American peoples." By making such a statement Colbourne (2017) is highlighting that studies on Native American and in a related sense Indigenous entrepreneurship deserves a look at a wider kaleidoscope one that includes their history, their traditions, their culture and their language. This understanding allows us to focus on Native American women entrepreneurship from various applicable provisions.

One of the first theories on Native American entrepreneurship that can be explored is that of the cultural theory that has been brought forth by Smith-Hunter (2003) to explain how some entrepreneurs - mainly immigrants, minorities, women and other marginalized groups have embraced entrepreneurship and embedded the development of their entrepreneurial spirit through their original culture. These cultural backgrounds perpetuate an entrepreneurial mindset in such groups (Smith-Hunter, 2003). Lindsay (2005) and Lofthouse (2020) later make similar arguments, positing that entrepreneurs from certain backgrounds will be alert to the "positive-sum market opportunities of entrepreneurship" (Lofthouse, 2020) and support

from their cultural roots (Lindsay 2005) and embrace entrepreneurship - which goes right alongside what could be propositioned for Native American /Indigenous women entrepreneurs.

Peredo et al. (2004) offers a slew of theories from an Indigenous Entrepreneurship perspective, namely modernization theory, dependency theory and regulation theory. From their perspective modernization theory speaks of a process where every group in a society has to modernize and move forward with the times so to speak, so Indigenous entrepreneurs, so some populations have to move forward and away from their original traditions, culture and languages (which have been seen as barriers) to embrace the modernization of the world and society around them includes the Indigenous entrepreneurs who are said to have embraced this modernization and eventual assimilation to the larger majority society, through their involvement with entrepreneurship (Peredo et al., 2004). In looking at Peredo et al (2004) dependency theory, the authors explain that dependency theory could also be applied to Indigenous entrepreneurship by emphasizing the role that dependency on certain factions - such as the government, the state or a community - can assist entrepreneurs from certain marginalized populations.

Finally, Peredo et al (2004) offers a regulation theory to explain Indigenous entrepreneurship stating that regulation theory is based on the needs of multiple-level economies, stating specifically that it is "based on such things as "habits and customs, social norms, enforceable laws and state forms - that have unique modes and can exist at virtually any territorial level – local, regional, national, global levels" (Peredo et al, 2004: 10). In addition, regulation theory passes through and explains different phases of economic development, and each phase of development sees different responses by entrepreneurs (Peredo et al, 2004). Ending with the argument that the current phase of regulation theory is seeing increased consumer use of a variety of products, increased mobility of capital and other resources worldwide and an increased flexibility and need for different groups to respond to these needs.

Social capital theory is another theory that has been aligned with Indigenous entrepreneurship. Dana et al (2012) posits that this theory emphasizes social capital and social networks and network structures (from a business perspective) and can be used to explain marginal groups succeeding in building their entrepreneurial groups since these groups will offer support both emotionally and financially (Dana et al, 2012). Smith-Hunter (2006) had looked at this extensively as it related to women entrepreneurship and contended that such social capital networks offered primary and secondary networks. These as well robust reciprocal relationships are critical for building entrepreneurial ventures. Finally, cluster theory which comes to us from Pascal et al (2008) and has been discussed previously in this paper. Pascal et al (2008) makes the proposition that Indigenous entrepreneurs that locate near their own Indigenous populations are more likely to derive successful ventures, more likely to survive and more likely to start businesses that cater to those populations (Pascal et al, 2008).

RESEARCH METHODOLOGY

Our core approach involves conducting exploratory analysis on data sourced from various outlets, with a primary focus on identifying relevant patterns associated with Native American female entrepreneurs and delineating pathways for subsequent research.

In this section we discuss all the data sets that are utilized in the following sections. We start with our procured dataset from Dun & Bradstreet (DB). We contacted DB and procured all available data focused on U.S women owned companies. We received a list of 4,296 Native American Female Owned (NAFO) companies, each with over 20 variables of interest. These variables encompass legal status, entity type, description, sales, address, number of employees, six digit North American Industry Classification System (NAICS) code, and various other categories for analysis.

To enrich DB data, we integrated columns about demographics for each U.S state. This involved downloading the 2020 Decennial Census from the U.S. Census Bureau website. Our augmented data set included: State Population from 2020, NA mixed: State population that declared themselves multi-racial with one piece Native American, NA only: State population that declared themselves as Native American, NA total: Addition of NA mixed and NA only. Furthermore, in our analysis, we included the following six variables: StatePercNAonly: Percentage of state population that declared themselves as NA only,

StatePercNAmixed: Percentage of state population that declared themselves as NA mixed, StatePercNAtotal: Percentage of state population that declared themselves as NA only or as NA mixed, USPercNAmixed: State population that declared themselves as NA mixed as a percentage of the total US Native American population, and USPercNAtotal: State population that declared themselves as NA mixed or NA only as a percentage of the total US Native American population.

Additionally, we obtained information on the North American Industry Classification System (NAICS) two-digit codes and their descriptions from the DB website. NAICS, introduced in 1987 as a replacement for SIC codes, was developed to reflect the evolving US and global economy by focusing on business processes instead of end products. NAICS encompasses numerous service industries, which were underrepresented in the SIC system. We added a column labeling each company with its two-digit NAICS code to enhance our dataset. This allowed us to generalize companies and create economic clusters within the dataset.

For a more in-depth exploratory data analysis, we accessed and analyzed multiple years of the Annual Business Survey (ABS) provided by the Census Bureau. Focusing on NAFO companies in our DB data, we incorporated ABS statistics on sex, ethnicity, and race to deepen our analysis. The ABS amalgamates business owner characteristics with valuable economic information about each company. Detailed information can be found on their website at census.gov under Annual Business Survey (ABS) APIs.

Our data was extracted from the AB2000CSCBO data file on the Census website. The ABS contains a plethora of questions answered by companies. We specifically filtered for the values based on NAICS code, Sex, Ethnicity, Race, Veteran status, Year, and the number of owners of employer firms. Additionally, we accessed the (AB2000CSA01) data file to include sales information and the number of employees categorized by race, ethnicity, and NAICS code.

Next, we added variables that describe various factors that would rank states in terms of favorability for startup businesses. Using the Main (2024) dataset we can look at business costs, business climate, financial accessibility and overall ranking for each state as it pertains to a company's success.

Finally, we added variables that described if a state contained an Indian reservation that based on population size in 2010 was one of the top 5 or top 10 reservations. This data was collected via the U.S Census Bureau.

EXPLORATORY DATA ANALYSIS

In this section, we focus on the augmented dataset obtained from DB and its extensions. Upon examining the DB dataset comprising individual companies owned by Native American females (n=4296), we delved into the distribution of these companies across different states and their association with population density. The table consists of variables (State PercNAtotal, USPercNAtotal, Business Costs, Business Climate, Financial Accessibility, and Overall Ranking) which are defined in the research methodology section. We also included the variables of: Number of NAFO Companies = the number of NAFO companies per state collected from our DB data set, Average of Employees (Total) = the average number of employees per state for each NAFO company based on the DB data set, and Average of Sales (100,000 US Dollars) = the average sales per NAFO company per state based on the DB Data set. These variables are presented in Table 1.

TABLE 1
DISTRIBUTION OF THE NUMBER OF NAFO COMPANIES AND OTHER VARIABLES FOR SELECTED STATES

States	State	Number of NAFO Companies	Average of Employees {Total}	Average of Sales {USD 100K}	Sales per Employee	State PercNAtotal	US PercNAtotal	Business Costs	Business Climate
OK	Oklahoma	487	8.26	11.36	1.38	16.0%	6.5%	5	5
CA	California	369	9.57	12.20	1.27	3.6%	14.4%	10	5
TX	Texass	345	11.31	14.02	1.24	2.7%	8.1%	7	4
NC	North Carolina	213	10.78	15.86	1.47	3.0%	3.3%	5	3
FL	Florida	210	7.99	9.81	1.23	1.8%	3.9%	8	4
AZ	Arizona	197	5.33	6.05	1.14	6.3%	4.6%	6	5
WA	Washington	159	6.54	10.20	1.56	4.1%	3.2%	12	9
AK	Alaska	158	10.82	9.45	0.87	21.9%	1.6%	10	5
VA	Virginia	155	22.74	99.41	4.37	2.1%	1.8%	7	5
MT	Montana	129	4.55	3.36	0.74	9.3%	1.0%	7	4
NM	New Mexico	126	7.25	7.11	0.98	12.4%	2.7%	6	8
MI	Michigan	77	27.99	17.87	0.64	2.4%	2.5%	5	6
SD	South Dakota	73	6.19	7.33	1.18	11.1%	1.0%	8	4
NY	New York	61	5.25	7.75	1.48	2.0%	4.1%	13	6
MN	Minnesota	56	8.15	13.63	1.67	2.8%	1.6%	10	5
WV	West Virginia	6	7.33	8.23	1.12	2.1%	0.4%	6	5
ME	Maine	5	4.00	2.69	0.67	2.5%	0.3%	12	3
RI	Rhode Island	3	2.67	2.22	0.83	2.1%	0.2%	10	5
VT	Vermont	3	5.67	2.33	0.41	2.6%	0.2%	11	7

Table 1 highlights that the states of Oklahoma (OK), California (CA), Texas (TX), North Carolina (NC), and Florida (FL) collectively account for 1624 companies, which is 37.8% of our DB-provided dataset. Intrigued by the high concentration of NAFO companies in these states, we investigated specific population density indicators. Through an analysis of population statistics (USPercNAtotal), we observed that OK (6.5%), CA (14.4%), and TX (8.1%) collectively have approximately 30% of the total Native American population in the U.S. We will delve further into this relationship in subsequent sections utilizing regression analysis.

Table 1 potentially reinforces the reliability of the findings presented by Pascal et al. (2008), Stewart et al. (2016), and Scott (2020). These scholarly works delve into how cultural identity and proximity play pivotal roles in the development of Native American companies. The alignment of our exploratory data analysis (EDA) with the conclusions drawn in these papers validates our dataset against previously published research. The authors of these studies emphasize and substantiate the impact of situating Native American businesses near Native American populations, highlighting the cultural and financial advantages it offers (Pascal et al., 2008; Stewart et al., 2016; Pascal, 2015: Scott, 2020).

Pascal (2008) specifically examines the effects of location and economic cluster development on Native American entrepreneurship. The study investigates the relationship between indigenous entrepreneurship and the proximity of indigenous firms to economic clusters. Regression analysis on the collected data suggests that Native American firms perform better near economic clusters, predominantly found in urban areas. The study notes an increase in firm sales and size when located in areas with a higher concentration of such clusters (Pascal, 2008). A subsequent study by Stewart et al (2016) proposes that this phenomenon could be attributed to Native American entrepreneurs' strong cultural and collective identity, providing them with a competitive advantage. Scott's study in 2020 further substantiates these claims, showcasing the varied benefits Native American entrepreneurs receive from proximity to other Native Americans, including training, emotional, financial, and moral support and mentorship (Scott, 2020).

Building upon these findings, our focus remains on gaining a deeper understanding of Native American Female-Owned (NAFO) companies. The literature reviewed underscores the extensive benefits Native Americans derive from residing near fellow Native Americans. This proximity is shown to offer significant cultural, social, economic, and political support (Pascal et al., 2008). Scott (2020) extends this notion by confirming the additional emotional, financial, and moral support proximity and clustering provide. With this robust support system in mind, our current study anticipates that Native American women business owners operating near Native American populations will experience more thriving, sustainable, and profitable businesses.

One other noteworthy observation from Table 1 is the lowest number of NAFO companies originating from states such as West Virginia (WV), Maine (ME), Rhode Island (RI), and Vermont (VT). This observation also aligns with the lower percentages of Native Americans in those states.

The data presented in Table 2 merges the aspects of population density statistics from Table 1 with the establishment years of NAFO companies, showcasing the percentage of companies created and surviving within specific five-year intervals, commencing from 1990 to 2019. For example, the cell value of 8.38 for CA (California) from 1990-1994 represents that according to the DB data set we have 8.38% of the companies that were established in CA did so in the five-year window of 1990-1994. By examining the CA column, one can see that this state has had a consistent NAFO company creation percentage regardless of the five-year window. Although data for 2020-2022 is included, it constitutes a three-year window. Additionally, at the bottom of Table 2, the corresponding rank of USPercNAtotal from Table 1 for each state is provided.

TABLE 2
ROW PERCENTAGE OF COMPANIES ESTABLISHED IN THE ASSOCIATED TIME BLOCK BY STATE

	CA	TX	OK	AZ	NY	FL	NC	WA		Row Total
1990-1994	8.38	6.59	11.38	3.59	0.60	7.78	6.59	4.79		49.70
1995-1999	6.45	10.08	14.92	4.03	1.21	4.44	6.45	3.63		51.21
2000-2004	8.44	5.54	12.66	4.49	0.53	3.69	5.80	2.11		43.27
2005-2009	9.09	5.10	12.92	3.67	1.44	6.22	5.42	4.94		48.80
2010-2014	9.11	8.77	9.57	5.47	1.14	4.90	5.01	4.56		48.52
2015-2019	8.01	8.72	11.87	5.27	1.72	4.16	3.75	2.74		46.25
2020-2022	8.18	10.68	10.00	6.14	1.36	4.32	4.09	4.09		48.86
Average	8.24	7.93	11.90	4.67	1.14	5.07	5.30	3.84		48.09
USPercNAtotal Rank	1	2	3	4	5	6	7	8		

Interestingly, states such as CA, TX, and OK emerge with the highest average percentages in company creation, standing at 8.2%, 7.9%, and 11.9%, respectively. These states also secure the top three positions in USPercNAtotal. A striking observation is that roughly 30% of NAFO companies established within any five-year period reside in CA, TX, and OK. Table 2 distinctly illustrates the consistent presence of these states in the top five for NAFO company creation since 1990, marking a clear trend over the past three decades.

Furthermore, it's noteworthy that approximately 50% of NAFO companies created in any given five-year period since 1990 have been concentrated in just eight states, hence the listing of those states in table 2.

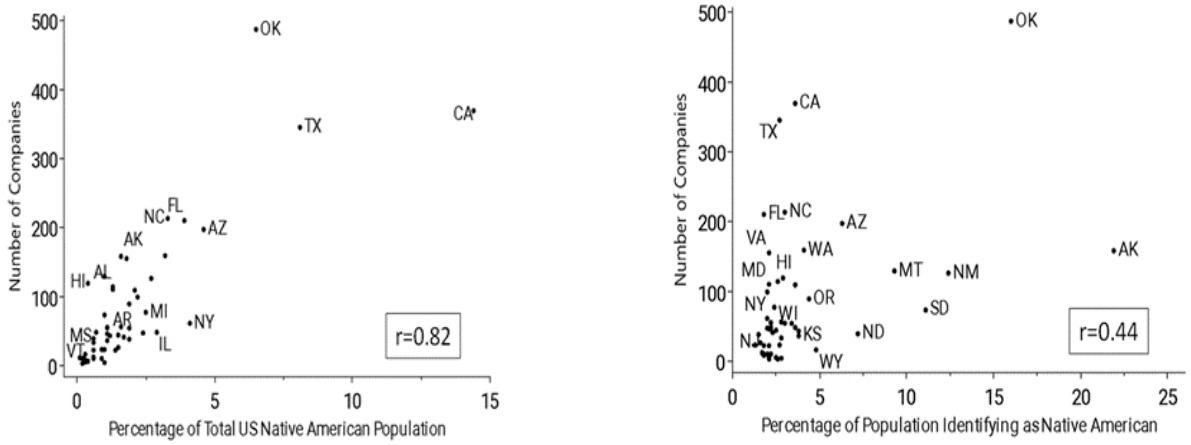
Interestingly, New York has the fifth highest USPercNAtotal of 4.1%, but this state has an average NAFO five-year company creation average of 1.1%. In perspective, Virginia has less USPercNAtotal but New York has one-third the average company creation of these states. The question becomes, how a state with such a large USPercNAtotal can have such a low NAFO company creation average. Living in New York, we do have some thoughts about job creation and the rough climate for new businesses in the state.

To explore plausible reasons behind the state's low NAFO company creation rate despite its substantial Native American population density, we investigated Forbes and Merchant Maverick. Forbes' comprehensive study on the best states to start a business in 2023 sheds light on New York's unfavorable business climate. Ranking last among the states, New York received a score of 0 out of 100, primarily due to factors such as high business costs, an adverse business climate, limited financial accessibility, economic constraints, and workforce-related challenges (Main, 2024). Specifically, the study highlights the high cost of living, a considerable unemployment rate, and a relatively low business survival rate of 79% in New York, attributing these factors to its unideal environment for new business ventures. Furthermore, Merchant Maverick's analysis focusing on women-led startups in 2022 reinforces these findings. The study considered multiple metrics to assess the viability of women-led startups across states. New York received a middling ranking of 24th due to several unfavorable factors, notably its 45th ranked income tax rate (8.82%) and 47th ranked unemployment rate (7.1%). Additionally, the state exhibited a modest startup early survival rate, ranking 35th at 77.03% (Beilby, 2022).

These studies highlight various challenges entrepreneurs face in New York, encompassing high business costs, unfavorable tax rates, elevated unemployment, and relatively lower survival rates for startups. Such unfavorable conditions may significantly contribute to the observed discrepancy between the state's substantial Native American population and the relatively low average creation of NAFO companies over five-year intervals. We leave this path of discussion as a potential research avenue for an eager reader.

Since our exploratory analysis indicates that the states with the largest number of NAFO companies are directly related to the percentage of the total Native American population in each state in the U.S. we decided to look at a regression analysis of this relationship. As illustrated in figure 1, the number of Native American women-owned companies displays a strong correlation (correlation coefficient equal to 0.82) with the size of the population identifying as Native American (figure 1 left panel). Conversely, the correlation with the relative size of a state's Native American population is less pronounced (figure 1 right panel).

FIGURE 1
SCATTER PLOT OF NUMBER OF NA FEMALE OWNED COMPANIES VERSUS THE TOTAL US NATIVE AMERICAN POPULATION (LEFT FIGURE). SCATTER PLOT OF NUMBER OF NA FEMALE OWNED COMPANIES VERSUS RELATIVE SIZE OF A STATE'S NA POPULATION (RIGHT FIGURE)



We added all the variables from Table 1 to enhance our regression analysis. We also included a few more variables to hopefully capture the most influential one. We added the following variables: The state's general population size, the percentage of companies in the top four sectors based on the NAICS codes, and the average years in business.

Examining the matrix in Table 3 reveals that the variables most strongly correlated with the response variable (number of NAFO companies) are those associated with the general and Native American population size of the state. In contrast, variables indicative of the state's overall business climate show no discernible association with the number of NAFO companies.

After performing stepwise regression modeling, we found that only the variable USPercNAtotal was significant (p-value of 6.54e-13 and a coefficient of determination of 0.6627) in predicting the number of NAFO companies at a state level. This is one of our main findings in this paper. We studied many variables at the state level but only population density kept surfacing as a variable of interest with respect to determining the number of NAFO companies that are created in a specific state.

TABLE 3
CORRELATION MATRIX OF VARIABLES USED IN THE REGRESSION ANALYSIS

		1	2	3	4	5	6	7	8	9
	Number of NAFO									
1	Companies									
2	State Population	**0.55 ***								
3	State PercNAtotal	**0.44 ***	-0.23							
4	USPercNAtotal	**0.81 ***	**0.86 ***	0.14						
	Percentage of Companies in Top									
5	Sectors	0.09	0.02	0.09	0.03					
	Average Years in									
6	Business	0.01	0.05	-0.02	0.02	-0.14				
7	Business Costs	0.04	0.22	0.01	0.16	-0.13	-0.07			
8	Business Climate	0.00	-0.09	0.06	-0.01	-0.19	0.13	0.23		
9	Financial Accessibility	0.10	0.01	0.04	0.06	-0.18	0.20	-0.26	0.16	
10	Overall Ranking	0.13	0.22	0.06	0.23	-0.20	-0.02	**0.62 ***	**0.51 ***	**0.47 ***

N = 50
*p < 0.001 (two-tailed tests)

The model obtained through the stepwise regression process is displayed in Table 4.

TABLE 4
STEPWISE REGRESSION MODEL FOR LOG (NUMBER OF NAFO COMPANIES)

	Estimate
Intercept	1.5636 *
log(USPercNAtotal)	1.0569 *
R-sq	0.69

* $p < 0.001$ (two-tailed tests)

Logarithmic transformations of the variables were informed by a Box-Cox transformation analysis (base-10 logarithms were used.) As a result, the final model can be interpreted as a "power-log model" with a scaling exponent of nearly 1. This indicates that as the percentage of the state population identifying as Native American increases, the number of Native American-owned companies (NAFO) increases at the same proportional rate. A diagnostic examination of the model residuals did not reveal any unusual observations. Our examination included the usage of Cooks distance to check for the possibility of outliers. We did not find the presence of any outliers.

Our analysis of the number of NAFO companies created per state led us to the study of cluster theory and the importance of population density to entrepreneurship. We found interesting results in New York, California, and Oklahoma that could represent a future path of study. To enhance this research, we move from our current variables of interest to the study of job types and another form of clustering, trade clusters.

EXPLORATORY DATA ANALYSIS CONTINUED

Before exploring further into this section, consider the following question: What are three prominent business sectors in which Native American Female-Owned (NAFO) companies have been established? With this interesting question in mind, let us transition to an exploratory data analysis on industry codes to help bring forth the answers to the question posed.

In this section, we delve deeper into an analysis of companies owned by Native American females by focusing on the North American Industry Classification System (NAICS) two-digit codes. This classification system provides a detailed insight into the specific industries where NAFO companies are established. Table 5 aims to elucidate the locations of NAFO companies and potentially uncover areas with opportunities for newly established businesses. It's important to note that the ABS (Annual Business Survey) encompass a dedicated section for the NAICS code. For our analysis, we utilized the 2020 version of the ABS, the most recent version available, to explore the impact of NAICS codes on female ownership.

TABLE 5
PERCENTAGE OF COMPANIES CREATED BY FEMALES SEPARATED BY NAICS CODES

NAICS General Description	NAICS Code	White	Pct	Hispanic	Pct	Black	Pct	Asian	Pct	NA	Pct
Total for all Categories	0	946,553	100.0%	80,309	100.0%	29,070	100.0%	138,344	100.0%	11,121	100.0%
Construction	23	90,915	9.6%	9,185	11.4%	1,290	4.4%	2,456	1.8%	1,605	14.4%
Professional, Scientific, and Technical Services	54	155,221	16.4%	10,213	12.7%	4,195	14.4%	17,359	12.5%	1,437	12.9%
Health Care and Social Assistance	62	118,824	12.6%	11,099	13.8%	10,815	37.2%	24,365	17.6%	1,427	12.8%
Retail Trade	44-45	109,803	11.6%	7,661	9.5%	1,520	5.2%	18,712	13.5%	1,227	11.0%
Accommodation and Food Services	72	74,547	7.9%	9,327	11.6%	1,529	5.3%	28,298	20.5%	1,216	10.9%
Other Services (except Public Administration)	81	72,952	7.7%	6,008	7.5%	1,892	6.5%	16,975	12.3%	857	7.7%
Administrative and Support and Waste Management and Remediation Services	56	60,780	6.4%	7,214	9.0%	2,134	7.3%	4,383	3.2%	844	7.6%
Real Estate and Rental and Leasing	53	72,176	7.6%	4,984	6.2%	1,647	5.7%	6,226	4.5%	630	5.7%
Finance and Insurance	52	37,381	3.9%	2,825	3.5%	782	2.7%	2,796	2.0%	600	5.4%
Transportation and Warehousing	48-49	21,772	2.3%	3,043	3.8%	1,085	3.7%	1,660	1.2%	245	2.2%
Wholesale Trade	42	41,123	4.3%	3,736	4.7%	340	1.2%	7,992	5.8%	242	2.2%
Arts, Entertainment, and Recreation	71	24,160	2.6%	1,075	1.3%	761	2.6%	1,072	0.8%	209	1.9%
Manufacturing	31-33	30,717	3.2%	1,877	2.3%	228	0.8%	1,965	1.4%	197	1.8%
Educational Services	61	17,653	1.9%	1,286	1.6%	594	2.0%	2,923	2.1%	187	1.7%

NAICS General Description	NAICS Code	White	Pct	Hispanic	Pct	Black	Pct	Asian	Pct	NA	Pct
Information	51	8,753	0.9%	415	0.5%	173	0.6%	952	0.7%	86	0.8%
Agriculture, Forestry, Fishing and Hunting	11	4,665	0.5%	120	0.1%	40	0.1%	-	0.0%	73	0.7%
Mining, Quarrying, and Oil and Gas Extraction	21	2,185	0.2%	147	0.2%	21	0.1%	10	0.0%	33	0.3%
Other	99	1,044	0.1%	27	0.0%	22	0.1%	43	0.0%	4	0.0%
Utilities	22	199	0.0%	5	0.0%	2	0.0%	4	0.0%	2	0.0%
Management of Companies and Enterprises	55	1,683	0.2%	62	0.1%	-	0.0%	153	0.1%	-	0.0%

In table 5, we utilized the 2020 ABS to categorize our data on female owners based on NAICS codes (economic clusters) and ethnicity. The cells highlighted in green denote the top four largest NAICS categories per ethnicity, while the cells highlighted in red represent the bottom three smallest NAICS categories per ethnicity. We will focus on the column titled NA (Native American) for our discussion in this section and its respective Pct = relative percentage = (Count of Owners in a Specific Code)/ (Count of Owners in Total for the Ethnicity). We will frame this discussion in a comparative analysis with other ethnicities.

Overall, we observe that female entrepreneurs across all ethnicities exhibit more than 50% ownership in companies categorized under NAICS codes 23 (Construction), 54 (Professional, Scientific and Technical Services), 62 (Health Care and Social Assistance), 44-45 (Retail Trade), and 72 (Accommodation and Food Services). Specifically, approximately 25% of White, Hispanic, and Native American female-owned businesses are situated within NAICS codes 54 and 62.

The advantage of using the ABS data is that we can analyze ethnicities and look for interesting results pertaining to them. For example, we found that 38.1% of female Asian-owned businesses are associated with NAICS codes 62 and 72. Additionally, of particular interest is that 37.2% of black female-owned companies are found within NAICS code 62. This finding is supported by AiryaunaW's article (2023), indicating that Black female entrepreneurs tend to create businesses in health, social services, education, and retail sectors. Finally, it's noteworthy that female ownership encounters challenges in NAICS areas 21 (Mining, Quarrying, and Oil and Gas Extraction), 22 (Utilities), and 55 (Management of Companies and Enterprises) across all ethnicities.

We created Figure 2 to elaborate on our investigation and incorporate data from the years 2017 to 2020 into our discussions. According to the ABS, this figure illustrates the composition of the entire NAFO business population. Notably, the codes 23 (Construction), 54 (Professional, Scientific, and Technical Services), 62 (Health Care and Social Assistance), and 44-45 (Retail Trade) collectively constitute 40% of all NAFO companies during this time frame. Additionally, codes 72 (Accommodation and Food Services) and 62 (Health Care and Social Assistance) represent other significant sectors.

FIGURE 2
SELECTED NAICS CODES FOR THE POPULATION OF NAFO COMPANIES
(ABS DATA SET)

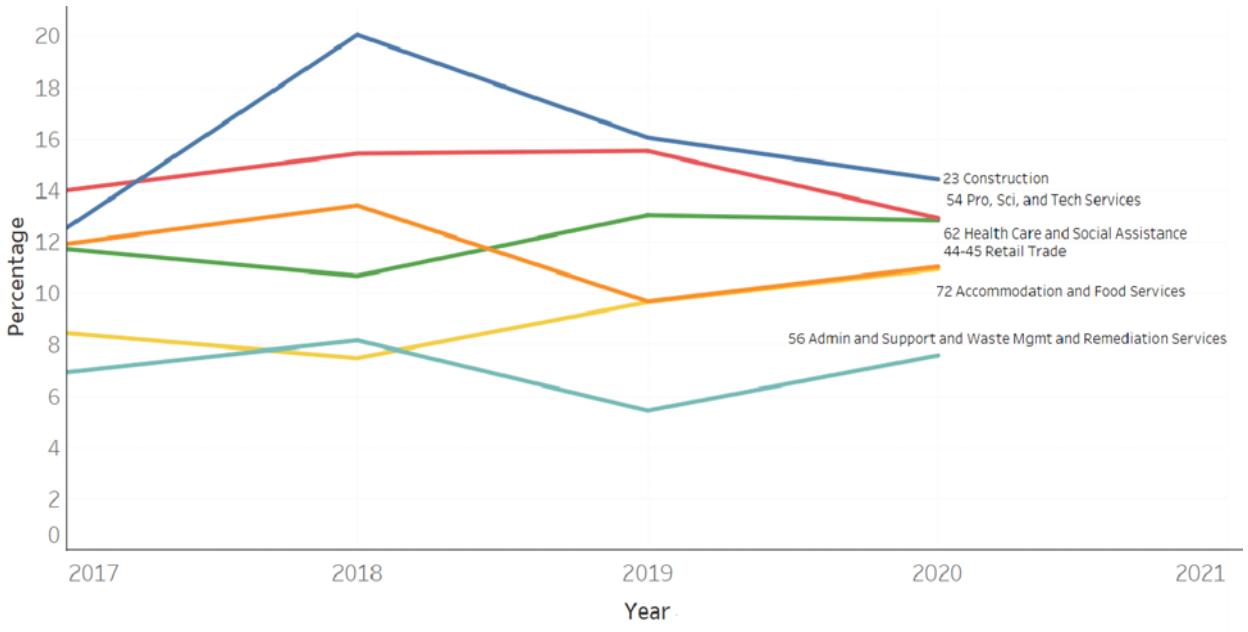
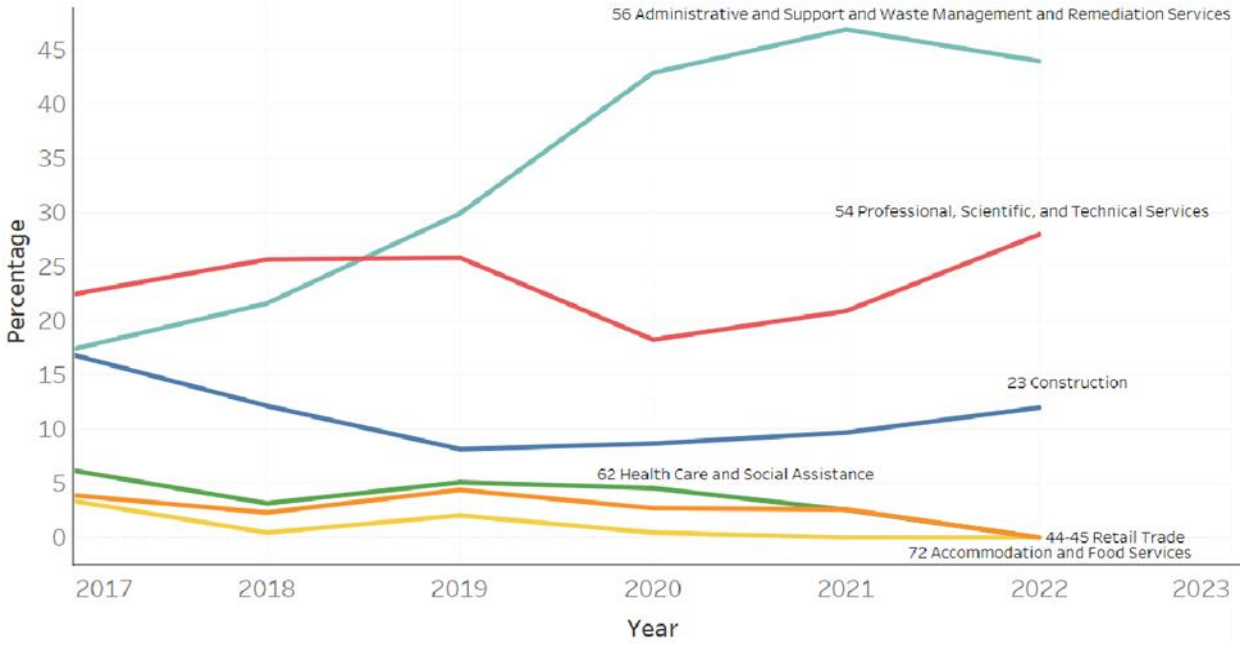


Figure 2, derived from ABS data, overviews established companies and their distribution across different economic clusters. Noteworthy distinctions arise when focusing solely on newly established companies, as depicted in Figure 3. This figure utilizes the DB dataset, enabling us to scrutinize shifts in the composition of recently established NAFO companies within specific economic clusters.

FIGURE 3
SELECTED NAICS CODES FOR THE POPULATION OF NAFO COMPANIES BY YEAR FOUNDED (DB DATA SET)



We observe the following patterns and trends based on an analysis of figure 2 (entire population of NAFO companies) and figure 3 (newly established NAFO companies):

- The most significant observation is related to Code 56 (Administrative and Support and Waste Management and Remediation Services). While traditionally forming a relatively modest portion of the NAFO business population, it emerges as the dominant sector among newly established companies.
- Code 23 (Construction), while representing the largest component of the existing company population, ranks as the third-largest sector when considering newly established companies only.
- Code 54 (Professional, Scientific, and Technical Services) is the second-largest sector when considering both the entire population of companies and newly established companies exclusively.
- Sectors identified with Code 44, 45 (Retail Trade), Code 62 (Health Care and Social Assistance), and Code 72 (Accommodation and Food Services) consistently hold top positions. They are prevalent in the top five of the existing company population and maintain this standing when considering newly established companies alone.

By examining both the DB and ABS datasets, we conducted exploratory analyses, utilizing the NAICS variable to visualize trends in NAFO companies across economic clusters. The ABS dataset offers an overview of established companies and their occurrence in various economic clusters. In contrast, the current D&B dataset reveals recent changes in the percentage of NAFO companies established within

specific economic clusters. These datasets have provided valuable insights into the economic activities of Native American female entrepreneurs.

Having completed a preliminary analysis of NAFO companies and their corresponding NAICS codes, reflecting on the patterns observed is pertinent. Across all datasets reviewed, it became evident that Construction (NAICS code 23) and Professional, Scientific, and Technical Services (NAICS code 54) emerged as leading sectors for entrepreneurship. Furthermore, an analysis of current data from the Database (DB) revealed a notable increase in company formations within Administrative and Support and Waste Management and Remediation Services (NAICS code 56).

This observation prompts an important question: why do NAFO companies gravitate toward these particular sectors? While a definitive answer remains elusive, we posit that federal assistance and grant opportunities may play a significant role. An examination of federal contracts via the Small Business Administration (SBA) website provides compelling evidence of a potential correlation between sector selection and the allocation of federal funds.

From 2020 to 2023, disaggregated SBA data indicates that, on average, $18 billion annually was awarded to Native American-owned companies, including those owned by both genders. Approximately $9 billion of these funds were granted to companies operating within NAICS codes 23, 54, and 56. While this finding does not constitute definitive proof, it strongly suggests that federal funding opportunities could influence sector selection for entrepreneurial ventures.

This line of inquiry offers fertile ground for further research, and we leave this intriguing question to the reader's consideration.

THEORETICAL AND MANAGERIAL IMPLICATIONS

What then are the key implications regarding the contributions of Indigenous women entrepreneurs. Firstly, they are shown to contribute to creating jobs within their local community, as evidenced by the numbers which indicate that total sales on average for a NAFO was $10,643,000 and that the sales per employee for NAFO companies is $135,000 per employe, compared to Black FO companies which is $94,000 per employee, Hispanic FO companies which is $134,000 per employee, Asian FO companies which is $141,000 per employee, and White FO companies which is $177,000 per employee. Simply stated, the financial figures for NAFO is nothing short of impressive.

Secondly, we see them making significant inroads into non-traditional industries, industries that offer higher returns and a greater likelihood of creating long term wealth. The latter move is consequential, since it can propel not only the specific Indigenous women entrepreneurs themselves, but their families and communities into higher long-term levels of income, having a further cyclical effect on their long-term financial positioning. In the same vein as creating wealth, the monies from Indigenous women entrepreneurs businesses' is often an additional income source in a family, further enhancing a family's income and long-term wealth.

Thirdly, by engaging in enterprise, Indigenous women entrepreneurs are contributing significantly to a nation's Gross Domestic Product (GDP). Our findings bear all of this out and urge stakeholders to focus on the elements highlighted by population density theory vis a vis Indigenous women entrepreneur, namely Indigenous businesses located near their corresponding population thrive, do well, are sustainable and are doing as well and even better than their counterparts from other races.

Fourthly, folding different statistical data sources into each other provides a more comprehensive picture of Indigenous, particularly the data from Dun and Bradstreet which provides very recent data and current and future trends. It is important to apprise key stakeholders that Indigenous women entrepreneurs are not embedded in the often-expected industry sectors such as retail, healthcare and social assistance and accommodation and food service - though these sectors are a part of the top sectors where they operate businesses. Instead, we offer intriguing findings that the top three industries for Indigenous women entrepreneurs are the non-traditional sectors for women entrepreneurs, including diverse women entrepreneurs of construction (code 23), waste management and remediation services (code 56) and professional and scientific and technical services (code 54) industries. Our results suggest that this nuanced

view is particularly significant, since the Indigenous women entrepreneurs' businesses are thriving, despite having achieved educational levels that are approximately half that of their female counterparts.

Based on the preceding, it thus becomes necessary for local and national economies to create conditions that reward Indigenous women entrepreneurs and engage in actions, policies and procedures that will promote and sustain their vitality. This study highlights the importance of debunking long-held beliefs that women entrepreneurs and, especially women entrepreneurs from diverse backgrounds do not contribute significantly to their local or national economy. It goes without saying that highlighting the contributions that Indigenous women entrepreneurs are making in certain industries, in their communities, and across the nation, should serve as a role model to young females across all diverse backgrounds, not just young females who are Indigenous. The study is further significant because gender was held constant in the current case looking solely at women entrepreneurs, with an ultra-in-depth look at Indigenous women entrepreneurs. A focus that has never been done before - where gender is held constant – and with a rigorous statistical data analysis for Indigenous women entrepreneurs. Therein lies the significance of this study - detailing how Indigenous women entrepreneurs are making inroads into thriving, profitable business areas that are often seen as barriers for women and for women entrepreneurs, albeit while doing so with lower educational levels.

LIMITATIONS AND FUTURE RESEARCH

Below we articulate the main points of limitations per source that we use in this article.

DB Data Limitations

One significant limitation of the DB dataset is survivor bias. It exclusively contains information about companies that are still operational, omitting details about those that have closed down. Additionally, the dataset's scope is confined to Native American Female-Owned (NAFO) companies, necessitating the integration of supplementary sources to enhance and diversify the dataset.

Census Data Limitations

The Census data used in this study presents challenges related to timeliness, extending only up to the year 2020. This creates a temporal misalignment with the current DB dataset, potentially impacting the accuracy of comparative analyses. Moreover, unlike the detailed information found in the comprehensive DB dataset, Census data lacks specificity, such as company names, which may limit the depth of the analysis. Another limitation is the timeframe restriction imposed by the dataset covering the years 2017 to 2020, which could constrain the comprehensive understanding of longitudinal trends, introducing potential gaps in the research findings.

Besides our limitations we have found certain areas in our analysis that require more comprehensive study. Having provided an overview of our dataset, we now aim to outline potential future research paths. To maintain brevity, our focus will be on thoroughly exploring our data concerning NAFO companies. We have identified several areas within our research that warrant further exploration.

- Table 2 highlights New York as having one of the largest Native American populations but exhibiting almost no growth in NAFO companies. This raises the question: What factors contribute to this lack of growth, especially when research indicates that sizable Native American populations typically foster company growth?
- Table 5 indicates that NAFO and other female-owned companies are predominantly involved in construction—an intriguing finding from our analysis. Exploring the reasons behind this trend would be beneficial. Additionally, delving into why NAFO companies face challenges in mining and utilities warrants further investigation.

CONCLUSION

In this article, we employed exploratory data analysis to validate current research on NAFO companies and to deepen the understanding of such entities. Through careful variable selection and data segmentation, we enhanced the credibility of existing research and unveiled intriguing yet unknown insights. Furthermore, we indicated potential areas in our data requiring further research derived from our visualizations and the need for deeper analysis.

This research provides insights into Native American Female-Owned (NAFO) companies, corroborating prior scholarly works that underscore the impact of cultural identity and proximity on Native American business development. In alignment with Pascal et al. (2008), Stewart et al. (2016), and Scott (2020), the exploratory data analysis (EDA) presented in Table 1 and Figure 1 fortifies the reliability of the dataset used. Figure 1, particularly, highlights the pivotal role of proximity to fellow Native American populations in fostering successful NAFO businesses. We enhance all the previous studies in two ways. We add more breadth to the current theories by analyzing all states in our analysis and we add more detail to the discussions because we focus on the female-owned companies.

Our correlation analyses reveal a strong relationship between Native American population concentrations in states and NAFO company establishment. Our research shows that states like CA, TX, and OK emerge as consistent leaders in NAFO company creation, as shown in Table 2. These findings collaborate the idea of cluster theory as we see from the dataset that the majority of NAFO companies exist in highly populated areas for Native Americans. Additionally, our analysis gives credence to Smith-Hunter's (2003: 2006) cultural theory since NAFO companies do exist in areas populated by Native Americans. One can potentially conclude a strong cultural tie exists in areas heavily populated by Native Americans.

Additionally, the study delves into NAFO companies' industry preferences, illustrating clear trends in economic clusters similar to Pascal's theory, with specific sectors showing more than 50% ownership across all ethnicities. Our analysis, utilizing both DB and ABS datasets, presents a comprehensive picture of Native American female entrepreneurship, emphasizing the critical influences of cultural identity, geographical proximity, educational level and sectoral preferences in shaping the landscape of NAFO businesses.

REFERENCES

Adamson, R., & King, J. (2002). *The native American entrepreneurship report*. Fredericksburg, VA: First Nations Development Institute.

Airyauna, W. (2023, September 9). *Black women are the fastest growing group of women entrepreneurs: Heres why-*. Career Mastered. Retrieved from https://careermastered.com/2023/09/09/black-women-are-the-fastest-growing-group-of-women-entrepreneurs-heres-why/#:~:text=Black%20female%20entrepreneurs%20are%20more,economic%20landscape%20will%20continually%20change

Anderson, R.B. (2002). Entrepreneurship and Aboriginal Canadians: A case study in economic development. *Journal of Developmental Entrepreneurship*, *7*(1), 45.

Anderson, K. (2005). *Tending the wild: Native American knowledge and the management of California's natural resources*. Univ of California Press.

Aspaas, H.R. (2004). Minority women's microenterprises in rural areas of the United States of America: African American, Hispanic American and Native American case studies. *GeoJournal*, *61*(3), 281–289. Retrieved from http://www.jstor.org/stable/41147943

Barr, M.S. (2015). Minority and Women Entrepreneurs: Building Capital. *Networks, and Skills*, *32*.

Birzer, B.J. (1999). Expanding Creative Destruction: Entrepreneurship in the American Wests. *The Western Historical Quarterly*, *30*(1), 45–63. https://doi.org/10.2307/971158

Bolin, S. (2015). *Behaviors Contributing to Native American Business Success.* Walden University. Retrieved from https://scholarworks.waldenu.edu/cgi/viewcontent.cgi?article=2782&context=dissertations

Bressler, M.S., Campbell, K., & Elliott, B. (2014). A study of Native American small business ownership: Opportunities for entrepreneurs. *Research in Business and Economics Journal*, *10*, 1.

Colbourne, R. (2017). An understanding of Native American entrepreneurship. *Small Enterprise Research*, *24*(1), 49–61.

Collins, J., Morrison, M., Krivokapic-Skoko, B., Butler, R., & Basu, P. (2016). Indigenous small businesses in the Australian Indigenous economy. In W. Sanders (Ed.), *Engaging Indigenous Economy: Debating diverse approaches* (Vol. 35, pp. 265–274). ANU Press. Retrieved from http://www.jstor.org/stable/j.ctt1d10hpt.26

Cunningham, R. (2017). *Inuit Qaujimajatuqangit practices in entrepreneurship*. Retrieved from https://www.amazon.com/Inuit-Qaujimajatuqangit-Practices-Entrepreneurship-Cunningham/dp/3330336153

Dana, L.P., & Light, I. (2012). Toward a theory of social capital in entrepreneurship. *International Journal of Social Sciences*, *1*(1), 35–54.

Deweese, S., & Macleod, M. (2007). The Native American dream: Entrepreneurs pursue their passion and self sufficiency. *Tribal College*, *18*(3), 20.

Di Addario, S., & Vuri, D. (2010). Entrepreneurship and market size. the case of young college graduates in Italy. *Labour Economics*, *17*(5), 848–858.

Garsombke, D.J., & Garsombke, T.W. (2000). Non-traditional vs. traditional entrepreneurs: Emergence of a Native American comparative profile of characteristics and barriers. *Academy of Entreprenuership Journal*, *6*(1), 93–100.

Gladstone, J.S., & Kennedy, D.M. (2017). Embracing cultural tradition: Historic business activity by Native people in the western United States. *American Indian business: Principles and practices*, 16–26.

Goreham, G.A., & Rathge, R.W. (1991). *Native American entrepreneurs in North Dakota* (No. 1188-2016-94023)

Goswami, K. (2021). Entrepreneurial Action by Métis and First Nations entrepreneurs in Saskatchewan: Similarities and differences with established notions of Entrepreneurial Action (Doctoral dissertation, The University of Western Ontario (Canada)).

Gouvea, R., & Francis, J. (2017). *Indigenous Women Entrepreneurs of New Mexico: Surpassing Narriers and Stereotypes.* Taylor and Francis.

Harrington, C.F., Birmingham, C., & Stewart, D. (2017). American Indian Entrepreneurship. In D.M. Kennedy, C.F. Harrington, A.K. Verbos, D. Stewart, J.S. Gladstone, & G. Clarkson (Eds.), *American Indian Business: Principles and Practices* (pp. 27–45). University of Washington Press. Retrieved from http://www.jstor.org/stable/j.ctvcwnqhd.7

Koko, M.A., Maishanu, M.M., & Hassan, A. (2017). *Women Entrepreneurs' Accessibility to Growth Capitaland Socio-Economic Development in Sokoto State, Nigeria.*

Lindsay, N.J. (2005). Toward a cultural model of indigenous entrepreneurial attitude. *Academy of marketing Science review*, *1*.

Lituchy, T.R., Oppenheimer, R., O'Connell, T., & Abraira, R.J. (2007). 30 Mohawk First Nations: successes and challenges of small business owners. *International handbook of research on indigenous entrepreneurship*, *378*.

Lofthouse, J.K. (2019). Institutions and economic development on native American lands. *The Independent Review*, *24*(2), 227–248.

Lofthouse, J.K. (2020). Culture and Native American economic development. *Journal of Entrepreneurship and Public Policy*, *9*(1), 21–39.

Main, K. (2024, October 15). Ranked: The Best States To Start A Business. *Forbes Advisor*. Retrieved from https://www.forbes.com/advisor/business/best-states-to-start-a-business/

Mason, A.M., Dana, L.P., & Anderson, R. (2008). Emerging Inuit Small Business from Caribou in Coral Harbour, Nunavut, Canada. In *ICSB World Conference Proceedings* (p. 1). International Council for Small Business (ICSB).

O'Neill, G.D., Jr., Hershauer, J.C., & Golden, J.S. (2006). The cultural context of sustainability entrepreneurship. *Greener Management International*, (55), 33–46.

Pascal, V.J., & Stewart, D. (2008). The effects of location and economic cluster development on Native American entrepreneurship. *The International Journal of Entrepreneurship and Innovation*, *9*(2), 121–131.

Pascal, V.J., Stewart, D., & Pascal, V. (2015). *Native American entrepreneurship: The differential effects of location and tribal gaming.* Unpublished manuscript.

Peredo, A.M., Anderson, R.B., Galbraith, C.S., Honig, B., & Dana, L.P. (2004). Towards a theory of indigenous entrepreneurship. *International Journal of Entrepreneurship and Small Business*, *1*(1–2), 1–20.

Scott, D. (2020). *Native Women Business Owners: Building Assets, Strengthening their Communities, and Working to Close the Women's Wealth Gap A Summary Data Report by the Oklahoma Native Assets Coalition, Inc. Sage Associates Inc.*

Seymour, N. (2003). Native American Entrepreneurship. *Digest*.

Smith-Hunter, A. (2003). *Diversity and entrepreneurship: Analyzing successful women entrepreneurs*. University Press of America.

Smith-Hunter, A. (2006). *Women entrepreneurs across racial lines: Issues of human capital, financial capital and network structures*. Edward Elgar Publishing.

Stephen, L. (1991). Culture as a resource: Four cases of self-managed indigenous craft production in Latin America. *Economic Development and Cultural Change*, *40*(1), 101–130.

Stewart, D., & Pascal, V.J. (2016). Native American Entrepreneurship: Locating Your Business☆. In *Tribal Wisdom for Business Ethics* (pp. 165–174). Emerald Group Publishing Limited.

Swinney, J., & Runyan, R. (2007). Native American entrepreneurs and strategic choice. *Journal of Developmental Entrepreneurship*, *12*(03), 257–273.

Teller, J. (2010). *Barriers to Entrepreneurship in Native America.* Available at SSRN 1791601.

Tingey, L., Larzelere, F., Goklish, N., Rosenstock, S., Jennings Mayo-Wilson, L., Pablo, E., . . . Barlow, A. (2020). Entrepreneurial, economic, and social well-being outcomes from an RCT of a youth entrepreneurship education intervention among Native American adolescents. *International Journal of Environmental Research and Public Health*, *17*(7), 2383.

Weir, W.I. (2007). *First Nation small business and entrepreneurship in Canada.* National Centre for First Nations Governance.