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AUTOMATION IN THE TRUCKING INDUSTRY: A CLASSIFICATION FRAMEWORK FOR TECHNOLOGY-BASED SOLUTIONS

Valentina Hurtado-Uribe, Missouri State University
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ABSTRACT

The transportation industry has been transformed from stone roads with carriages and paved roads with motor vehicles to roads and new emerging industries such as trucking. The trucking industry has a unique position in US history. Trucking has been a hero and a bridging link to the supply of goods, moving around 71% of the country's freight. Since the introduction of the highway system, the trucking industry's benefits for customers have been generally recognized, although there have also been specific challenges in this field. The trucking sector has been forced to turn to technological solutions to solve the problems due to a combination of labor shortages, increased competition, changes in deregulation, fuel prices, and the continuous search to reduce costs and improve efficiency.

The cost, organization, and effectiveness of the road system are expected to change due to innovations in automated transportation technologies and artificial intelligence. The combination of artificial intelligence and human capabilities can overcome current challenges by offering technology options that could benefit supply chain and logistics industry operations. Companies in this industry will be forced to choose the technological option that best suits their needs and objectives in adopting automation. Currently, there are different options in terms of automation in motorized vehicles; however, a classification is needed to choose the most appropriate one according to the type of need. This paper investigates the trucking industry with automation in mind to better understand the emerging sector. In addition, this paper presents a model of technology-based trucking options. It ends with managerial implications and future avenues of research.

INTRODUCTION

The combination of technological innovations and economic development has led to remarkable changes over time, boosting industries such as manufacturing, communications, and transportation. The arrival of technologies such as AI, the Internet of Things (IoT), and Cloud Computing within industries have transformed productivity, employment, and other facets of the human economy (Laiton-Bonadiez et al., 2022). The combination of new technologies, the labor shortage, the COVID-19 isolation situation, and the constant search for cost reduction and efficiency improvement have changed business in the 21st century (Güler et al., 2021). The transportation industry, especially the trucking service field, has been forced to make fundamental adjustments to keep pace with rapidly changing events (Belman et al., 2018). High speed was given priority with the development of land transportation to incorporate mass storage in trucks and rails, with trucks being essential to bringing about the mechanization of transportation. From the late 19th to the early 20th century, there was a transition from stone roads with carriages to paved roads with motor vehicles to roads and the emergence of numerous trucking firms (Daggett, 1941).

The trucking industry peaked in popularity between 1992 and 1999. According to the Bureau of Labor Statistics, employment within the industry grew 31.1% faster than total US employment growth during those years due to the implementation of roads (Hokey and Lambert, 2002). The road system grew almost 1% in terms of its length in miles for this same period and 6.1% from 1992 to 2016, thus favoring the trucking industry's growth(US Department of Transportation, 2022b). Trucking has a unique position in the history of the United States. Thomas J (2021 considers the trucking industry to be a popular hero and a bridge link for the supply of goods to the citizens of the nation. The US trucking industry, moving about 71% of the country's cargo, reached a worth of $740 billion in 2018(Kim et al., 2022; Viscelli, 2018). In the logistics industry, for instance, trucking is the primary mode of transportation. Almost all the tangible goods we use are transported by truck at some point in the supply chain. (Roy, 2001; Viscelli, 2018). Making it a relevant industry above other transportation modes such as trains, rails, ferries, or planes.

Since the road system's introduction, the trucking industry's benefits to customers have been generally acknowledged, yet there have also been particular challenges in this field. Some of the challenges the trucking business is currently facing were created by the sector on its own, such as labor shortages or increased competition. In contrast, others just appear due to the economic environment, such as deregulation or fuel prices (Engel, 1998). The growing demand for its popularity and the deterioration of truck driver wages propelled this industry into a crisis of labor shortages due to aging, affecting its probability and incrementing operative costs (Kim et al., 2022). Despite the efforts made by this industry to control the expenses, Min and Lambert (2002) suggested the enforcement of the workforce as the primary strategy for productivity gains. At the same time, Kim et al. (2022) argue that relying solely on increasing the workforce is problematic given the decline in the working-age population and social output (Koricanac, 2020a).

Meanwhile, technology-based solutions have begun to gain ground in the trucking industry to address workforce problems. Automated transportation seems to be an innovation in the transportation industry that seeks to combat labor shortages, thus preventing the increase in operating costs. The adoption of autonomous vehicle (AV) technology will likely transform the cost, organization, and efficiency of the road transport system (Kim et al., 2022; Standage, 2021). Companies like Tesla, TuSimple, Locomation, and Daimler are at the forefront of adopting autonomous driving technology (ADT). These automakers see the benefits of fully autonomous trucks, so they want to bring today's personal vehicle technology and its ability to adapt to self-driving to large companies with thousands of trucks in their fleets. For example, TuSimple Holdings Inc. completed more than 550 miles (885 km) of driving on public roads in Arizona without a human behind the wheel and only with self-driving trucks (ATBS, 2021; US News, 2022). Locomation has also contracted with major trucking companies to automate their fleets (Locomotion, 2022).

AV technology is a new and innovative technology based on AI that is offered in different transportation industries, such as logistics or supply chains. According to the SAE, there are currently six stages of driving automation proposed in the living document J3016, which establishes a standardization of autonomous driving capabilities within the automotive industry. The six stages described in the document are based on functionality, where the first three stages (S0, S1, and S2) include the basic functionality of driver support and are defined as "Driver Support Systems," while the last three levels (S3, S4, and S5) includes a complete driving autonomy and is defined as "Automated Driving Systems" (Harrington et al., 2018; Koricanac, 2020a). The premise of driverless vehicles has been around for a while, but the available technology and the high prices have prevented mass manufacturing (Bagloee et al., 2016; Krasniqi and Hajrizi, 2016). Any form of automation involves an investment; thus, businesses adopting these technologies may examine whether their goals and objectives and any potential benefits are compatible before adopting. Bagloee et al. (2016) predict, based on the deployment and adoption of previous smart vehicle technologies such as automatic transmission and electric hybrid driving, that by 2040, the demand for autonomous vehicles is expected to increase due to the reliability of technology, and constitute about 50% of vehicle sales.

High-tech companies, primarily in the US and China, have been attempting to create highly sophisticated software that will enable trucks to deliver freight throughout the nation without the aid of a human driver. The race to provide the safest and most effective automation technology for trucks is fierce. It is anticipated that advancements in automation and AV will enable companies to save up to $10 billion each year, contributing to one of the main objectives of this adoption: cost reduction (Koricanac, 2020a). While offering solutions to several issues the trucking industry has faced for a long time, both in the social sphere and within organizations. Solutions include reducing emissions, mitigating accidents by compensating for driver inattention, reducing stress, and driving for monotonous periods while optimizing rest times for drivers of towed vehicles. It also compensates for driver shortages, reduced traffic congestion, improved highway safety, and mileage costs with better aerodynamics (Bagloee et al., 2016; Berger, 2016).

The combination of AI and human capabilities can overcome the current difficulties in the trucking industry operations and planning. With the implementation and evolution of automation in the trucking industry, more technology options seem to benefit the operations of logistics and supply chain companies. With the substitution of the human driver for an automated controller, it is expected to obtain benefits such as the optimization of the drivers' rest times, greater efficiency in the use of fuel by making better use of the vehicle, and therefore the elimination of human errors (Berger, 2016; Kim et al., 2022). Companies will be forced to choose the technological option that best suits their needs and objectives in adopting automation. Currently, there are different options regarding automation in motorized vehicles, as presented by the SAE in the J3016 document. Thus, the present study proposes a classification model for technology-based road transport options for trucks based on three guidelines, driver, AI, and automation, as well as the possible combinations among them.

LITERATURE REVIEW

Modern transportation methods do not result from a revolution based on a few mechanical inventions. They are the result of a long and slow evolution, such as the development of industry and the invention of the printing press, which allowed the dissemination of knowledge and aroused the interest of landowners in trade and industry, promoting the movement of passengers and goods through different transport methods (Daggett, 1941). However, Daimler and Levassor state that the beginning of road (truck) transport is primarily associated with the invention of the gasoline-powered internal combustion engine rather than other factors. Initially, the most common mode of transportation was the movement of people, which gradually changed to the movement of products as society developed (Daggett, 1941; National Geographic Society, 2022). Before 1800, moving products across regions was a slow, challenging, expensive, and frequently dangerous process. People relied on natural force, whether human or animal, such as carts, sleds, or even boats without artificial power and well-conditioned roads (Bowersox et al., 1981). With the advent of technological advances of the time, such as artificial power and the steam engine, the US first developed its railway system at the beginning of the early 1920s, helping to connect the growing nation and create a set of distinct local and regional economies (Allonso, 2015; Mohl, 2008; Wootton et al., 1995).

Traditional Trucking

The first rail or tramroads developed in the United States were brief stretches intended for industrial uses to transport granite or other heavy loads. Most railroad transportation was over short distances; thus, many American railroads were organized to render local service. Despite the expectations regarding the arrival of this invention, both in England and in the United States, the introduction of the railways provoked the opposition of some groups that resisted the change due to the high costs, the low efficiency in time, and personal preferences in other methods, such as waterways or even cars. The social pressure and minor disadvantages of the railways enhanced the preference for highways. Highways were built primarily to meet the needs of local traffic, where they were initially used as smooth roads for the commercial and industrial development of the time, leaving the railways to handle long-distance movements due to their higher profitability (Bowersox et al., 1981).

Since the transportation revolution in the United States in the early 1800s, the trucking industry has become a dominant mode of cargo transportation. In 2021, the US Department of Transportation reported that approximately 72.2% of freight total domestic tonnage shipped in the US was transported by truck. Only in primary shipments 10.93 billion tons of cargo were moved, which generated revenue in gross freight of $875.5 billion, around 80.8% of the nation's freight bill for that year. Freight tonnage is forecast to rise faster from 16.4 billion tons in 2019 to 20.6 billion tons in 2030 (Costello, 2021). The total revenue derived from primary freight shipments in the US will increase from an estimated $1,083 billion in 2021 to $1,627 in 2032, making the trucking industry an integral part of the country's economy (McNally, 2022; US Department of Transportation, 2022). Trucks play a crucial role in intermodal transportation systems, including pipelines, ships, planes, and trains, and their influence is felt throughout the entire transportation industry (US Department of Transportation, 2016). Consequently, the freight transportation system relies on various modes to support national and international supply chains. Freight transportation is now considered a crucial component of doing business, with 24.1% of the 38.9 million registered trucks used for commercial purposes in 2020 alone, not including government and agricultural purposes, and 1.95 million heavy and tractor-trailer truck drivers (Costello, 2021; Woods, 2022).

Companies within the trucking industry evaluate performance in terms of reliability, time efficiency, and quality of service for competitiveness, where drivers are a crucial element (Min and Lambert, 2002). Due to long drives and accident risk, traditional trucking operates under two systems: solo driver or as a team operation. The solo or team drivers could be owner-operator, lease-operator, or company driver. Solo or solo drivers operate alone, and their sleeping hours are spent in a sleeper berth inside the truck while the vehicle is parked. The team's drivers, meanwhile, operate with a partner, sleeping in a moving vehicle at their respective sleeping hours, guaranteeing the constant movement of the truck (Dingus et al., 2001; Klauer et al., 2005a).

Most long-haul truck drivers are allowed to work an 11-hour limit after 10 consecutive hours off duty by taking a 30-minute break after 8 hours of driving. Despite the regulations put in place to keep drivers from being overworked and the potential risks, they often work much longer to meet their deadlines, making it a demanding and risky job (FMCSA, 2022; Turnbull, 2017). According to the American Trucking Association, the truck driver shortage was first documented in 2005 with a need of approximately 20,000 drivers; by 2015, this shortage reached 45,000; by 2021, 87,000, and by 2030, it is projected to reach 160,000 (Costello, 2017; Placek, 2022). While all industry sectors struggle to find enough drivers, the ATA emphasized that the real shortage is in "long-haul trucking," which refers to truck drivers traveling long distances across state lines. Truckers all over the world are getting older. According to the Bureau of Labor Statistics, the average age of a commercial truck driver in the US is 55 years old, which means that these drivers will retire within the next 10 to 20 years and will no longer be eligible to fulfill this job.

Faced with the lack of truck drivers, logistics and trucking companies have struggled hard to solve this problem, which does not seem to improve. In order to recruit more drivers, especially young truckers, most carriers have been offering benefits such as high pay wages or 401K and tuition reimbursement options. In April 2022, Walmart announced that it would pay its long-haul private fleet truck drivers as much as $110,000 a year when the average for a long-haul driver is $56,491 a year in 2022 (Cortes and Sprague, 2022; Redwood, 2021; Woods, 2022). The industry has also chosen to reduce time on the road based on government regulations imposed where truckers will work a maximum of 11 hours driving within a 14-hour duty period (FMCSA, 2022; Lardieri, 2019). Yet, such efforts have led to an increase in the cost of transportation and commodity prices that affect both logistics companies and customers. The growth of expenses and the absence of a workforce have led companies to create strategies to survive in the supply chain industry, delivering products to customers quickly at low cost but creating an environment of risk of accidents.

The demand for the trucking industry's services is extremely high compared to other transportation modes and is projected to remain strong for decades. The need for trucks is expected to grow by 1.4 percent annually through 2045, according to the United States Department of Transportation (Rubocki, 2018). Thus, in order to meet the increased demand for services and address current issues, such as driver shortages, high risk of accidents due to human error, truck exhaust pollution, and road traffic congestion, the trucking industry should consider technology-based options to address the issues (Bagloee et al., 2016; Berger, 2016). Automated transport is an option with great progress in the transport sector, and its objective is to combat labor shortages and current problems while avoiding increased operating expenses (Kim et al., 2022; Standage, 2021). The deployment of autonomous vehicle (AV) technology is projected to disrupt the economics, structure, and efficiency of the road transportation system.

Automated Vehicles

AV technology is a new and innovative technology stimulated by AI offering efficient solutions to logistics companies and supply chains regarding trucking transportation (Koricanac, 2020a; Ma et al., 2020). The idea of cars that drive themselves has been around for decades. In 1918, vehicle automation was initially envisioned, but only until 1939 did General Motors first exhibit the concept at the “Futurama” exhibition (Faisal et al., 2019; Standage, 2021). The basic concept of automation of road vehicles refers to the total or partial substitution of the human work of driving by electronic and/or mechanical devices. Early advances in vehicle technology focused on features such as autonomous speed, automated emergency braking, lane centering, and other basics of cruise control, which are represented for the three first stages of the taxonomy of driving automation systems for on-road motor vehicles in its living document J3016 (SAE, 2022).

AV technology has experienced drastic growth in the past few years. Self-driving vehicles represent a fast-paced field of modern technology as companies compete for dominance in this important field of emerging transportation capacity. Hi-tech companies, mainly from the US, have been working on developing highly sophisticated software that will allow vehicles to reach the highest stages of automation at S3, S4, and S5 stages, according to SAE (Faisal et al., 2019; SAE, 2022). Recent advances in AI have opened up nearly unprecedented opportunities to improve performance across various industries, including the automotive and transportation sectors, where the trucking industry has seen encouraging results in productivity, sustainability, reliability, and safety. For instance, by being able to adapt to each shipment to boost efficiency by suiting well to the type of truck’s engine, the weight of the truckload, and the terrain, AI could significantly lower firms’ costs in various areas, such as fuel wear and tear. Authors such as Agrawal, Gans, and Goldfarb (2018) predict that AV can save up to $10 billion in a year for companies after its implementation (Faisal et al., 2019; Koricanac, 2020).

Current advances in driving automation have mainly focused on passenger transport based on driver assistance technologies. Car manufacturers such as Honda, Tesla, Cadillac, and Ford have developed car models with semi-autonomous driving features such as adaptive cruise control, lane centering assist, and automatic parking (Mijatovíc, 2022; Patel, 2022). Cars are able to detect and classify their local environment, determine different types of objects on the road, and even interpret sensory information to identify appropriate navigation routes under traffic rules (CBS News, 2022; Slowik and Sharpe, 2018). There will likely be about 8 million driverless or semi-autonomous vehicles on the road by 2025 (ABI Research, 2018). Self-driving cars might need to develop through six stages of driver assistance technology breakthroughs in order to be considered fully autonomous. Today, human drivers still play an important role in autonomous driving systems; even the highest level of driving automation available to consumers requires the engagement and undivided attention of drivers. There are several levels of driving automation technology, classified according to their level of autonomy and support to the human driver, where each level specifies how much control a vehicle can exert over the dynamic driving job (Dimitrakopoulos and Panagiotopoulos, 2021).

The levels for driving automation have been standardized and developed by SAE International (2022). The taxonomy of degrees of automation in vehicles is explained in the living document J3016, which represents the most recent and complete common lexicon, where six different stages of automation of highway passenger vehicles are classified (Darlintong, 2020; Shahandashti et al., 2019). SAE J3016 defines driving automation on a scale of zero to five; Stage 0 means that no functions of the vehicle are automated, while Stage 5 means the vehicle can operate without human intervention or even presence (Synopsys, 2022). S0, S1, and S2 are classified as driver support features where the driver's intervention is required at specific points. S0, named "No Driving Automation," represents most vehicles on today's roads. The driver provides the dynamic driving task with the support of features limited to provided warnings and momentary assistance. S1, named "Driver Assistance," represents vehicle features as a single automated system for driver assistance, such as steering or brake/acceleration under driver's supervision. S2, named "Partial Driving Automation" or "Advanced Driver Assistance System," represents automated features combined where the vehicle can control both steering and braking/accelerating supervised by the driver (SAE, 2022).

S3, S4, and S5 are considered automated driving functions in which the driving automation system at the board executes the main part or all the driving tasks, including vehicle control and monitoring of the driving environment. In such cases, the driver must be able to resume the driving task at any time (Dimitrakopoulos and Panagiotopoulos, 2021; SAE, 2022). S3 is called "Conditional Automation," where the driver is not required when the automated driving features are engaged. Thus, the driver must be ready to take control when needed. S4, named "High Automation," represents features that drive the car under limited conditions as long as they are met. While S5, called "Full Automation," can perform all elements of the dynamic driving task under all conditions while the driver is not involved in any driving task (Dimitrakopoulos & Panagiotopoulos, 2021; Harrington et al., 2018; SAE, 2022).

Investment in autonomous cars has been highly significant. According to Forbes (2022), total global investment in AV technology exceeds $200 billion and is expected to increase once AVs are adopted for different purposes. Just as society was transformed when Henry Ford introduced the first assembly line, AV will have a transformative impact on both human lifestyles and the economy. The impact that each level of automation in passenger transport has created in society is generating a domino effect in the logistics industry, which will change road freight transport and retail trade. For AV to fit into the trucking industry, some specific features may need to be implemented due to the different designs, weights, dynamics, and purposes of trucks, such as Driver-Assisted Truck Platoon (DAPT), Highway Assistant, and Predictive Powertrain Control, platoons, real-time vehicle-to-vehicle communication, Highway Pilot and Truck Pilot Berger, (2016).

Following the same six levels of automation proposed by SAE, Berger (2016) has stated six levels of automation in trucks from L0 to L5 that include the features needed to transfer more control from the driver to the truck. L0 and L1 are currently developed, L2 is pending, and L3, L4, and L5 represent the trucking industry's future. An interplay of human capabilities and technology areas enables autonomous trucks. Based on three criteria—driver, AI, and automation—and potential combinations. The current study suggests a classification model for technology-based trucking options (Figure 1). Just as Berger (2016) pointed out the necessary additions for adopting truck automation technology from the classification of existing automation levels, this article presents a useful classification model to understand the possible combinations, interactions, and the whole potential of automation technology in the trucking industry.

The proposed model (Figure 1), "A model of technology-based trucking options," consists of three overlapping circles illustrating the logical relationships between Driver, AI, and Automation. The intersection of the circles creates sections that represent further categories. Each section is shaded based on the development timeline. The light gray section comprises the current traditional truck options, such as (1) Traditional Trucking and (1/3) Traditional Platooning with Two Drivers. The dotted section comprises truck options pending development, such as (3) Traditional Platooning and (1/2) Assisted Automated Trucking. At the same time, the dark gray section covers the industry's expected future fully automated truck options, such as (2) Fully Automated Trucking, (2/3) Fully Automated Platooning, and (1/2/3) High Automated Platooning with Service Employees.

As shown (1) in Figure 1, traditional truckers perform tasks determined by the Occupational Requirements Survey (ORS). The tasks of traditional truckers include driving long distances following traffic laws, reporting incidents on the road or serious mechanical problems affecting the operation, ensuring proper transportation of cargo, and keeping track of work hours and driven mileages, following all federal and state regulations (Gittleman and Monaco, 2020; US BLS, 2022). Long-haul truck drivers, as defined by the ORS, drive large trucks and tractor-trailers with a gross vehicle weight rating of at least 26,000 pounds, mostly moving cargo along intercity routes that occasionally cross multiple states (CDC Centers for Disease Control and Prevention, 2022; US BLS, 2022). The physical demands of truck driving may be high. Driving for many consecutive hours tends to be exhausting, and some drivers are even required to load and unload their trucks in addition to their regular tasks.

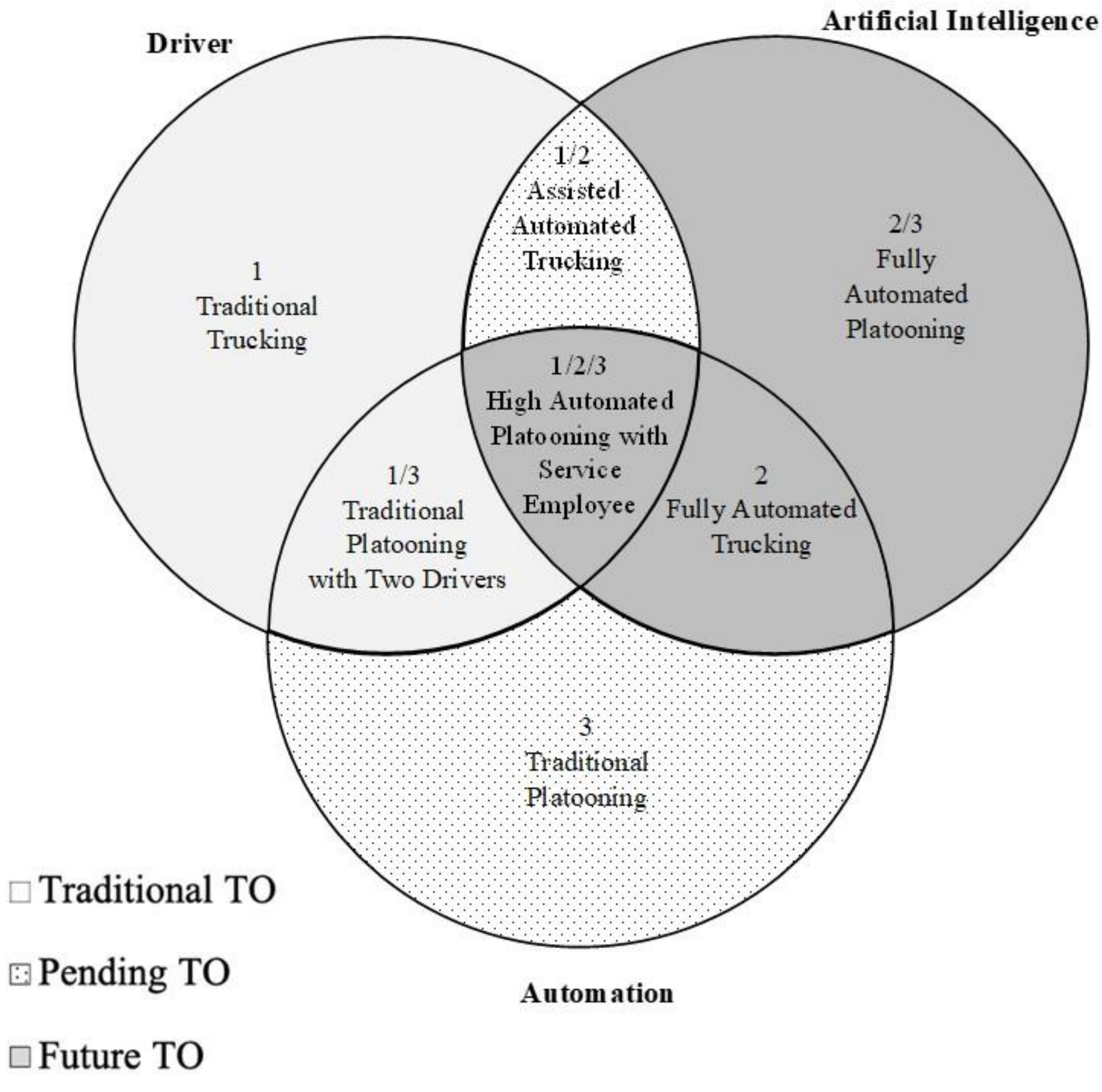
The present laws for truck drivers prohibit them from driving after 15 hours of labor (driving and non-driving chores) and limit their driving time to 10 hours, followed by an 8-hour rest period, due to the physical and mental tiredness of their operations (Braver et al., 1999). Due to limitations on hours of service, trucking companies have considered putting a two-driver crew on a truck. The trucks are equipped with bunk units that allow the co-driver to sleep during their rest time while the truck continues its journey to provide an effective way to rest and increase the productivity of the vehicles, which is determined according to the distance traveled. (Hanowski et al., 2005; Klauer et al., 2005b). The inclusion of AI has accelerated in the transportation industry as a possible solution to strict regulations on emissions, fuel consumption and working hours, the

lack of truck drivers, the increase in traffic congestion, and concerns about safety and accident proneness (Katreddi et al., 2022a).

AI increasingly drives the industry's technological development, allowing the processing of large volumes of data, improved machine learning, and the development of powerful computers (Rubocki, 2018). Assisted Automated Trucking (1/2) describes the ability of trucks to reach certain levels of autonomy with technological and AI interaction with areas that include hardware, software, and embedded controls. Advanced driver assistance systems (ADAS) based on AI are becoming more widespread in trucks with the promise to reduce the cognitive load on drivers and increase driving safety in general. AI options for trucks seek to assist the driver (who holds the primary responsibility of the truck) with driving features such as blind spot detection, collision warning system, traffic sign recognition, or adaptative cruise control (Rudigier et al., 2021a).

Most ADAS currently use a wide range of sensors, including video cameras, traditional radars, and lidars that mimic a human driver's perception process, reducing human error. While certain truck activities may be automated, the truck is not fully autonomous if the driver must still present (Rudigier et al., 2021b). Fully Automated Trucking (2) Figure 1 represents the performance of AI without any human intervention and is denoted as Fully Automated Trucking. (2) category represents a truck that can operate without a driver in the vehicle at all. The vehicle is designed to perform all safety-critical driving functions and monitor roadway conditions for an entire trip (Crandall and Formby, 2016). The fully autonomous technology comprises software with an adaptive cruise control system that adapts to any environment.

Fully autonomous trucks are still under testing, yet they are expected to comprise intersection management systems and collision avoidance systems with other heavy trucks, cars, motorcycles, and pedestrians at the same time (Müller, 2020). The intelligent autonomous truck will have to use sensors to sense its surroundings, evaluate and process the data, and then use that information to define further its environment and status information (Rudigier et al., 2021b; TuSimple's Editorial Team, 2022). The information is estimated by self-learning to predict future environmental changes and thus make autonomous decisions without driver responsibility (Fisher, 2022; Wang and Zhang, 2022).



According to current AI developments, platooning is considered one of the most significant developments in road transport so far. Section (3) shows Traditional Platooning as a technology-based option that is only partially autonomous (Katreddi et al., 2022b). Traditional Platooning allows two or more trucks to follow each other closely through a combination of production safety systems and connected vehicle technology (Waldman, 2020). Trucking platooning uses features such as radars and vehicle-to-vehicle (V2V) communication where multiple trucks, guided by the lead vehicle driver, can safely follow each other in proximity, like train cars (Katreddi et al., 2022b; US Department of Transportation, 2021). The lead driver drives normally, supported by best-in-class active safety systems. The connected fleet can accelerate, brake, and turn in unison, while the semi-autonomous functions of the main truck reduce the possibility of human error (Waldman, 2020). The remaining fleet has drivers steering, monitoring the road, and responding as needed to other traffic with feet off the pedals until they break the chain to finish their planned deliveries (Perry, 2022).

In 2020, for instance, Locomation, an automation technology company, teamed up with Wilson Logistics, a trucking and logistics company, to launch an automated platooning program. Locomation has developed a platooning system named Autonomous Relay Convoy (ARC) as a pilot program that enables the driver to be off duty while in the cab, extending the hours the trucks can be on the road, not restricted by the 11 hours of service. Under the terms of the agreement, at least 1,120 Wilson Logistics tractors were equipped with Locomation's (ARC) technology, with the first units delivered in early 2022 (Baker, 2020; Kingstone, 2020). Section (1/3) represents the Traditional Platooning with Two Drivers, based on technology that works in the same dynamic as traditional platooning, with the difference of team drivers instead of solo drivers in each truck. Based on truckdrivers' regulations, even in Traditional Platooning (3), driving hours restrictions represent constraints. The team drivers allow the platoon to keep a non-resting trip during its operation. While drivers take turns resting, they maintain safety and efficiency according to current regulations.

As in Fully Automated Trucking (2), the need to improve and optimize the truck's operation drives the platooning strategy to achieve absolute automation, eliminating any responsibility from the driver. Section (2/3) in Figure 1 represents Fully Automated Platooning, where the platoon operates completely autonomously without needing a driver in any of the trucks. For example, the trucks can vary the speed with a constant following distance, join or split the platoon simultaneously, and detect any type of failure (Lu and Shladover, 2014). Currently, only semi-automated platooning has been tested, as the current infrastructure cannot safely support fully automated platooning. The semi-automated platooning is somewhere between a support role and a fully automated truck.

The current autonomy approach keeps a human firmly seated in the cab of the truck squad's lead vehicle. In this case, the V2V connectivity between the trucks acts as an enabler that allows the automation of the following vehicles (Mascalchi and Willemsen, 2022). The main driver of the truck has the support of ADAS systems, understood as Assisted Automated Trucks (1/2), in which the driver is still responsible for the driving task (Bishop, 2020). By fully automating driving tasks to achieve the platoon's total autonomy, the driver's presence is no longer essential (Hjälmdahl et al., 2017). The human driver in the lead truck will begin to handle a wide range of complex non-driving operational scenarios, such as refueling vehicles, communicating with the central station, or communicating with customers to coordinate the delivery. Thus, the role of the human goes from being a driver to being an assistant employee, as described in section (1/2/3) from Figure 1, High Automated Platooning with Service Employee.

MANAGERIAL IMPLICATIONS

Today's society is beginning to feel the effects of AI technology. The use of autonomous vehicles is growing in the transportation sector. Over the past decade, autonomous vehicle technology has been the most adaptive trend in the automotive industry, and it promises to increase road safety and driver comfort (Koh, 2022). Substantial advancement in the field of autonomous vehicle technology is attracting increasingly more attention from vehicle manufacturers, technology companies, and the general public. Trucking companies need to take advantage of the growing popularity of automation. Working with manufacturers so that beneficial vehicles are designed with high technologies that impact the market. The phenomenon of autonomous driving is not new, yet it is probably one of the most stunning inventions ever made. In lieu of being merely a theoretical concept, autonomous trucks have been built and are already in use worldwide. Volkswagen subsidiary Scania is creating the world's first fully autonomous truck platooning system(Moon, 2017). Singapore intends to platoon four trucks on public highways to move containers between ports. While on the roadway, Korea has successfully shown platooning of heavy-duty trucks (Kim et al., 2022).

AV supporters claim this technology provides environmental stability and social benefits. The global autonomous vehicle market is expected to reach USD 325.9 billion in revenue by 2030, with the US dominating the autonomous vehicle market (Renub Research, 2022). Factors such as strong and established automotive company clusters and the establishment of the world's largest technology companies, such as Google, Microsoft, and Apple, have led the US to occupy this position. Technology developer companies, in alliance with logistics companies, seek to have a vision of the future so as not to be left behind in the development of AV. Thus, alliances between these industries will be essential for the trucking industry. In 2020, for example, Daimler Truck, with its independent subsidiary Torc Robotics, started its proposal to develop L4 autonomous trucks in the US. The companies have the most extended association for autonomous truck driving technology in the industry and have been safely and reliably testing a fleet of autonomous trucks on public roads in the US daily (Daimler Truck, 2022; Ribeiro, 2021).

Even though AV has been claimed to represent advanced technology that does not require human functions, the technology cannot be implemented on autonomous trucks (AT) as impeccably as in theory. Geistfeld (2017) and Koh (2022) consider that once the act of driving in humans is eliminated and control is given to a computer or an automated system, the driver's moral responsibility disappears since he does not have control of the vehicle. Thus, the road tests of AT performed worldwide have included drivers inside the trucks as service employees in case of emergency (Paulsen, 2018). As in the rest of the world, safety concerns and unknown effects are significant reasons that legislation allowing AV testing on public roads is challenging to implement. American transportation regulation has allowed states like California, North Dakota, Tennessee, Virginia, and Michigan to test and use AV under restricted mobility to specific test areas and driving conditions; thus, companies adopting AT must be aware of the regulations established (NCSL, 2020). According to Harrington et al. (2018), AV is expected to eventually operate in unstructured environments and close the gap with humans regarding adaptability, as current infrastructure is designed and built based on human capabilities. Road signs, for instance, are scaled and placed according to human perception capabilities concerning speed restrictions and local traffic patterns. Hence, managers should be aware of the need for the road infrastructure to change to keep up with advancements in AV technology.

Safety in the trucking industry is a huge concern. According to *the National Highway Traffic Safety Administration (NHTSA, 2021),* an estimated 439,206 large trucks were involved in police-reported traffic crashes nationwide only during 2020. Trucks are difficult to control, maneuver, and stop quickly because of their design, size, and weight. The risk of truck accidents is more than double that of car accidents, so automation is expected to reduce the accident rate due to driver error. While Ats can handle tasks like merging into traffic from an on-ramp or changing lanes, companies are still working to ensure they can respond to less common situations, like a sudden car collision or an unexpected pedestrian on the road (Metz, 2022). The prospect of sharing the road with autonomous vehicles while companies test and demonstrate their capabilities raises concerns for most American drivers. According to a survey carried out by CDL Life in 2021, 53% of drivers would feel less safe sharing the road with autonomous trucks, generating a rejection of these technological advances. Rei (2021) considers that Ats will have to share the road with human-powered vehicles for a certain period based on the evolutionary behavior of the roads and transportation. Eventually, Ats will occupy their own roads in the long run.

An Update on the State of the Development after 2022

In recent years, the autonomous trucking industry has seen multiple significant changes. The category entered the growth phase, and as expected, it is experiencing shake-outs among some inventors and changes in the directions for others. For example, Alphabet's Waymo entered self-driving taxi development, exited trucks, and planned to test their driverless taxis in 10 new cities, starting with Las Vegas and San Diego in 2025, building on their success in San Francisco (Hawkins, 2025). Tesla is getting ready to launch its robotaxi service (Reuters, 2025). They obtained California's first set of permits to run the Cybercab, their robotaxi without a steering wheel and control pedals. Another important player, BAE Systems of Australia, together with Trusted Autonomous Systems, is developing AI systems to be used in unmanned ground vehicles for the army (Military Leak, 2024).

Meanwhile, the development of autonomous trucks (ATs) proceeded on multiple fronts. Kodiak Robotics and Aurora were leading the others in aiming for fully automated driverless trucks (Taube, 2024; Clevenger, 2024). Both companies use teams of two specialists to ride in the trucks to monitor the systems. So far, the tests with teams of safety drivers and technology monitoring service employees have been satisfactory and plans to take the ATs to public roads without drivers are underway.

We expect the commercial adoption of ATs will be fast as the collaboration among technology developers, established truck makers, component suppliers, shippers, trucking and logistics companies. Multiple stakeholders also encourage discussions on safety and labor relations. For example, Aurora, which was planning to have about 20 fully autonomous trucks by the end of 2024 on the Dallas-Houston route, collaborates with truck manufacturers, Paccar and

Volvo, suppliers, and fleet partners, including Continental, FedEx, Schneider, Werner, Uber. Similarly, Kodiak Robotics, which plans to operate ATs on public roads again, works with Loadsmith, Maersk, Werner, C.R. England, Ryder Systems, and Pilot Company, among others. Kodiak also partners with the US Department of Defense to use its system on military vehicles. The Dallas-Houston route was picked as the first driverless operation in Kodiak (Taube, 2024) (Clevenger, 2024).

As major expansions are planned for the ATs, the discussions about how ready the US highways and citizens are flaring up. The majority of discussions seem to focus on three main topics: safety and related regulations, the impact on labor and union relations, and overall costs.

1. <u>Safety: improved or compromised</u>

   During the early development of ATs, a robotaxi hit a jaywalking pedestrian and dragged her about 20 feet in 2023 (Thadani, 2024). This event caused a fear of potential catastrophes that a heavier AT may cause. The majority of issues with autonomous vehicles seem to come from the erratic behavior of other drivers and pedestrians. Both Kodiak and Aurora put safety first as they designed their systems to slow down and let other drivers merge. Aurora truck systems are designed to operate in fog and light rain. They do not intend to operate in ice or snow conditions. An Aurora technology specialist reported an incident when the system recognized traffic in a foggy drive before the human controllers in an interview (Taube, 2024). However, the risk is still noteworthy as large long-distance trucks at speeds above 65 miles per hour on rural roads and brings in the debate of whether the US road structure can handle that type of technology.

   The lack of federal regulations and confusing and contradictory state laws seem to slow down development, especially road tests. ATs can run on all roads of the US unless a state explicitly forbids it. Texas, Florida, Arizona, and Nevada allow road tests and completely driverless trucks. California, Massachusetts, and New York forbid it.

2. <u>Labor: New jobs or lost jobs</u>

   The potential for job loss among drivers creates concerns and forces unions to act, claiming that the notion of lack of human interaction in 18-wheelers on chaotic highways and crowded cities terrifies people. The role of the drivers seems to change and enhance as they need to know more about technology to be able to run and maintain the systems. Moreover, trucking companies claimed that they have difficulty finding drivers for long haul and boring routes like the Dallas-Houston highway. (Thadani, 2024) A bill in California that required a trained human driver behind the ATs was introduced but later vetoed by the governor (Reuters, 2024). Still, the loss of immediate jobs is a valid concern, that requires all players to reinvent their logistics networks and retrain labor for the emerging jobs.

3. <u>Benefits or costs for logistics companies:</u>

   A major apparent benefit of ATs is reducing time by eliminating the physical limitations of human labor. Right now, truck drivers are allowed to drive 11 hours and stay 10 hours off duty in consecutive hours by law. ATs help the transfer of goods around the globe faster. Aurora estimates that ATs could cut fuel costs by 13 to 32 percent as they don't have to return home at the end of the shift, detour for bathroom breaks, or idle during rest times (Skibell, 2024). However, maintenance costs may increase different and special service requirements for these ATs. For example, Pilot opened the first AT Port by collaborating with Kodiak Robotics in Villa Rica, GA. They provide a hub for drivers to pick up and drop off first and last-mile deliveries, refueling, maintenance, and inspections. This indicates that technology can create new job opportunities for maintenance technicians, dispatchers, and fuelers while providing alternative routes to long-haul drivers.

The Trucking Options Model may help the industry to organize interactions among humans, robotics and trucking requirements to provide optimum logistics and transportation service alternatives that match the needs of customers and logistic companies the best. When the dust settles, standards, the necessary support services, and job definitions will emerge. AT development also caused side inventions such as robotaxis, unmanned military ground vehicles, etc. Eventually, the technology developed for ATs will diffuse into all other vehicles like personal cars, planes, and trains and will change the future of transportation vastly. Maybe, instead of rushing to connecting flights, passengers will be transferred to their main flights via human-size drone bubbles from their homes directly in the future.

FUTURE RESEARCH AVENUES

The current study proposes technology-based trucking options based on AI, driver capabilities, and their combinations. The levels of automation range from traditional trucking, where AI tools assist the driver, to the highest level of automation, where AI takes complete control of the truck. As the amount of automation increases, so does the transfer of responsibility from the driver to the truck, with the driver leaving his ability to intervene only in an emergency and becoming a support employee inside the truck. Future research should consider the comfort of transitions from a fully automated system to human driver intervention during emergencies. Zhang et al. (2019) emphasized the significance of assessing the driver's reaction ratio after becoming a support employee and monitoring the system for long periods. It is critical for regulators to establish a limit regarding the number of working hours for a support employee inside the truck, just as authorities established it for drivers in traditional trucking. Driver exhaustion and reaction time tests and transition simulators to retake control of the truck will be necessary.

Further research should also be conducted to examine the environment in which AT will perform in the current infrastructure. Multiple surveys on the perception of AVs versus traditional vehicles have analyzed that at least 45% of Americans have expressed discomfort sharing the road with driverless vehicles (Rainie et al., 2022). The design nature of trucks themselves and their weight when carrying goods makes them more prone to fatal road accidents. AT must ensure that the AI technology is adaptive and safe for both the support employee inside the cabin and the traditional vehicles with which it must share the road. ATs may need to process large amounts of data in real time. Sari et al. (2022)highlight the importance of AT connection with road infrastructures and networks to offer better connectivity and safety. Thus, more research would help determine if the current highways could be (adapted or if there is a need to invest in alternated technological infrastructure only for ATs, especially for platooning operations.

In truck platooning, a platoon can consist of many trucks moving together over short distances, just like a road train. There is no universal cap on the number of trucks that can link in platooning. Janssen et al. (2015) assert that when truck drivers must merge into highway traffic from on- and off-ramps, a platoon of more than two trucks would be a problem. However, more research should be conducted regarding the dynamics of traffic immersion with platoons of different dimensions. This would help to identify the types of trucks that will be able to platoon and the regulations necessary for ensuring safety on the road. Regulations in the state of Minnesota, for instance, have limited platoons to three trucks in order to keep safety due to possible intimidation of fellow road users and troublesome to leave or enter the highway in coordination with car drivers (Minnesota Department of Transportation, 2019). These current laws point out the limitations regarding traditional platooning and semi-autonomous platooning in some other states, but will they be the same regulations for fully autonomous platooning?

In the US, both railroad and trucking have promised an innovative future for the transportation industry. There is certainly a similarity between truck platooning and rail systems. The technology required to automate trucks is not cheap. The technology is estimated to cost between $30,000 and $100,000 (United World Transportation, 2023). Experts fear the high cost of autonomous trucks will drive small and midsize fleets out of the trucking industry. Thus, big companies and regulators will need to take measures to prevent the disappearance of small businesses and a possible impact on the country's economy. Research should be necessary to determine the transition methodologies from the traditional system to the fully automated one and to identify what possible use will be given to traditional trucks once the transition is completed.

Rail transport is one of the most environmentally friendly modes of transport, which is why many national and international authorities have set ambitious goals to increase the market share of rail transport (Lawson, 2007). In the mid-1820s, the US invested significant money in a rail system that promised to change freight transportation. Today, this system presents an almost total abandonment, where 1,755 rails are considered abandoned (Association of American Railroads, 2022). Currently, the deployment of automated vehicle technology is on the rise, and the US is targeting the implementation of AT for freight transportation. Meanwhile, Europe plans to shift 50% of long- and medium-stance haulage from road to train (Schwerdfeger et al., 2021). Future research should incorporate the railroad experience to learn from the lessons and produce more appropriate results for AT investment, taking into account cost, safety, and efficiency. A detailed comparison of the two systems would aid in determining how automation in the trucking industry would outperform the railroads and benefit the economy from across the supply chain.

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AN INSTRUMENT TO MEASURE ORGANIZATIONAL SUPPORT AND FOLLOWERSHIP SKILLS

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ABSTRACT

The purpose of this study was to create an instrument to measure organizational support and followership skills. We followed DeVellis' scale development method. From the literature review, we found 44 items for the item-pool. Two rounds of review by a panel of experts reduced the number to 33 items. Survey data came from 175 participants from 40 branches of a financial institution, private sector in Nigeria. Principal component analysis resulted in two factors with eigenvalues greater than 1.0. Optimization of the factors resulted in two five-item scales with the five highest loading items for each of the two scales. Factor 1 (loading ranged from .901 – 1.00) has a Cronbach alpha of .948, and Factor 2 (loading ranged from .855 – .945) has a Cronbach alpha of .945. We tested the instrument for concurrent and discriminant validity and test-retest reliability and found the scales both valid and with high reliability.

Keywords: *Organizational support, Followership Skills, Training Support for Followership Skills, and Organizational Empowerment*

AN INSTRUMENT TO MEASURE ORGANIZATIONAL SUPPORT AND FOLLOWERSHIP SKILL

The purpose of this study was to develop an instrument to measure organizational support and followership skills. Though Latour and Rast's (2004), Nguyen and Seung-Wan's (2018), and Allen et al. (2007) studies gave evidence of POS's positive relationship with follower skills development and continuance, there have been no studies to develop a single instrument that measures organizational support and followership skills. However, Yufan et. al (2024) argued that a leader's relational power arouses follower creativity, and this helpful relationship is facilitated by the follower's interpersonal identification with the leader. Also, the indirect consequence of a leader's interpersonal power on follower creativity is moderated by perceived organizational support(leadership) for creativity.

Organizational support is employees' belief regarding the degree to which the organization vigorously supports them to use their strengths at work (van Woerkom, Mostert, et al., 2016). Yilmaz (2019) argued that the concept of organizational support is expressed as the general belief that employees are members of the organization that they value and contribute to their well-being. The value of the efforts put forward by employees and the perception of this value by individuals is critical for both employee satisfaction and the future of institutions (Eisenberger et al., 1986: p501; Wang & Netemeyer, 2002). Perceived organizational support believes that employees value the organization's contributions and are interested in their well-being (Eisenberger et al., 1986; Kraimer & Wayne, 2004). Perceived organizational support affects all organizational policies. Creating the desired working conditions, providing executive support, and having an accepted reward and a sense of justice in the working environment increases personal respect, trust, and personal development. In this way, employees feel less under pressure, provide more satisfaction from their jobs and perform better.

There are four important factors in providing the desired organizational support; fairness, executive support, and organizational reward and working conditions (Yaghoubi et al., 2014). Organizational support is the perceptions employees develop depending on the value of their contribution to the organization and the degree of caring for their happiness (Taştan et al., 2014). Tharushika, Sellar, and, Anton-Arulrajah (2025) confirm that transformational leadership has both direct and indirect effects on employees' (followers) creativity, with perceived organizational support helping as a partial mediator. Organizational support can be defined as the motivation of organizational bosses to rate their employees' contributions and to care about their well-being (Eisenberger et al., 2020). In summary, high levels of POS help increase positive work outcomes and decrease negative ones (Wu & Liu, 2014).

Latour and Rast (2004) argued that literature had paid little attention to followership skills development. Latour and Rast (2004) also believe that few professional development curricula, plus those of the U.S. military, devote time to developing hands-on follower skills and culture. Instead, commissioning bases, executive seminars, college business plans, and professional military education curricula focus on training leaders. It is possible this may be the reason why there is no instrument available to study organizational support and followership skills. Stephen and Lynne (1990) claimed that there are skills that empower followers. These skills are interpersonal communication, problem-solving skills, information gathering, coping with change, and conflict management (Stephen & Lynne, 1990). Akhilele et al. (2021) study confirmed known followership skills and new followers' skills such as (a) humility skills, (b) analytical skills, (c) skills to study one's boss, (d) skills to understand the leader, (e) followers' listening skills, (f) followers' inquisitive skills, (g) skills for speed, (h) understanding of work culture, (i) emotional intelligence skills, (j) skills to study rules, (k) teachability skills, (l) accuracy skills, (m) commitment skills, (n) followers' discipline skills, (o) work ethics, (p) followers' patience skills, (q) skills to manage the leader, (r) skills to help in vision, (s) skills to help in the mission, and (t) skills to be on the same page.

Akhilele et al. (2021), found that the construct followership skill is not as popular as leadership skill. However, Akhilele et al. identified some amount of organizational support. So, this study seeks to take advantage of this portion of the relationship to develop a quantitative instrument for future research on organizational support and followership skills. This is significant as it allows a large sample size for the of study organizational support and followership skills development in organizations.

Participants were from some selected junior staff of the private sector in Nigeria. Participants were requested to self-report on their own demographic characteristics (also called biodata), attitudes, beliefs, knowledge, feelings, and behavior. Self-reports can be done either by a questionnaire or an interview. Self-report is a commonly used method of measurement and is frequently criticized for its vulnerability to social desirability bias.

OPERATIONAL DEFINITION

Organizational support will be measured by (a) causes of feelings of powerlessness are diagnosed, and empowerment strategy is employed, (b) subordinates are provided with efficacy information, (c) subordinates feel empowered as a result, and (d) behavioral effects of empowerment are noticed (Conger & Kanungo, 1988). The variable followership skill is possessing followers' skills set such as courage following skill, report-writing skills, accuracy skills, loyalty skills, good relationship skills, commitment skills, followers' discipline skills, work ethics, and many others (Akhilele et al., 2021). These skills set enable followers to play their roles in their organizations. Participants were selected from some selected junior staff of the private sector in Nigeria. Self-Report will be used to define these variables (Peter et al., 2017).

LITERATURE REVIEW

Organizational support

Organizational support denotes the employment of resources, structures, and processes that aid organizations to achieve their goals effectively. It comprises the knowledge, skills, and capabilities needed for achieving planned objectives. These competencies assist organizations in being better equipped to adapt to inventions and sustain their competitive benefit (Khotijah et al., 2023).

Organizational support for followership skills development has backing from the works of Conger and Kanungo (1988). Their studies on leadership have revealed a positive relationship between empowering subordinates (followers) and organizational success. They concluded that the empowerment of subordinates creates an understanding of organizational effectiveness. The objective of their study was to address and provide an analytical treatment of the empowerment construct. They believed that empowering subordinates(followers) can be done in the following stages:

1. Causes of feelings of powerlessness are diagnosed, and empowerment strategy is employed.
2. Subordinates are provided with efficacy information.
3. Subordinates feel empowered as a result.
4. Behavioral effects of empowerment are noticed.

One can say that organizations that provide skill acquisition for followers have an excellent chance of succeeding.

They believe that despite increasing attention to the concept of empowerment, understanding of the construct and its underlying processes remains inadequate. Conger and Kanungo attempted to deal with these inadequacies by offering an analytical treatment of the construct and integrating the diverse approaches to the subject found in psychology and management literature. They believe that empowerment can be seen in two ways: (a)as a motivational construct, and (b) as a relational construct. It is proposed that empowerment should be viewed as a motivational construct. In conceptualizing empowerment in these terms, Bandura's self-efficacy notion (1986) is used. Empowerment, therefore, represent the process whereby an individual's belief in their self-efficacy is heightened. Empowerment as an enabling process affects both the initiation and persistence of subordinates' task behavior. Sources of self-efficacy information include: (a) enactive attainment, (b) vicarious experience, (c) verbal persuasion, and (d) emotional arousal.

The scale items that emerge from this concept are as follow:

- My organization have ways powerlessness is diagnosed.
- My organization have an empowerment strategy in place.
- I feel empowered by my organization.
- My organization provide me with efficacy information.
- My organization helps enhance my self-worth.
- behavioral effects of empowerment are evident in me.
- Because of organizational empowerment, I can initiate task.
- Because of organizational empowerment, I have persistence at work.
- Because of organizational empowerment, I am emotionally aroused.
- Because of organizational empowerment, I have remote experience.
- I get verbal persuasion from my organization.
- My organization make me feel motivated to deliver on assigned goals.
- My organization encourage me to relate well to organizational superiors.
- My organization encourage me to relate well with organizational subordinates.
- My organization encourage me to relate well with my teammates.
- My organization encourages my accomplishments.
- My organization enables me to grow in my career.

ORGANIZATIONAL SUPPORT AND FOLLOWERSHIP SKILLS

Akhilele et al. (2021) examined organizational support for followership skills development in Nigeria with a phenomenological study. The study revealed the impact of organizational support for followership skills development in Nigeria. The study determined how organizational efforts or behavior supported followership skills development. The study's significance was in the organization's ability to develop capabilities that will help them function as followers. Nguyen and Seung-Wan's (2018) findings of organizational support for followership behavior were the theoretical foundation for the study. Their study revealed that perceived organizational support is critical to influencing followers' behaviors in organizations. Alanazi, Wiechula, and Foley (2024) noted that leaders habitually lack a deep understanding of their team's roles, skills and limitations, which can lead to mismanagement and mistakes. One can say that leaders represent core organizational support.

The study involved the use of an in-depth interview method for data collection. The purposeful sampling research required 12 HR heads who worked in the 12 selected federal agencies. The experiences obtained from this research conformed to theories of in-depth phenomenological studies (Patton, 2015). The study results proved that followers do not receive the necessary support for followership skills development from the selected federal agencies in Nigeria. The study also discovered 20 new followership skills. The participants with 25 responses believed in the existence of a followership skills concept. Also, participants with 27 responses identified different followership skillsets. The skills identified from the study as follower skills include (a) humility skills, (b) analytical skills, (c) skills to study one's boss, (d) skill to understand the leader, (e) followers' listening skills, (f) followers' inquisitive skills, (g) skills for speed, (h)trust building, (i) understanding of work culture, (j) emotional intelligence skills, (k) communication skills, (l) integrity skills, (m) skills to study rules, (n) teachability skills, (o) courage following skill, (p) accuracy skills, (q) report-writing skills, (r) loyalty skills, (s) good relationship skills, (t) commitment skills, (u) followers' discipline skills, (v) work ethics, (w) followers' patience skills, (x) skills to manage your leader, (y) skills to help in vision, (z) skills to help in mission, and (aa) skills to be on the same page.

Some followership skills such as good relationship skills, trust-building skills, loyalty skills, courage following skills, and integrity skills supports Latour and Rast's (2004) empowerment for followers. They claimed that followers display loyalty, functioning well in teams, integrity, courageously communicating and building trust. The study results also showed that report-writing skills and communication skills corroborate Stephen and Lynne (1990) claimed that interpersonal communication and information-gathering skills empower followers to function correctly in organizations.

Twenty new followership skills that emerged from the study include (a) humility skills, (b) analytical skills, (c) skills to study one's boss, (d) skills to understand the leader, (e) followers' listening skills, (f) followers' inquisitive skills, (g) skills for speed, (h) understanding of work culture, (i) emotional intelligence skills, (j) skills to study rules, (k) teachability skills, (l) accuracy skills, (m) commitment skills, (n) followers' discipline skills, (o) work ethics, (p) followers' patience skills, (q) skills to manage the leader, (r) skills to help in vision, (s) skills to help in mission, and (t) skills to be on the same page. The participants believed these followership skills could help followers follow properly and perform their assigned tasks.

The scale items that emerge from this concept are as follow:

- My organization trains followers with humility skills.
- My organization trains followers with analytical skills.
- My organization trains followers with skills to study one's boss.
- My organization trains followers with skills to understand the leader.
- My organization trains followers with listening skills.
- My organization train followers with inquisitive skills.
- My organization trains followers with skills for speed.
- My organization trains followers with trust-building skills.
- My organization trains followers with understanding of work culture.

- My organization trains followers with emotional intelligence skills.
- My organization trains employees (followers) with communication skills.
- My organization trains followers with integrity skills.
- My organization trains followers with skills to study rules.
- My organization trains followers with teachability skills.
- My organization trains followers with courage skills.
- My organization trains followers with accuracy skills.
- My organization trains followers with report-writing skills.
- My organization trains followers with loyalty skills.
- My organization trains followers with good relationship skills.
- My organization train follower with commitment skills.
- My organization train follower with discipline skills.
- My organization trains followers with work ethics.
- My organization trains followers with patience skills.
- My organization train follower with skills to manage your leader.
- My organization trains followers with skills to help in vision.
- My organization trains followers with skills to help in mission.

My organization trains followers with skills to be on the same page as a leader.

SELF REPORTS

Grimmond, Brown, and Hawkins (2025) claimed that self-reports are used universally to probe people’s thoughts, moods, and behaviors. It is frequently criticized for its vulnerability to social desirability bias. Respondents' bias must be seen as a threat (Padgett, 2017). It implies that the truthfulness and sincerity of respondents are questionable. It means that respondents may withhold information or lie to protect their privacy. Also, some respondents may want to be helpful and provide answers they think the researcher would like to hear or have a faulty recall. One may try to deal with all these issues by asking the respondents to state their biases and let them know the negative effect of this type of response on the study.

METHOD

DeVellis (2017) suggested eight steps for scale development: (a) determine clearly what it is you want to measure, (b) generate an item pool, (c) determine the format for measurement, (d) have initial item pool reviewed by experts, (e) consider inclusion of validation items, (f) administer items to a development sample, (g) evaluate the samples, and (h) optimize scale length.

Determine Clearly What You Want to Measure

In this empirical work, the organizational support and followership skills instrument was developed to measure organizational support and followership skills. Since at the time of this study there is no known empirically validated tools to identify measure organizational support and followership skills in organizations. So, this instrument that was constructed is considered new and unique.

Generate an Item Pool

We identified 44 items associated with the organizational support and followership skills instrument that emerged from studies in the literature reviews. These items are summarized in the literature review section. There were some redundancies in the item list, but DeVellis (2017) indicated that redundancy is not necessarily bad: At this stage of the scale development process, it was better to be more inclusive, all other things being equal. Redundancy is not a bad thing when working a scale. The truth is that the theoretical models that directs scale development efforts are based on redundancy (DeVellis, 2017).

Determine the Format for Measurement

We developed a Self-report questionnaire and deployed to collect responses from participants. Self-report is a commonly used measurement method. Scales, which are composed of items that can be graded on a continuum, are highly compatible with a theoretical model that the study seeks to address (DeVellis (2017). The people who participated in this study were asked to indicate if their organizations provided the itemized support and if their organizations support the training of the itemized skills sets. The ranking was built on a continuum from 1 (never) to 7 (always). Examples of a scale item are provided as follows:

My organization has ways powerlessness is diagnosed.

Never— 1 2 3 4 5 6 7 —always

My organization trains followers on humility skills.

Never— 1 2 3 4 5 6 7 —always

Expert Panel Review

The 44 scale items identified in the literature review were sent to experts on the study subject to determine which of these items needs to be eliminated as redundant, ambiguous, or requiring context for understanding to be included in the test instrument for further analysis. The panel of experts, who published literature on followership and organizational studies, were contacted and they agreed to participate.

An online survey was created using SurveyMonkey™ that listed the 44 items that describe organizational support and followership skills. In a manner consistent with Reid's (2012) understanding, the experts were requested to rate each of the items as either highly relevant, somewhat relevant, or not at all relevant. Additionally, a comment box was made available for each item so that the expert could comment on the rating when an item is ambiguous, redundant, confusing, or required context for understanding. Still following Reid's approach, the results were quantified by assigning a score of 3 to a *highly relevant* item, 2 to *somewhat relevant*, and 1 to *not at all relevant*. To understand the experts' belief, whether the item has relevance for measuring organizational support and followership skills and needs to be retained, an average score of at least 2 on an item was considered as an indication to that belief. Accordingly, the initial 44 items that were reviewed by the expert panel were reduced to 33.

The 33 items were sent to the sample via an online survey service. We received 175 responses. Please see table 1 for the sample demographics. We conducted a Pearson-r correlation and noted the high number of correlations above 0.50, so we used direct oblimin rotation as suggested by Brown (2009, p.21). We also used SPSS to determine the KMO measure of sampling adequacy and Bartlett's test of sphericity. The results, shown in table 2 indicated that the data was a good candidate for data reduction, per Hair et al. (2010) recommendation of KMO above .60 and Bartlett's test of sphericity *p-value* < .05. If KMO is above .9 and Bartlett's *p-value* < .05, the data can benefit from factor analysis.

Table 1: Sample Demographics

		Frequency	Cumulative Percent
Gender		3.4	3.4
	Male	40.6	40.6
	Female	100.0	100.0
	Total		
Age	21-30	29.1	29.1
	31-40	74.9	74.9
	41-50	98.3	98.3
	51-60	100.0	100.0
	Total		

Table 2 KMO and Bartlett's Test for Factor 1

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.961
Bartlett's Test of Sphericity	Approx. Chi-Square	8777.448
	Df	496
	Sig.	.000

The first factor analysis showed two factors with eigenvalues above 1.0. Factor 1 had an eigenvalue of 23.83 and explained 74.4 percent of the variance. Factor 2 had an eigenvalue of

1.92 and explained 6.2 percent of the variance. There were four items that cross-loaded on the two factors. We removed the items and conducted another factor analysis that produced two factors. Factor 1 included 15 items, had an eigenvalue of 20.07, and explained 74.3 percent of the variance. Factor 2 had 12 items, had an eigenvalue of 1.81 and explained 6.7 percent of the variance.

We conducted scale reliability analysis for the two scales and found that the 15-item scale-1 had Cronbach's a of .983 and the 12-item scale-2 had Cronbach's a of .948. DeVellis (2017) method calls for scale optimization when Cronbach's alpha is high.

We chose the five highest loading items for each of the two scales. Factor 1 (loading ranged from .901 – 1.00) has a Cronbach alpha of .948 and includes the following items:

- Q9_4 My organization trains followers with patience skills.
- Q9_3 My organization trains followers with work ethics.
- Q8_5 My organization train followers on commitment skills.
- Q7_5 My organization trains followers on integrity skills.
- Q9_1 My organization train follower on discipline skills.

We named Factor 1 'Training Support for Followership Skills'.

Factor 2 (loading ranged from .855 – .945) has a Cronbach alpha of .945 and includes the following items:

- Q2_4 Because of organizational empowerment, I am emotionally stimulated.
- Q2_2 I feel empowered by my organization.
- Q2_1 My organization have an empowerment strategy in place.
- Q2_5 Because of organizational empowerment, I have experience.
- Q5_1 My organization makes me feel motivated to deliver on assigned goals

We named Factor 2 'Organizational Empowerment.'

We conducted a Pearson-r correlation test of the two variables and found that the two variables are highly correlated with $r = .706$. We ran a t-test for each variable with gender as the grouping variable and found no significant differences for either variable by gender. We ran ANOVA on the two variables, each with the grouping variable of age and we found no significant differences for either variable by age. Descriptives for the two factors showed the five-item organizational support variable for our study showed a mean of 7.77 and a standard deviation of 2.05. The five-item empowerment variable for our study showed a mean of 6.92. A skewness and kurtosis analysis showed that both variables could be treated as normal data because both tests were within -3.0 and +3/0.

DISCUSSION

The purpose of this research was to create a valid and reliable instrument to measure organizational support and followership skills. In this study, the concept organizational support and followership skills is therefore operationalized and a statistically validated instrument, as

Organizational Support and Followership Skills Questionnaire (OSFSQ), is created to measure both constructs. Before this study, there was no instrument to measure organizational support and followership skills. Though Latour and Rast's (2004), Nguyen and Seung-Wan's (2018), and Allen et al. (2007) studies gave evidence of POS's positive relationship with follower skills development and continuance, there have been no studies to develop a single instrument that measures organizational support and followership skills.

IMPLICATIONS OF RESEARCH

The OSFSQ enables researchers to measure organizational support and followership skills - an approach that brings about studies of various organizational behaviors as it relates with wide range of followership skills. Thus, the development of such an instrument opens more doors for empirical research on organizational support and followership studies. The OSFSQ is significant to the practitioner as well. First, the study could be used to solve the problem of not been able to generalized certain findings because limited respondents were employed (Padgett, 2017). Now, with OSFSQ as instrument, large samples can be studied and results can be generalized. Secondly, the study contributes to organizational leadership development of followers and leaders, by deepening the conversation on the leader- followership relations (Akhilele et al., 2021). Thirdly, organizations can employ this study to know how much support followers gets, what exactly their challenges are, and the training they can receive (Alanazi, Wiechula, and Foley, 2024; Stephen & Lynne, 1990). Fourthly, mentors or trainers in organizations will now know skills sets to emphasis in their trainings or contact sessions. Finally, this simple 10-item Questionnaire can be included in the study of organizational support and followership skill studies.

CONCLUSION

From 40 branches of a financial institution in a private sector in Nigeria, 175 participants submitted responses via an online survey service. 165 responses were found usable. We conducted a Pearson-r correlation test of the two variables and found that the two variables are highly correlated with r = .706. We chose the five highest loading items for each of the two scales. Factor 1 (loading ranged from .901 – 1.00) has a Cronbach a of .948 and includes the following items: labelled, my organization trains followers with patience skills, my organization trains followers with work ethics, my organization train followers on commitment skills, my organization trains followers on integrity skills, and my organization train follower on discipline skills. They are named Factor 1 ‘Training Support for Followership Skills’. Factor 2 (loading ranged from .855 – .945) has a Cronbach a of .945 and includes the following items: labelled because of organizational empowerment, I am emotionally stimulated, I feel empowered by my organization, my organization have an empowerment strategy in place, because of organizational empowerment, I have experience, and my organization makes me feel motivated to deliver on assigned goals. They are named Factor 2 ‘Organizational Empowerment.’

The two five-item factorscomprise the Organizational Support and Followership Skills Questionnaire (OSFSQ).The OSFSQ provides scholars and researchers with a valid and reliable instrument for future research related to organizational support and followership skills research or studies; while encouraging practitioners for personal development, followership development, coaching and mentoring of organizational members for valuing and practicing followership skills development within organizations and beyond. Further research is recommended to develop and further the construct of followership skills development in public and nonprofit organizations.

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PUBLIC PERCEPTIONS OF UNIVERSAL HEALTHCARE ON SOCIAL MEDIA: A MACHINE LEARNING APPROACH WITH SENTIMENT ANALYSIS AND TOPIC MODELING

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ABSTRACT

In the United States, universal healthcare has been a long-term, open-to-debate topic, because the US is the only developed country without it, and health insurance imposes significant costs on employers and employees. Public opinions on universal healthcare are diverse and influenced by multiple factors, such as political campaigns, public health crises, social events, and technological advancement. The public perceptions on universal healthcare need to be precisely captured and understood for stakeholders to make the right decisions to cover the majority people's interests. Social media's rise and popularity offer an innovative method to track public sentiment over such societal topics. Prior research has shown that the rich source of information on social media can be used to understand the public's sentiment and opinions on major events. Therefore, in this study, we collected and analyzed 371 posts and 22,756 comments on Reddit related to universal healthcare, using Reddit Application Programming Interface (API) and Python programming. With Linguistics Inquiry and Word Count (LIWC), we discovered public sentiment shifted gradually in a positive direction on universal healthcare topics in the past 15 years. In addition, we used machine learning Latent Dirichlet Allocation (LDA) topic modeling to identify five key themes in the public discourse related to universal healthcare: costs and taxes, voting to change, comparison with other countries' healthcare systems, healthcare cost, and government authority expansion and socialism. Implications of the findings will be discussed.

Keywords: *universal healthcare, sentiment analysis, topic modeling, machine learning, social media analytics*

INTRODUCTION AND PREVIOUS RESEARCH

Universal healthcare (UHC) has been an open-to-debate topic in America for many years (Zieff et al., 2020). While proponents of UHC advocate its benefits to public health, the hefty financial cost to implement UHC is recognized as a formidable barrier (Bloom et al., 2018). Many countries and territories in the world have universal healthcare systems, such as Canada, the United Kingdom, Saudi Arabia, Japan, Brazil, and Australia. However, the United States is not one of them, and health insurance impose significant costs on both workers and businesses that hire them in the U.S. Several efforts have been made in American history towards universal healthcare, such as Medicare and Medicaid from the 1960s, Bill and Hillary Clinton's advocacy for universal health coverage, and the Affordable Healthcare Act in Barack Obama's presidential election. However, a comprehensive universal healthcare system has yet to be implemented in the United States. Public opinions on universal healthcare in the United States are diverse and have been swinging over time alongside historical events and technological revolutions, such as presidential elections, the COVID-19 pandemic, and the new advancement of artificial intelligence (Bloom et al., 2018; Brenan, 2023).

Previously, public opinion on such public policy was evaluated primarily through traditional survey firms, such as Gallup and Pew Research, to interview certain groups of people with questionnaires (Brenan, 2023). Since the emergence of the internet and Web 2.0 technologies, the number of social media users has surged dramatically. As of 2022, there were 4.62 billion social media users worldwide, which represents sixty-two percent of the world population (Pabian & Pabian, 2023). Social media offers a new option for end users to express their opinions and emotions about a wide spectrum of subjects with minimal constraints. This genuine user-generated content on social media provides a rich source of information for businesses, governments, and policymakers. Social media content mining, sentiment analysis, and topic modeling based on computational analysis provide a novel approach to tracking public responses to universal healthcare topics.

Content mining refers to the process of extracting pertinent information from a natural language text. Within this domain, sentiment analysis is the field of study that specifically identifies people's subjective opinions, evaluations, and attitudes or sentiments towards products, services, political issues, education, and so on from the written language. The sentiment analysis methodologies can be classified into three main categories in general, i.e., lexicon-based techniques, machine learning techniques, and hybrids of both approaches. The lexicon-based technique is also known as a dictionary-based approach. It relies on a collection of known and predetermined sentimental terms, counting positive and negative words in the related data set, and assumes that the overall sentiment expressed in a given text document can be calculated as the average of the sentiment scores of its words and phrases. Linguistic Inquiry and Word Count (LIWC) is the major lexicon-based sentiment analysis tool. Machine learning approaches are based on various algorithms for training data sets to detect sentiments from test data sets; hybrid approaches are based on a combination of these two (Drus & Khalid, 2019).

Topic modeling is a machine learning technique used to identify latent topics within a corpus of documents or texts. Latent Dirichlet Allocation (LDA) is a commonly used unsupervised learning algorithm for topic modeling in Natural Language Processing (NLP) and acts as an intermediate layer between words and documents. LDA is based on the Bayesian probability model, assuming that each topic is a mixture over a set of words and each document is a mixture over sets of topic probabilities (Blei, 2012). In iterative learning processes, the LDA model assigns topics to a given corpus based on the words present.

The above-mentioned natural language processing techniques have been used in numerous studies (Sanders et al., 2021; Ye & Zhao, 2021; Melton et al., 2022; Ruan & Lv, 2022) to surveil social media posts. X (Twitter) is the leading social media platform that is used to collect user opinion for social media content analysis (Drus & Khalid, 2019). However, our study utilizes Reddit as the content resource for the following reasons: unlike X, which limits tweets up to 280 characters, Reddit posts can reach 40,000 characters, while comments can extend to 10,000 characters. The expanded character space allows for more in-depth and nuanced discussions on Reddit, which is an invaluable source of data for Natural Language Processing as it provides a deeper insight into user opinions and attitudes. In addition, the majority of user accounts on Reddit are anonymous, which encourages unrestricted sentiment expression compared to X, which are mostly identifiable profiles. Moreover, Reddit represents the platforms that have not been studied as extensively as X, and it is worth further exploration. The key comparisons between Reddit and X are listed in Table 1.

Table 1
Comparison of Reddit and X (Twitter)

	Reddit	**X (Twitter)**
Social Media Type	Blogs	Micro-blogs
Length of Post	40,000 characters on posts and 10,000 on comments	280 characters
Content focus	Wide range of topics, large and diverse user base, detailed discussion	Short updates of current events, politics, breaking news and cultural topics
Privacy	Authors are anonymous and user driven	More popular with celebrities and influencers, most public profiles
Interaction Style	Upvotes, downvotes, and threaded comments	Direct interaction through replies, retweets, and likes

To our best knowledge, no social media content sentiment analysis or latent topic modeling research has been done on universal healthcare topics on Reddit. In this study, the public's opinion data from Reddit was retrieved and analyzed with NLP techniques, LIWC, and LDA, aiming to answer the following questions:

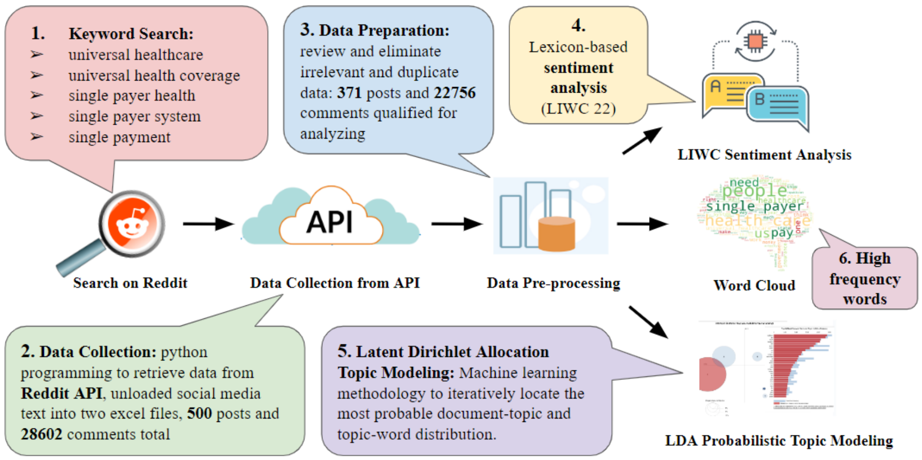
RQ1: What are the public perceptions of universal healthcare expressed in related social media discussion?

RQ2: What are the main topics in the public discourse concerning universal healthcare?

METHODS

The overall data collection, data preparation, and data analysis procedures of this study are indicated in Figure 1. We started with a Reddit platform search, and data was retrieved from the Reddit API. The returned data was pre-processed before further analysis using Natural Language Processing tools.

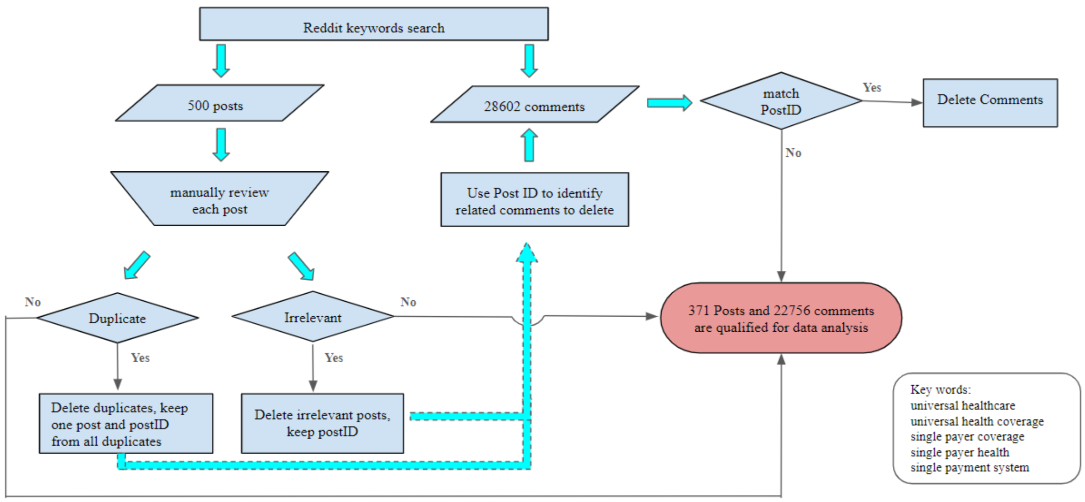
Figure 1
Data Collection, Data Preparation, and Data Analysis Process with NLP Tools



Data Collection and Data Preparation

The Reddit posts and comments written in English were searched and retrieved via the Reddit Application Programming Interface (API), which is a program interfacing between applications and web services to perform specific functions. Our data retrieval application is developed in the Python programming language. The interchangeable phrases "universal healthcare," "universal health coverage," "single payer coverage," and "single payer health," and "single payment system" were used as search keywords. The search through the Reddit API returned the top 100 most relevant posts for each keyword, with a time range from 2009 to 2023. Each post also contains a cluster of responding comments, and the comments are linked to the post by a unique postID. In total, 500 posts with 28,602 comments were retrieved initially. Each post was reviewed individually to eliminate duplicates and posts unrelated to universal healthcare in the United States. Follow-up comments associated with the eliminated posts were also removed. After the review and elimination process, 371 posts and 22756 comments were retained for data analysis. The data collection and data preparation workflow are illustrated in Figure 2.

Figure 2
Data Collection and Preparation Workflow



This study utilized Linguistic Inquiry and Word Count (LIWC), a widely adopted text language analysis tool, to analyze the various emotional, cognitive, and structural elements within people's spoken and written language samples (Boyd et al., 2022). The LIWC text analysis operates by calculating the percentage of words in the target text matching its dictionary. LIWC-22, the most recently released version, has expanded dictionaries and improved user-friendly software design. The LIWC-22 analyzes over 100 dimensions of text and is capable of capturing 80% - 90% of all words people use in oral and written English, including words frequently used on social media (Boyd et al., 2022). The psychological constructs and processes in LIWC-22 include affect, cognition, and perception. Positive emotion and negative positive emotion are both measured constructs as part of the affective process. For example, LIWC would score the sentence "Pizza is my favorite food" as 20% for positive emotion because "favorite" is the only word of positive emotion out of the total of five words in the sentence. Prior research has proved the reliability of LIWC in identifying emotional expression (Tausczik & Pennebaker 2010). The direction and strength of the sentiment can be calculated by the sentiment polarity of each post using the following formula: polarity = positive score - negative score (Salehan & Kim 2016), where both scores range from 0 to 100. Therefore, the sentiment polarity score falls within the range [-100, 100], with 0 representing a neutral sentiment.

This study utilized Latent Dirichlet Allocation (Blei et al., 2003), a probabilistic topic modeling algorithm, to discover latent discussion topics related to universal healthcare. The application was developed in the Python programming language with the SciKitLearn package, and LDAVis, a web-based interactive visualization tool, is used to display the frequency and relativity of words and topics. LDA uses unsupervised machine learning to assign words to the topics and topics to the documents in a corpus. An iterative process helps to discover optimal assignments, and the coherence score measures how semantically similar the top words of each topic are, with a scale of [0-1] (Syed and Spruit, 2017). A higher coherence score indicates that the topics are more meaningful and interpretable.

RESULTS

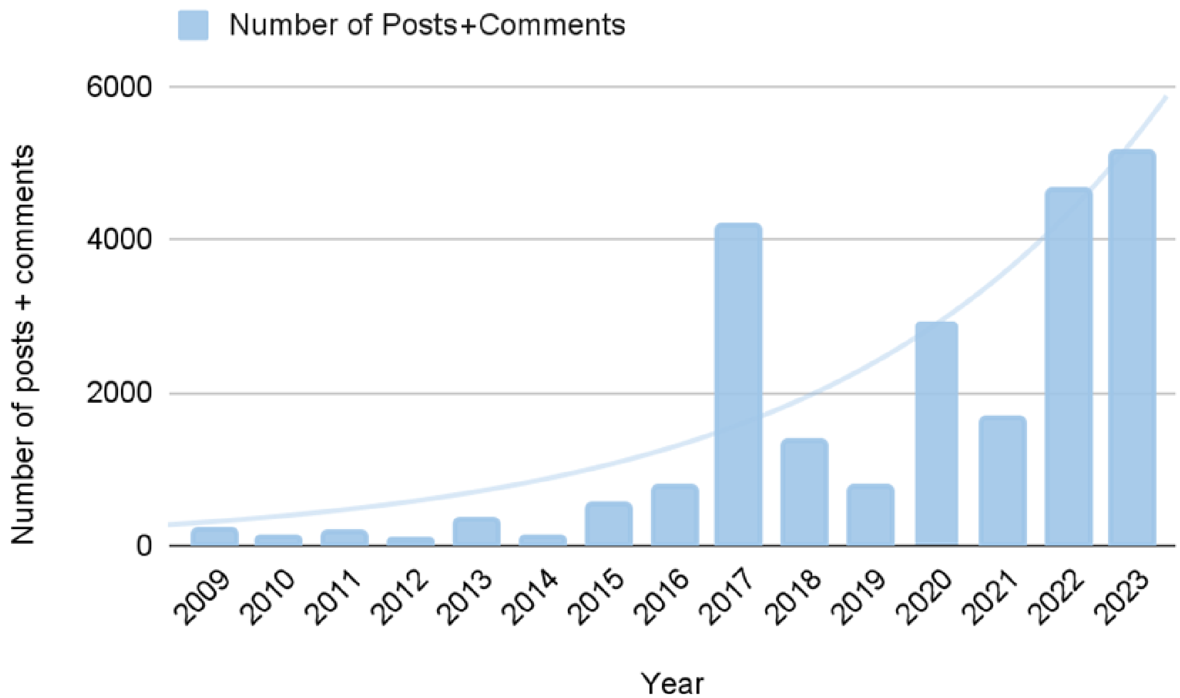
Dataset

After manual review and elimination, 371 posts and 22,756 comments related to universal health care were retained from the keyword search on Reddit. The number of posts and comments for each year is listed in Table 2, and the graphic view is shown in Figure 3.

Table 2
Summary of Number of Posts and Comments Each Year

Year	Number of Posts	Number of Comments	Number of Post + Comments
2009	3	224	227
2010	2	128	130
2011	3	169	172
2012	1	80	81
2013	5	356	361
2014	2	107	109
2015	12	542	554
2016	15	768	783
2017	88	4094	4182
2018	19	1343	1362
2019	11	760	771
2020	34	2903	2937
2021	30	1637	1667
2022	64	4587	4651
2023	82	5058	5140
Total	371	22756	23127

Figure 3
Annual Total Number of Posts and Comments on Universal Healthcare Related Topics



The total number of relevant posts and comments on Reddit increased exponentially over the past fifteen years from 2009 to 2023. There was a sharp spike in the number in 2017, which indicates public attention was attracted to universal healthcare during 2017. Close examination of the public discourse reveals that the large spike occurred when former president Donald Trump started to repeal the Affordable Care Act and Senator Bernie Sanders advocated for single payer health, fueling substantial public discussions. Additionally, universal healthcare topics regained public interest in 2020 and have received continuously heightened ongoing attention and discourse. The second surge of public interest occurred amid the COVID-19 pandemic when millions of people lost their jobs and their employer-sponsored healthcare insurance, bringing public attention back to universal healthcare.

To address the potential impacts of the same users posting multiple opinions on the results, we also tabulated the posting frequency distribution in Table 3. A total of 20137 unique user IDs are identified from the posts and comments. Only less than ten users out of 20137 posted more than 8 posts and comments, which account for less than 0.05% of total user IDs. The majority of the users post less than or equal to three times, which account for 99.5% of the total user IDs. This result suggests that the data set represents a wide range of users' opinions, instead of a few users with a high volume of biased opinions.

Table 3 Summary of Number of Users for Posts and Comments		
Number of Posts + Comments by the Same User ID	**Number of User ID**	**Percent in Total Accounts**
20	1	0.0050%
12	1	0.0050%
9	3	0.015%
8	4	0.020%
7	2	0.0099%
6	6	0.030%
5	27	0.13%
4	49	0.24%
3	490	2.4%
2	1631	8.1%
1	17923	89%
Total	20137	100%

Sentiment Analysis

The retained posts and comments were analyzed by the LIWC-22 application, with each item receiving a positive tone score and a negative tone score. The polarity of each item is calculated as:

polarity = positive tone score - negative tone score

Positive polarity scores mean more favorable opinions on the topic; zero means neutral; and a negative score means unfavorable opinions. Sample posts and comments with positive, neutral, and negative polarity scores are provided in Table 4.

Table 4
Sample Reddit Posts and Comments with Polarity Scores

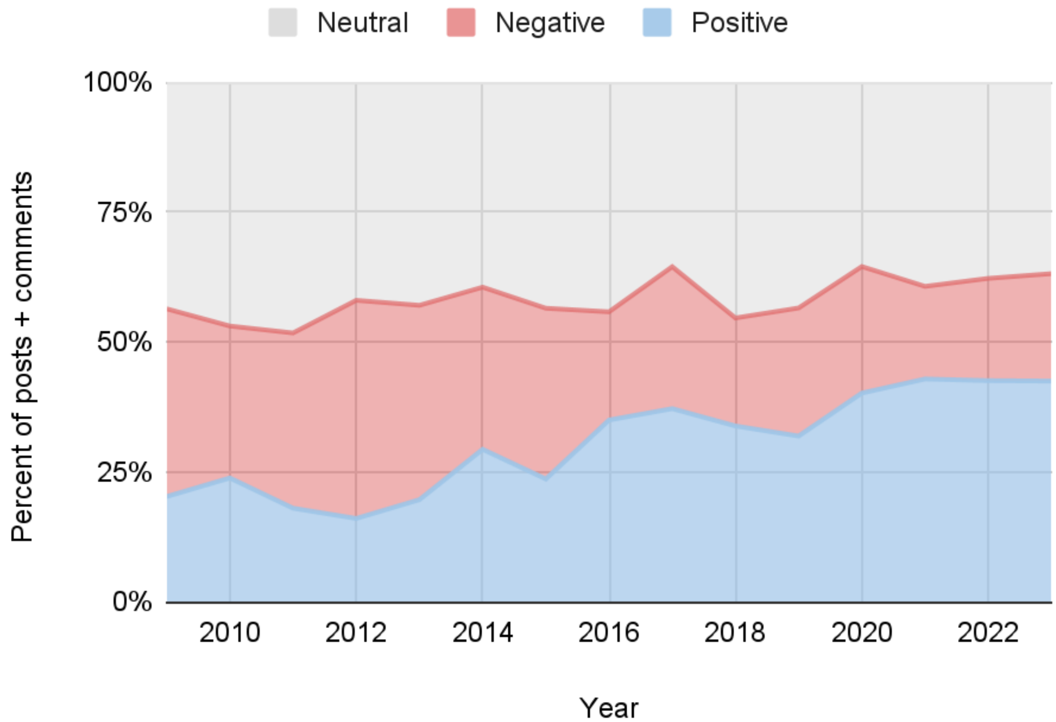
Sentiment	Sample Reddit Posts	Polarity
Positive	*100% yes. Health care is a basic human right and should be free to everyone*	13.33
	It must be a lot of work for doctors to keep all the current insurance plans in line. A single payer plan would help simplify that job.	7.41
	Many of us already pay insurance, deductible, and co-pays that are nearly what we would pay under universal health care. The main thing we lose is insurance companies paying bonuses to the CEO and going bankrupt ourselves. We gain everybody having coverage.	2.38
Neutral	*Just FYI, my company pays part of my premium, my share was 1,200 for a family.*	0
	And somehow, dental and optometry don't make the cut?	0
	The answer is unpredictable. It's the same as betting at what age you will develop cancer.	0
Negative	*Apparently universal healthcare implies slavery of doctors...*	-14.29
	No. Quality and service goes down. Korea did universal HC but it was so bad many people opted for private insurance.	-4.76
	No. I don't want my taxes going to pay medical bills for people living unhealthy lifestyles. If there were some kind of stipulations about things like smoking, alcohol use, drug use, diet induced obesity I'd reconsider.	-2.78

In terms of sentiment polarity, the percentage of positive, negative, and neutral posts and comments from each year is presented in Table 5 and Figure 4.

Table 5
Sentiment Distribution by Percent of Post and Comments Each Year

Year	Number of posts + comments	Number of positive posts + comments	Number of negative posts + comments	Number of neutral posts + comments	Percent of positive posts + comments	Percent of negative posts + comments	Percent of neutral posts + comments
2009	227	46	82	99	20.3%	36.1%	43.6%
2010	130	31	38	61	23.9%	29.2%	46.9%
2011	172	31	58	83	18.0%	33.7%	48.3%
2012	81	13	34	34	16.1%	42.0%	42.0%
2013	361	71	135	155	19.7%	37.4%	43.0%
2014	109	32	34	43	29.4%	31.2%	39.5%
2015	554	131	182	241	23.7%	32.9%	43.5%
2016	783	274	163	346	35.0%	20.8%	44.2%
2017	4182	1555	1142	1485	37.2%	27.3%	35.5%
2018	1362	461	283	618	33.9%	20.8%	45.4%
2019	771	246	190	335	31.9%	24.6%	43.5%
2020	2937	1180	715	1042	40.2%	24.3%	35.5%
2021	1667	715	297	655	42.9%	17.8%	39.3%
2022	4651	1980	915	1756	42.6%	19.7%	37.8%
2023	5140	2184	1062	1894	42.5%	20.7%	36.9%

Figure 4
Sentiment Distribution Over Time

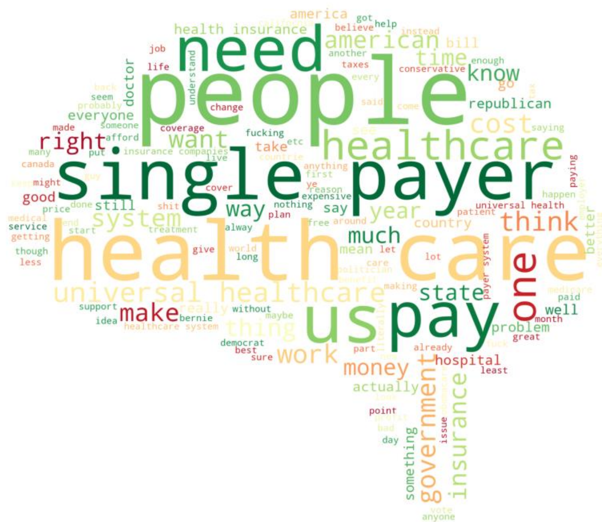


From 2009 to 2015, the percentage of negative posts and comments outweighed the percentage of positive posts and comments on universal healthcare discussion, while the majority remained neutral. After 2015, the percentage of negative posts and comments gradually decreased, while the percentage of positive posts and comments rose, indicating more favorable opinions toward universal healthcare, even though a large number of people still remain neutral.

Topical Modeling with Latent Dirichlet Allocation

We first use word cloud to highlight the popular terms. The font size and color of each word is proportional to its frequency in the posts and comments. Most prominent words can be identified in a quick glance in Figure 5, such as health care, people, single payer, universal healthcare, need, and pay.

Figure 5
Word Cloud Depicting the Frequency of Words



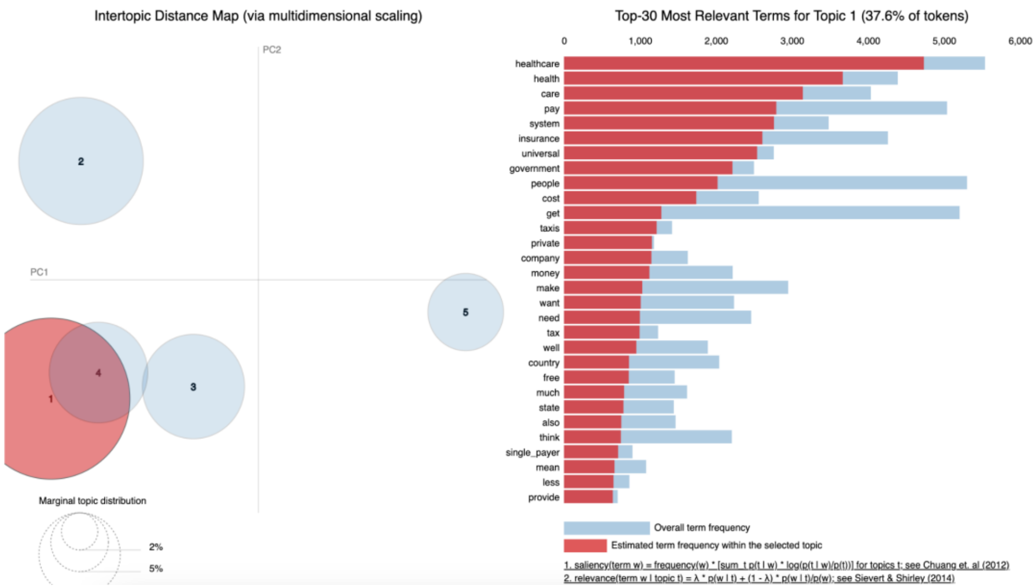
The Latent Dirichlet Allocation analysis is applied to the dataset using the list of stop words – words such as "a, the, from, with" that are ignored in the analysis – from Natural Language ToolKit (NLTK) and manual evaluation to eliminate interference from words dominating multiple topics. Through an iterative process of adjusting parameters for the LDA algorithm combined with human judgment (Kwok et al., 2021), five distinct latent topics have emerged (Table 6).

Table 6
Topics Emerged in LDA Analysis

Topic Number	Topical Words
1	pay, taxes, go, tax, year, cost, people, say, healthcare, get
2	healthcare, vote, universal, people, get, support, right, even, go, say
3	country, healthcare, world, right, free, universal, develop, military, government, literally
4	pay, insurance, cost, healthcare, government, system, health, make, state, people
5	care, health, universal, people, free, socialism, poor, say, want, child

The LDA visualization example for "Topic 1" is shown in Figure 6. The blue bar indicates the overall term frequency, and the red bar signifies the term frequency from "Topic 1." The circle represents each topic that is identified from the LDA analysis. The size of the circle is related to the percentage of words in the topic; the bigger the circle, the higher the percentage of words in the topic. The location of circles represents how the topics are related. The closer the circles, the topics are more related, and vice versa. Topic 1 and Topic 4 are more related than other topics in Figure 6. The coherence score is 0.613 for the LDA analysis in this study, which means a good semantic similarity between topical words and each topic (Syed and Spruit, 2017).

Figure 6
Example of LDA Visualization on Topic 1



Next, we will provide a brief overview of these LDA identified latent topics, with sample Reddit posts.

Costs and taxes (topic 1): The first latent topic generally addresses the question of "how to pay for a universal healthcare system"? The main reason that people have concerns about universal healthcare is possible tax increases to cover the costs of a universal healthcare system. Sample comments include:

- *"I believe these polls have generally been true, but the numbers drop significantly when you add the term, "Though it will raise taxes.""*
- *"This will never pass. Tax increases never pass in CO and a fucking 10% increase will be laughed right off the ballot. Ppl advocating for single payer just screwed the idea if this is the best they can do. It kills the middle class, not the rich."*
- *"Would you accept higher taxes to enable universal mental health care?"*

Voting to change (topic 2): many posters recognize the critical role of voting for individuals to exert their power in shaping the healthcare system. Some comments read:

- *"Don't forget people, get yourself a union that fights for free insurance. I pay $0 for mine because the Teamsters did well. And voting helps too. To get us Medicare for all."*
- *"As long as Americans vote for Republicans we will NEVER have universal health care. The ONLY ones I see advocating for it are the Democrats."*
- *"I prefer the public option, but if we had the votes to get single payer I'd be happy for that as well."*
- *"Vote for better people. Let them know that it's important to you."*

Comparison with other countries' healthcare systems (topic 3): people compare the American healthcare system with those of other countries, as the United States is the only developed country without universal healthcare, while even some developing countries have universal healthcare. Some sample posts state that:

- *"The United States is the only major country on Earth without universal healthcare, that's an absolute disgrace..."*
- *"I have said for a long time that the reason so many Americans hate the idea of universal health care is that they really believe we have the greatest system in the world, and that's because they have no experience with systems in other countries. I broke my wrist while on vacation in Greece. I had multiple sets of x-rays, an ER visit, a consult with an orthopedist. Cost me nothing. Absolutely nothing. Insurance is basically a for-profit way to keep people from getting healthcare. Right now, I am paying almost $300 a month for insurance (with an $8,000 deductible) and all of the providers I've used locally have stopped taking "marketplace" plans. So I have insurance, sure, but right now I have no access to health care."*
- *"Yes. A former conservative, I traveled around the world and found that universal health care can work beautifully. And we would save all the costs like insurance and out-of-pocket costs. We could create the best universal health care system in the world. This issue led me to leave my former party and become an Independent who leans Progressive."*

Healthcare cost (topic 4): the cost of healthcare at the individual and organizational levels emerges as another cluster of discussion. Whether people can afford the cost of healthcare under the current healthcare system is the issue that bothers many Redditors. The affordability of employee health plans to employers also attracts substantial discussion. Showing some overlapping with topic 1 (see Figure 6), the issues of costs and taxes are also brought up in some comments under this topic. Sample comments are:

- *"Just started a new job. For me and my spouse, I pay ~$269.00 per pay period (every two weeks). My employer's contribution is ~$530.00. Oh and the majority of it still only pays 80% after the deductible, not 100%. Fucking Bullshit..."*
- *"I am a contract employee and have really shitty healthcare. Would love another option. I doubt it would cost more than I already pay in premiums and co-pay."*
- *"If every company in America continued to pay what they're currently paying for health care into a singular fund we likely wouldn't even need to increase personal taxes much, if at all. The divided market only creates inefficiencies and increases costs."*

Government authority expansion and socialism (topic 5): many people consider the government provided healthcare a form of socialism and are against the expanded control from government. Some of those users commented that:

- *"When is Sanders going to start teaching college courses on socialism for free, full time? It's our human right after all. Then maybe when he's done taking 12 years of free medical courses, he can operate on me for free too. I really need that surgery Bernie, hop to it!"*
- *"100+ years of socialism has been systematically killing America. The solution is obviously more socialism. Plus, I see nothing wrong with stealing other people's money and redistributing it. As long as I *FEEL* it's the right thing to do - fuck our Constitution, freedom, and liberty."*
- *"Keep the government out of the bedroom, bathroom and women's bodies" but now we want the government to have full control of our healthcare. Socializing the healthcare system is a horrible idea... like socialism."*

DISCUSSION AND CONCLUSION

The objectives of this study were to apply computational social media content analysis to explore public sentiments, examine public perception trends, and identify the main topics in public discourse concerning universal healthcare. Posts and comments related to universal healthcare over the past fifteen years were collected from the social media blog site Reddit and analyzed. Results indicate an upward trend in public interest in universal healthcare topics over time.

Public Sentiment Towards Universal Healthcare

In response to the first research question, 371 Reddit posts and 22,756 comments related to universal healthcare and single payer systems topics from 2009 to 2023 were analyzed. The annual total number of posts and comments increased exponentially, indicating rising public interest in universal healthcare topics on Reddit. We also observed substantially heightened public discussions on universal healthcare in 2017 and 2020, triggered by significant political and public health events. The elevated public attention to universal healthcare continues to present, likely due to multiple factors including post-pandemic lifestyle change, such as retiring earlier and reducing working hours, younger generations desiring flexible employment opportunities, and the concerns of Artificial Intelligence replacing human jobs. These trends signal a more permanent shift towards valuing healthcare portability.

As the United States is the only developed country without universal healthcare coverage, people have mixed feelings towards this topic. Many people have the concern that government-provided healthcare is a form of socialism and will cause increased taxes and costs while reducing the quality of healthcare services. There was a higher percentage of people who showed unfavorable opinions on universal healthcare before 2015. However, public opinions changed gradually after 2015. This turning point is possibly due to the post-implementation effect of the Affordable Care Act, which launched open enrollment for the public in 2014. After a year of enrollment, more people accepted the government subsidized healthcare coverage. From 2015 to present, a slowly increasing percent of public opinions showed positive sentiment towards universal healthcare. After years of implementation of the Affordable Care Act, more people are covered under this system. In addition, societal and cultural changes in lifestyle, generational changes, and technological advancements all impact the public's perception of universal healthcare, despite the large amount of negative sentiment that still exists. In summary, the slow but steadily increasing positive sentiment reflects the public's gradual favorable swing towards universal healthcare.

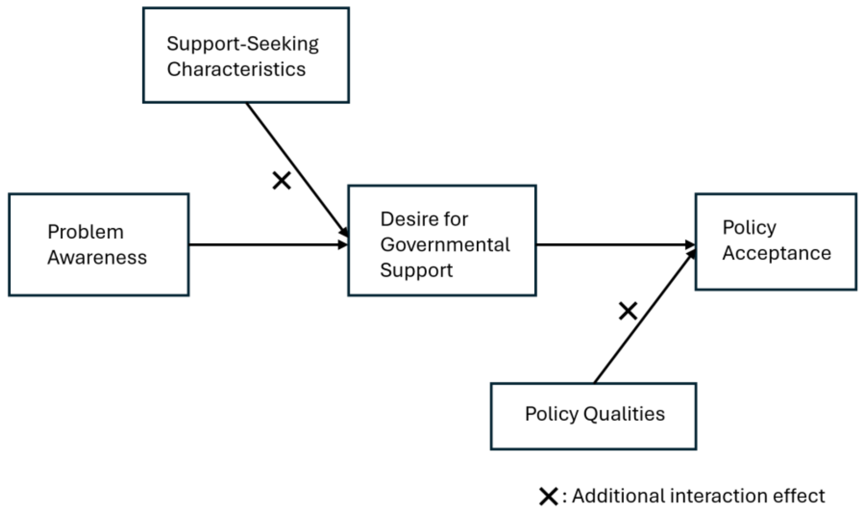
Topics of the Public Discourse on Universal Healthcare

The second research question of our study concerns the latent topics prevailing in the public discourse related to universal healthcare. The LDA topic modeling analysis provided insights into the key themes, such as the struggle with current healthcare insurance costs and desires to reduce payment. However, worries over potential tax increases caused by funding universal healthcare and government authority expansion pose barriers to expanding favorable support for universal healthcare. The fragmented American healthcare system was compared with the unified healthcare systems in other countries around the world, and questions were brought up about whether universal healthcare can be implemented in the United States. Voting was commonly cited as the optimal democratic mechanism to transform healthcare and address these challenges. The LDA analysis results revealed the multifaceted issues, opinions, and potential solutions comprising public discourse on this complex policy topic.

Theoretical and Practical Implications

To our knowledge, there has not been significant theoretical work that specifically addresses the citizens' attitudes toward universal healthcare as a public policy. However, researchers have recognized the importance of public acceptance to the success of public policies and investigated the psychological determinants of people's attitudes toward government policies and interventions in other domains of decision-making. Recently, Grelle and Hofmann (2024) conducted a review of over one hundred relevant empirical studies in fields ranging from psychology to political science and summarized the findings into the Integrative Public-Policy Acceptance (IPAC) framework, as shown in Figure 7. For scholars interested in understanding the formation of policy acceptance as a personal attitude in any given domain of policymaking, the IPAC framework serves as a concise and generalized framework that could be readily contextualized for a specific domain (Grelle and Hofmann, 2024). While it is outside the scope of this brief discussion to fully elaborate on the IPAC framework, it provides a suitable theoretical lens to interpret the findings and contributions of the present study.

Figure 7
The Integrative Public-Policy Acceptance (IPAC) framework (Grelle and Hofmann, 2024)



The first fundamental premise of the IPAC framework is that a citizen's awareness of a specific problem is the primary driving force behind their acceptance of a public policy aiming at addressing the issue. For example, those aware of the negative health effects of both firsthand and secondhand smoking will be more receptive to government interventions aiming at reducing public consumption of tobacco products and restricting smoking in public spaces. In alignment with this principle, the present study reveals awareness of the burden of healthcare costs on employers and individuals in the US as a prominent factor in the public mindset related to universal healthcare. In addition, knowledge of universal healthcare as a functioning policy in other countries may also be a contributing factor to citizens' awareness of the issue.

The IPAC framework also incorporates people's general desire for support from the government in a particular domain as a crucial mediator between problem awareness and public policy acceptance. Moreover, a citizen's perceptions of the characteristics of a certain public policy also contributes to policy acceptance both as a direct antecedent and as a moderator of the effect of desire for government support. Grelle and Hofmann (2024) describe perceived policy characteristics such as effectiveness, intrusiveness, transparency, fairness, and cost that could be salient in different problem domains as "policy qualities". For example, if a citizen perceives an outright ban by the government of all alcohol consumption to be an intrusion on private freedom, they may be less supportive of such policy even with higher degrees of awareness of the alcohol problem and desire for government support in tackling such problems in their country. The current study suggests that the cost of implementing a universal healthcare system to the taxpayers in the US to be one critical consideration concerning policy quality. Furthermore, some Redditors expressed their view of universal healthcare as a symbol of government overreach and socialism, suggesting that perceived intrusiveness on the private sector may also play a similar role in deciding acceptance of a national healthcare system operated by the government.

Additionally, the IPAC framework includes individual characteristics such as personal attitudes and beliefs that may affect a citizen's inclination to accept government support in a specific domain. One such characteristic is a person's belief of control attribution, or the degree to which they attribute the outcomes of policymaking to the influence imposed through their own actions. The construct of perceived behavioral control has long been understood as a predictor of behavioral intention and actual behavior in Ajzen's theory of planned behavior (1991). Our finding points to a citizen's belief in their ability to control the direction of policymaking concerning universal healthcare by exercising their voting rights as one relevant individual characteristic.

In summary, the IPAC framework provides a valid theoretical underpinning for further understanding of public acceptance of universal healthcare. Successful application of a general framework such as IPAC in a policy domain requires researchers to contextualize key constructs by answering these questions: *what problem*, *which individual characteristics*, and *which policy characteristics*? By helping to answer these questions in the domain of universal healthcare, the present study lays the groundwork for contextualization and operationalization of the IPAC framework and contributes to further theoretical development in this area of research.

A deeper understanding of the factors that influence individual motivation to accept a universal healthcare system is also valuable to the practitioners in developing strategies to promote universal healthcare to the populace. Experts in health-related fields have weighed the pros and cons of universal healthcare. They advocate that universal healthcare will help reduce the economic burden of healthcare at the societal level in the long run, therefore the advantages of promoting a healthier population outweigh the initial implementation costs (Zieff et al. 2020). However, at the individual level, each citizen's interest in and disposition toward universal healthcare is understandably shaped by their socioeconomic and demographic characteristics, personal situations, and local conditions. Our findings highlight the importance of raising public awareness of the unsustainable costs of healthcare as a problem for the nation as a whole. Policymakers should also ensure transparency in the rulemaking process of the universal healthcare system to alleviate the concern of government overreach. To achieve broad support for universal healthcare, it is helpful to encourage each citizen to actively participate in the discussion and establish the belief that the future of healthcare is in their hands through the democratic process, i.e., casting votes in political elections at different levels.

LIMITATIONS AND FUTURE RESEARCH

One of the limitations of this research is that the Reddit API returns the top 100 most relevant posts per keyword search based on the Reddit matching algorithm. There is a possibility that posts that are relevant to universal healthcare but not returned by Reddit. We did multiple keyword searches and manually reviewed each search result. In each keyword search result, there are irrelevant posts being returned and there are duplicate posts returned across different keyword searches that are manually excluded from the analysis, which means our search method captures as many relevant posts as possible, but we cannot control the Reddit returning algorithm. Also, because Reddit accounts are anonymous, the analysis cannot be further categorized by users' age, gender, location, career or income levels, but this information will have impacts on the users' position on universal healthcare topics.

This study is also limited to the examination of public opinion expressed on one social media website during a particular period. To gain broader and deeper insights into the American public's attitude toward and potential acceptance of universal healthcare, we suggest several directions for future research such as expanding to other social media platforms and including a more diverse user population. The research design can also be refined to unveil new findings and reveal the nuances that were not the focus of this study, such as sentiment analysis of each latent topic, or sentiment and topical analysis during major political and social events and movements to better understand the underlying dynamics of public sentiment shifts. Furthermore, the computational approach can be compared and combined with traditional survey methods to achieve a comprehensive understanding of public perceptions and validate the accuracy of computational findings against survey data. Lastly, there is fertile ground for scholars to apply the same analytic approach to address research questions related to other public policies with nationwide impacts on businesses and employees.

CONCLUSION

The findings of this study suggest that universal healthcare has attracted increasing public attention and will continue to be a spotlight on social media. The public's sentiment toward universal healthcare is moving in a favorable direction over time. The prevalent themes about which the public is most concerned about universal healthcare include healthcare affordability, potential tax increases, international healthcare comparison, government authority expansion, and voting being the optimal method of change. Also, this study demonstrates that social media content mining, sentiment analysis, and topic modeling have proved to be efficient and productive computational approaches for public opinion tracking and complex policy assessment. The data-driven governance and evidence-based policymaking approach provides leaders with an additional feedback channel beyond traditional polling.

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THE DARK SIDE OF ORGANIZATIONAL LEADERSHIP IN BRAZIL: PERCEPTION, CAUSES, AND CONSEQUENCES

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ABSTRACT

Effective leaders and good leadership behavior, and practices are well-researched areas in leadership and management. However, the dark side of leadership in Brazil has often been lamented in the literature and subjected to limited scholarly inquiry. This study surveyed 216 managers who participated in strategic management or project management executive certificate programs through a prestigious Brazilian professional development organization to assess their perception and experience of destructive leadership behavior. The paper identifies and analyzes the common perception, causes, and consequences of negative leadership in Brazil.

To the best of the authors' knowledge, this study is among the first empirical studies to explore the dark side of organizational leadership in Brazil, focusing on its perception, causes, and consequences. The research is another plea to contribute to the leadership literature by providing empirical findings on the subject and its implications for leaders, practitioners, organizations, and those in charge of leadership development. It also addresses the study's limitations, implications, and directions for future research.

Keywords: *The dark side of leadership, Leadership, negative leadership, destructive leadership, derailment characteristics, and Brazil.*

INTRODUCTION

As commonly understood, a leader's success is determined by meeting followers' expectations. In this sense, effective/ethical leadership is a value-driven approach to leadership (Pucic, 2015). In a value-driven approach, a leader can affect followers' motivation, thinking, and behaviors by influencing an individual's self-concept and beliefs (Den Hartog & Belschak, 2012; Shamir, House, & Arthur, 1993).

While leadership is widespread in research and academic, and organizational circles, there are still gaps in the literature regarding its dark side, particularly in Brazil, that need to be studied. For instance, Allas (in Brady, 2021) indicated, "There are a lot of very good bosses, and then there are a lot of very bad bosses. And even exceptionally good bosses do not necessarily realize that their impact on the people who work with them goes well beyond the business. The impact [bosses have] inside the workplace bleeds into a person's overall life satisfaction...."

(Para. 10). These displayed behaviors have often been characterized by labels that are not related to leadership, such as destructive, abusive, uncivil, negative, or other labels (e.g., Conger & Riggio, 2007; Tepper, 2000; Schyns & Schilling, 2013).

Although a large number of scholars have argued that the ethical component of leadership should be emphasized and present in the daily life of an organization and its people (e.g., Bass & Steidlmeier, 1999; Brown, Treviño, & Harrison, 2005; Ogunfowora, 2009; Toor & Ofori, 2009; Yesiltas et al., 2017), however, there still exists a dark side of leadership that exemplifies unethical, yet destructive and toxic leadership that abuses others (Northouse, 2022).

On the dark side of leadership, research has focused chiefly on person-oriented and high-intensity 'harmful behavior' of the abusive supervisor (e.g., Almeida et al., 2021; Tepper et al., 2017). However, the impact of harmful behavior has mostly been neglected.

Regardless of their ranks, the organization and its employees have mutual expectations and exchange relationships. It is given that the organization expects its employees to be committed to its goals and objectives and be responsible for their actions. Similarly, employees require leadership that values their contributions, treats them ethically, and provides a safe and stress-free environment. Contrary to that belief, real-life instances showed that some negative leadership traits, behaviors, and other situational factors could contribute to individual and organizational ineffectiveness. Thus, examining destructive leadership behaviors in this study through examining followers' perceptions forms the foundation of this empirical study and adds to the knowledge of this phenomenon.

The current study has been designed in such a way as to provide study respondents with the ultimate freedom to discuss their perceptions of the dark side of a leader's behavior rather than limiting the respondents to pre-established categories that might frame their way of thinking.

Researchers studying the negative side of leadership have proposed several concepts that could fall within the scope of destructive leadership aimed at subordinates. These concepts include but are not limited to "abusive supervisors" (e.g., Mackey et al., 2020; Tepper, 2000), "bullies" (e.g., Mathisen et al., 2011), "self-centeredness" (e.g., Cramwinckel, et al., 2013; Schmid et al., 2019), and "derailed leaders" (e.g., Inyang, 2013), "failed leader" (e.g., Ghazzawi, 2023), and "psychopaths" (e.g., Landay et al., 2019).

In this study, destructive leadership is defined as "Subordinates' perceptions of the extent to which a supervisor's behavior negatively affects their psychological, physiological, or behavioral being and how that behavior could lead to impediments in their own and/or their organization's performance" (Ghazzawi, 202, p. 74).

Thus, this paper focuses on the broad questions of what behavior makes a leader destructive, what subordinates do not like about this type of leadership, and what the consequences are for them and their organizations. Accordingly, this article provides a context for understanding the dark side of leadership, adds to the literature on this leadership type, and sheds light on its impact on people and organizations, as little research has examined this relationship in Brazil.

The article is divided into five sections. After this brief introduction, the next section reviews the literature. Section three presents the study's research methodology. Section four presents the findings and discussions of the study sample's conceptualization of the negative leader, what causes such behavior, and its consequences on people and organizations. Finally, section five provides conclusions, implications, and suggestions for future research.

LITERATURE REVIEW

The meaning of being "good" reflects morality, and in addition, it reflects leadership effectiveness. Toor and Ofori (2009) suggested that the expected definition of a leader is the same as the one about "what is good leadership or what is ethical leadership."? Brown (2007) asserted that the normative approach to leadership in business ethics can usually be formed by focusing on how employees should be treated in the workplace. Moreover, when it comes to leadership acceptance, effectiveness, or ineffectiveness, researchers over the years have agreed and to a certain extent that some relationship exists between personality traits and her/his leadership ability or its lacking (e.g., Gehring, 2007; Kornør & Nordvik, 2004; Nordvik & Brovold, 1998; Zaccaro, 2007).

Past research assumed that regardless of a leader's situation, innate abilities shape human personality and behavior (Kolp & Rea, 2006). A good deal of researchers asserted that traits did play a leadership ability; however, there was no clear indication of its extent role (e.g., Gehring, 2007; Kenny & Zaccaro, 1983; Kirkpatrick & and Locke, 1991; Kolp & Rea, 2006; Kornør & Nordvik, 2004; Zaccaro, 2007).

Over the years, several theories that focus on the relationship between leaders and subordinates have emerged to explain this complex construct from various perspectives and different explanations. These theories range from the trait to the behavioral approach, the leader-member exchange, the least preferred coworker (LPC), situational Leadership, and the path-goal (George & Jones, 2012; Greenberg, 2011).

Personality Traits and Leadership

A sheer amount of literature focuses on personality and its effect on leadership emergence. A few available studies have been conducted to determine which individual traits influence leadership emergence beyond the established personality factors (Ensari, Riggio, Christian, & Carslaw, 2011). Researchers studying traits and their relevance to leadership have established that some traits, such as knowledge of the task, intelligence, self-confidence, dominance, honesty, integrity, energy level, stress tolerance, and emotional maturity, have the most substantial relationship to leadership effectiveness (e.g., Bass & Stogdill, 1990; Stogdill, 1974).

Thus, Capowski (1994) suggested ten traits that are the essential attributes of leadership. These are vision, integrity, trust, selflessness, commitment, creative ability, toughness, communication, risk-taking, and visibility. However, the relationship between personality traits and leadership has been inconsistent and has been reviewed by some leadership researchers with skepticism (e.g., Anderson, 2006; Lord, De Vader, & Alliger, 1986; Zaccaro, Foti, & Kenny, 1991) or concluded that only few personality traits are associated with effective leadership (e.g., House & Aditya, 1997).

Similarly, other studies have identified personality traits known as the Big Five traits, which most psychologists agree constitute someone's personality in a hierarchy (Digman, 1990; George & Jones, 2012). As the Big Five Personality Traits have become a focal research theme, a stream of personality studies have validated that traits were relevant to leadership effectiveness (e.g., Benoliel & Somech, 2012; Hendricks & Payne, 2007; Hoogh, Den Hartog, & Koopman, 2005; Kalshoven, Den Hartog, & De Hoogh, 2011).

While the trait approach to leadership assumes that effective leaders possess some innate traits that help them achieve goals, not all effective leaders possess such traits. Additionally, even for those who do, there are no guarantees that they will be effective.

The Behavioral Approach to Leadership

Other scholars have suggested that a person's behavior impacts the leader's ability to lead or mislead (e.g., Schaubroeck, Lam, & Cha, 2007; Schuleigh, Malouff, Schutte, & Loi, 2019; Waldman, Ramirez, House, & Puranam, 2001). On the other hand, other researchers have argued that the situation and/or the followers impact the leader's style and behavior when leading others (e.g., Atwater, 1988; Bass & Stogdill, 1990; Thompson & Vecchio, 2009).

Tortorella and Fogliatto (2017) suggested that more excellent leadership experience, which is closely related to leaders' age, may entail enhanced interpersonal skills that favor the leader's choice of behaviors that more effectively support lean manufacturing implementation in Brazil.

In a follow-up study, Tortorella et al. (2018) study on the impact of leadership style on lean manufacturing implementation in Brazil suggested that a task-oriented leadership style makes leaders more likely to achieve higher levels of lean manufacturing as opposed to a relationship-oriented style as a highly relation-oriented leader tend to be more of a delegator and facilitators which as opposed to someone who drives the highly specified activities.

Regardless of these varied suggestions or controversies, the current research will provide an in-depth assessment and analysis regarding the interaction between the dark side of leadership and other variables and/or traits, as suggested by the study sample.

Despite the universal characterizations of leadership, cultural differences might play a role in the leader's style and behavior and, accordingly, should not be ignored (e.g., Cervo et al., 2016; Tsai, 2011).

On the other hand, Tortorella et al. (2017) indicated that more excellent leadership experience, closely related to leaders' age, may entail enhanced interpersonal skills that might favor the leader's choice of behaviors. On the other hand, Tannenbaum and Schmidt (1973), for example, proposed a model focused on how much decision-making is centralized in a group of employees versus by the leaders. For example, some leaders may have a dominant role in decision-making, while others may allow the group to make decisions independently, within prescribed limits.

A few field studies in Brazil highlighted the significance of transformational leadership and its positive impact on Brazilian corporations. Transformational leadership builds commitment to supporting employees in achieving their goals (e.g., Cavazotte et al., 2012;

Chammas et al., 2019). Additionally, it was asserted that leaders must adapt their leadership behavior to the startups' environmental conditions (Chammas et al., 2017).

Contingency, Situation, and Leadership

Research investigating traits and leadership indicated that while there is some consistent relationship between personality and leadership, leadership is not about passive possession of some traits; it is more relevant to the situations the leader is in. Said studies treated leadership as an interactive construct (e.g., Fiedler, 1981; Podsakoff et al., 1993; Yukl & Van Fleet, 1992).

The contingency theory model of leadership effectiveness was based on Fiedler (1978). It has been the basis for an extensive body of research, and numerous studies support its propositions and findings (e.g., Hersey & Blanchard, 1982; Mitchell et al., 1970). As the leadership and followership relationship is unclear, the behavioral approach to leadership ignores the situation in which leadership takes place, as the leader-follower relationship is unclear (Fiedler, 1967; George & Jones, 2012).

According to Fiedler (1967), leadership effectiveness is a product of individual-specific characteristics and the situation the leader is in. Fiedler (1981) asserted that a leader might be successful in a leadership role or not; it all depends on the situation, as opposed to only the personality or skills she/he has. Accordingly, effectiveness is a product of the interaction between the leadership style and the degree to which the situation enables the leader to exert influence.

Accordingly, the situational approach addresses the specific two questions of why a leader could be more effective than someone else in a particular situation while both possess the same personal characteristics and experiences and why a leader is effective in a particular situation and not in another one (e.g., Fidler 1981; George & Jones, 2012). Similarly, validating the situational relationship, the organization's culture might influence a leader's behavior and style. According to Hofstede et al. (2010), culture plays a significant role within the organization, as leaders and subordinates within an organizational setting are inseparable. This relationship is based on the common values they share. Hofstede, Hofstede, and Minkov (2010) argued that when people are asked to describe their leadership qualities, it seems as if they have been asked to describe their organizational culture.

The situational approach to leadership identified two types of leadership styles: relationship-oriented and task-oriented. Leaders may fall into one of these styles. A leader who is characterized by being relational is usually liked by subordinates, forms a good relationship with them, and wants them to perform at a higher achievement level (Fiedler 1967). In contrast, a task-oriented leader focuses on subordinates performing at an elevated level, while the intention of a good relationship is unimportant or has a second priority.

There was a continuous stream of research to validate further and/or improve the situational contingency theory of leadership (e.g., Hersey & Blanchard, 1982; Mitchell et al., 1970). For instance, Hersey and Blanchard (1982) suggested that subordinate maturity moderates the relationship between leader tasks and relationship behaviors. This means that leadership depends on followers' maturity, which is their readiness and willingness to assume responsibility for their behavior (Hersey & Blanchard,1982).

When validating this theory, research findings showed mixed results. While some research findings provided some support for the situational theory (e.g., Avery & Ryan, 2002; Bosse et al., 2017; Sims, Faraj, & Yun, 2009; Walter, 1980), others produced little or no support for this claim (e.g., Blank, Green, & Weitzel, 1990; Goodson, McGee, & Cashman, 1989). Others suggested that the theory, as initially formulated, has little descriptive utility (e.g., Fernandez & Vecchio, 1997); it could be applicable only for certain types of subordinates (e.g., Vecchio, 1987), or it is characterized by "Logical and internal inconsistencies, conceptual ambiguity, incompleteness, and confusion associated with multiple versions of the model" (Graeff, 1997, p. 153), and the magnitude of its overall results on subordinates' performance was not significant (e.g. Graeff, 1983; Norris & Vecchio, 1992).

Finally, it is important to touch on the Path-Goal Theory with its premise that the extent to which certain leadership styles (i.e., directive, supportive, participative, and achievement-oriented) help in clarifying the paths of the subordinates based on their characteristics and on the contextual demands within which they have to operate (e.g., Avolio, Kahai, & Dodge, 2000; Hernandez et al., 2011).

The Impact of Culture on Leadership in Brazil

To better understand and explain leadership in Brazil, it will be appropriate to briefly touch on the country's culture. Rooted in Portuguese culture and language, Brazil's culture is a high-power distance culture (Cervo, 2016; De Hilal, 2009; Hofstede, 2011).

Power Distance has been defined by Hofstede (2011) as:

> *The extent to which the less powerful members of organizations and Institutions (like the family) accept and expect that power is distributed unequally. This represents inequality (more versus less) but is defined from below, not from above. It suggests that a society's level of inequality is endorsed by the followers as much as by the leaders. Power and inequality, of course, are extremely fundamental facts of any society. All societies are unequal, but some are more unequal than others (Hofstede, 2011: P. 9)*

As a high-power distance culture, Casado (2018) asserted that Brazil is a land of contrasts, and its society has been characterized by a blind culture, which resulted in new cultural practices and identities. This hybrid culture resulted from the interaction and mixing of various cultural backgrounds since the Portuguese colonization of Brazil in 1500 through migration and trade (Freyre, 1984). This colonization by the Portuguese was done in an exploitative agrarian model, where slaves constituted the primary labor force (Cavazotte et al., 2014). Cavazotte et al. (2014) suggested that the roots of power distance germinated from a societal model that was a top-down one, based on the model of the colony's native country, with little or no regard for democracy or participation by ordinary citizens in running collective affairs.

Hess and Da Matta (1995) suggested that despite its Western-like society and institutions, Brazil is a nation where Western culture has meshed with non-Western cultures and values for centuries. Others described the Brazilian national culture as “complex and multi-faceted” (e.g., Caldas, 1997, p. 81). In a study in a large International Brazilian bank, Da Hilal (2002) identified paradoxical aspects that legitimize Brazilian Bank leadership; the first one is based on hierarchical authority supported by a set of clearly defined norms and rules, whereas the second one is the fact that the authority of the leaders prevailed over the rules. This paradox might manifest as a potential source of organizational conflict.

A society with high power distance implements hierarchical orders where each member has their place. On the other hand, people in a society with low power distances strive for equal power distribution. Accordingly, the authoritarian behavior of people in a high-power society might indicate a conflictive situation. However, Brazilians have a repugnance or an intense disgust toward conflict. A revulsion of conflict does not mean that such perception eliminates it. Like all hierarchical societies, Brazil has an elevated level of conflict (De Hilal, 2009).

However, the family has always had a stronger expression in Brazilian society. De Hilal (2009) summed up the interplay between the culture and the behavior in Brazilian society that might have an impact on leadership behavior:

> *The home is the place where people find their identity, while the street is the place of individual anonymity. There is, therefore, a double-edged ethic that operates simultaneously and that determines different behaviors that apply to the street (where behavior is free of the sense of loyalty, free of the meaning of us, ruled by the criteria of individualism, bylaws, and by the rules of the market) and to the home (where behavior is ruled by personal relations, the sense of loyalty, and emotions through reciprocity and friendship. People can express different or even contradictory opinions and behaviors depending on whether they position themselves in the street or in the home (De Hilal, 2009, pp. 96-97).*

Cavazotte et al. (2014) observed that Brazilian leaders are expected to exhibit charisma and value-based leadership. However, these same leaders are often characterized by "personalism," prioritizing allegiance to individuals rather than principles. This personalism manifests in "particularism," where the interests of their specific group supersede broader organizational goals. Furthermore, a "paternalistic" approach is frequently adopted, restricting the autonomy and responsibilities of subordinates. Within this context, personal connections often moderate the rule of law, reinforcing a substantial distinction between in-group and out-group members.

A case in point is that organizational leaders in Brazil tend to treat their subordinates according to masculine-type controls with authority. At the same time, they also treat them based on the feminine-type controls using seduction (e.g., De Hilal, 2009; Motta et al., 2001).

On a positive note, Brazil has shown progress toward economic development, creating more jobs and opportunities and enjoying better social mobility. Additionally, the proportion of the population with complete higher education increased from 6.8% in 2000 to 18.4% in 2022 (IBGE, 2025).

The current study seeks to make two contributions. The first is to review and expand the extant literature on destructive leadership. The second is to explore and validate the characteristics of destructive leadership and its consequences for organizations in Brazil. This country has not received much research on this subject.

RESEARCH METHOD

It is important to acknowledge the importance of followers' perceptions of destructive leaders on their behaviors. Therefore, a database containing 2,888 prospective participants in executive business certificate training programs in the US, the UK, and Italy in 2022 and 2023 was used to send an email soliciting their participation in this study. All executive certificate programs were delivered in English and focused on business themes. Accordingly, participants are proficient in English, even though they are Brazilians.

Participants and Setting

A significant part of the study included a survey that targeted 2,888 individuals from various organizations in Brazil. Of the 2,888 targeted, 269 responses were received, a 9.31% response rate. However, the authors decided that 216 responses were valid after eliminating responses deemed invalid (i.e., fifty-three responses) for reasons that included incomplete information or others that came from people who were not Brazilians. Based on that, the valid response rate was almost 7.5%.

The survey contained a questionnaire with a cover letter explaining the purpose of the research and instructions on how to complete it. The instructions also mentioned the anonymity of data and the voluntary nature of participation in the study. Additionally, respondents were assured that their information would be kept confidential. Table 1 depicts the demographic characteristics of respondents.

All participants were asked to provide information regarding their age group, gender, industry, number of employees, and years of experience at the time of data collection. Responses showed that participants were 49.44% female and 50.46% male. While the more significant part of the respondents came from the age that ranges between 26 to 35 years old (i.e., 43.06%), 16.20% were from the age brackets of under 25, 21.30% were from 36 to 45 years, 12.50% were from 45 to 55, and 6.94% were in the age group of 55 or older.

Table 1: Demographic characteristics

Items	Frequency (N=216)	(%)
Gender		
Male	109	50.46
Female	107	49.44
Age		
Twenty-five and under	35	16.20
26-35	93	43.06
36-45	46	21.30
45-55	27	12.50
Over fifty-five	15	6.94
Sector		
Education	12	5.55
Service	101	46.76
Technology	43	19.91
Manufacturing	56	25.93
Non-Profit	4	01.85
Rank within the Organization		
Employee	80	37.04
Middle Management	74	34.26
Upper Management	49	22.69
Other Rank	13	6.02
Number of Employees		
Below one hundred	77	35.64
100-499	44	20.37
500-999	17	07.87
1000-4999	22	10.19
5000-9999	14	06.48
Above 10000	42	19.45
Years of Experience		
less than 5	94	43.52
5-10	58	26.85
11-15	31	14.35
16-20	16	7.41
Above 20	17	7.87
Total	**216**	**100%**

Out of 216 respondents, 5.55 % worked in the education sector, 46.76 % in the service industry, 19.91 % in technology, 25.93 % in manufacturing, and 1.85 % worked for non-profit organizations. As for participants' ranks within their organizations, 37.04 % were employees, 34.26 % were middle managers, 22.69 % were upper managers, and 6.02 % had various ranks.

When asked about the size of their organization as measured by the number of employees who work there, it revealed that 35.64 % work for an organization with less than 100 employees, 20.37 % work in an organization with 100 to 499 employees, 7.87 % of the respondents work in organizations with 500 to 999 employees, 10.19% work in larger organizations with 1000 to 4999 employees, 6.48 % in organizations with 5000 to 9999 employees, and 19.45% work for larger firms that employ over 10000 employees. 43.52% had less than 5 years of work experience, 26.85% had between five and ten years of industry experience, 14.35% had between eleven and fifteen years of experience, 7.41 % worked between sixteen and twenty years, and 7.87% had over twenty years of industry experience.

The Instrument

This study examined the common perception, causes, and consequences of negative leadership in Brazil. The research method for this paper is based on empirical analysis and descriptive statistics. The study utilized text mining to explore the consequences of destructive leadership.

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Table 2: Negative Leadership Behavior

	Leader's Behavior	5 Strongly Agree	4 Agree	3 Neutral	2 Disagree	1 Strongly Disagree
1	Autocratic Behavior					
2	Poor Communication					
3	Unable to Effectively Deal with Subordinates					
4	Poor Ethics/Integrity					
5	Inability to Use Technology					
6	Inconsistent/Erratic Behavior					
7	Poor Interpersonal Behavior					
8	Micromanagement					
9	Poor Personal Behavior					
10	Excessive Political Behavior					
11	Lack of Strategic Skills					

Source: Erickson, A., Shaw, J., & Agape, Z. (2007). An empirical investigation of the antecedents, behaviors, and outcomes of bad Leadership. Journal of Leadership Studies, 1(3), 26–43. doi:10.1002/(ISSN)1935-262X

The Destructive Leadership Questionnaire (DLQ) 11 categories measuring destructive leadership behavior survey developed by Erickson et al., (2007) was used utilizing a Likert-type scale anchored with five frequency adverbs: 5 Strongly Agree; 4 Agree; 3 Neutral; 2 Disagree; and 1 Strongly Disagree (please refer to Table 2).

In addition to the above table, three specific questions were asked participants to respond to these were (1) "Have you encountered a leader or a superior that you classify her/him as destructive?" and (2) "What would you think are the consequences of having a negative leader for you and your organization?"

Participants were asked to refer to Table 2, which describes the leader's behavior. Participants were also encouraged to add other behaviors they encountered but listed in the provided Table 2. The questions provided to participants were reviewed, and feedback was received from three academicians with expert knowledge about leadership and organizational behavior.

Methodology Used to Analyze the Consequences of Destructive Leadership

This study applied text-mining techniques to analyze unstructured textual responses regarding the consequences of destructive leadership. The analysis was conducted using Text Explorer in JMP Pro 18, a tool designed to process and extract meaningful patterns from unstructured text sources such as survey comment fields, incident reports, and open-ended responses.

First, data preparation and cleaning were conducted to enhance consistency and accuracy in the dataset. This involved translating seven responses from Portuguese to English to create a uniform linguistic base for analysis. Additionally, non-informative words, such as common stop words, were reviewed to prevent distortions in frequency-based insights.

Second, the dataset was processed using Text Explorer to standardize word variations and refine text consistency. The "Stem for Combining" feature was applied to group related words under a single root form, ensuring that terms such as “stress,” “stressed,” “stressing,” and “stressful” were consolidated under “stress·” to improve consistency. Additionally, recording techniques were used to refine the dataset by standardizing semantically equivalent terms. For example, “unmotivated” was recoded into “demotivated” and “anxious” into “anxiety,” ensuring that related concepts were treated as a single entity. This process enhanced the interpretability of frequency-based analysis while reducing redundancy in the dataset.

Third, semantically similar terms were manually reviewed and categorized into broader thematic groups to facilitate meaningful insight extraction. For instance, terms associated with psychological distress, such as “anxiety,” “depression,” and “stress,” were grouped into a unified category, “Anxiety, Depression, and Stress,” with their frequencies combined. This categorization was guided by term frequency distribution and expert judgment, ensuring that the aggregation of terms remained analytically meaningful while preserving the intent of participant responses.

By leveraging Text Explorer’s text-mining capabilities, this study systematically transformed qualitative responses into structured insights, providing a clearer understanding of destructive leadership's psychological and workplace consequences.

Common Method Bias and Sample Limitations

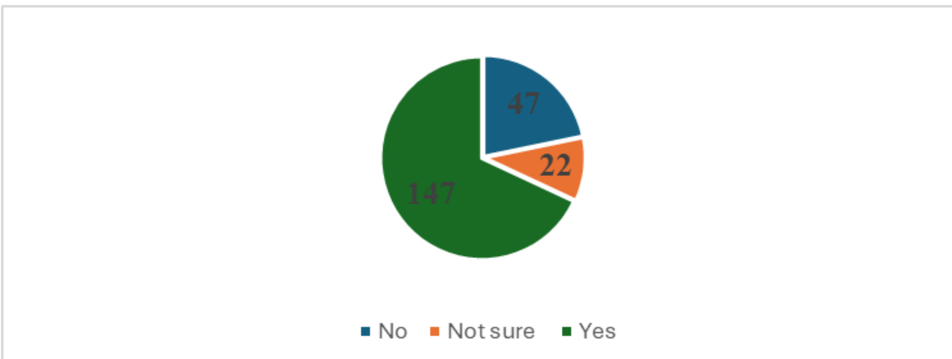
As with many survey-based studies, this research carries potential sample limitations and standard method bias risks. The survey targeted 2,888 individuals from various organizations in Brazil, with 216 valid responses (7.5% response rate) after excluding incomplete or ineligible responses. While the sample includes participants from multiple organizations, responses were self-reported and collected simultaneously, which may introduce recall bias, attribution errors, or consistency bias.

Although efforts were made to mitigate bias by ensuring anonymity, emphasizing voluntary participation, and clarifying the research purpose in a cover letter, relying on self-reported data from a single respondent type per case may introduce perceptual bias. As a result, participants' responses could reflect subjective interpretations rather than objective assessments of destructive leadership behaviors. Future research could address these concerns by incorporating multi-source data collection (e.g., supervisor and peer ratings) or longitudinal designs to mitigate the potential influence of standard method variance (CMV).

FINDING AND DISCUSSIONS

Figures 2 and 3 display data summaries reflecting the guiding research questions and respondents' responses, i.e., (1) The encounter with a leader or a superior that the respondent classified her/him as destructive and (2) the consequences of having a negative leader on the person and the organization as believed by the study participant.

Figure 1: Encounter with a Destructive Leader



After removing those participants who stated that they did not encounter a destructive leader (47 participants) and those who stated they were not sure (22 participants), the study analysis revealed that 147 out of 216 (68%) of the participants encountered a leader who is considered destructive. Please refer to Figure 1.

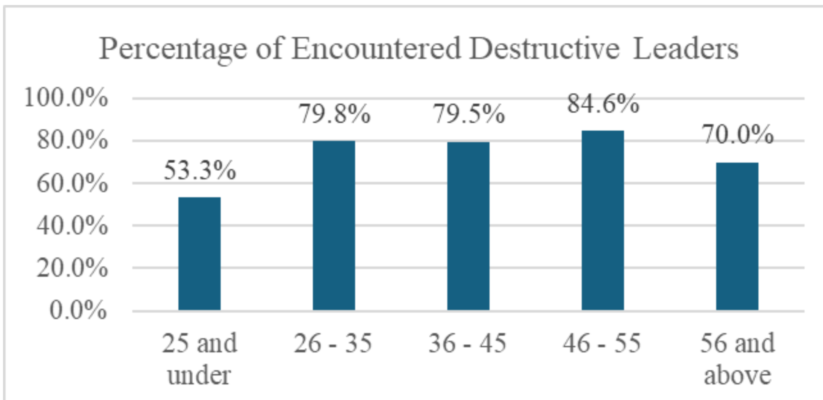
Destructive Leadership and Demographics

Based on the provided data regarding the encounter with a destructive leader connected to the provided demographics in Table 1, the study utilized the contingency analysis of independence to statistically test and determine if two categorical variables are related. Accordingly, such tests help analyze the encounter of destructive leaders as related to the demographics, including management rank, gender, age, length of work experience within the same organization, the number of employees, and the type of organization.

Based on the analysis, a significant finding of the study is that the encounter with a destructive leader is significantly associated with age. Pearson’s Chi-squared test shows that there was a significant association between encountering a destructive leader and age at the 5% significance level. $X^2(8, N = 216) = 22.68, p = 0.004$.

Figure 2 shows a reverse U-curve shape that summarizes the relationship between the various study age groups and the destructive leadership encountered. The same figure suggests that the percentage of participants who encountered destructive leaders increases with age until age 56. After the age of fifty-six, the chance of encountering destructive leadership is reduced. The study did not show any significant analysis with other demographics other than age.

Figure 2: Age and Destructive Leadership



It is important to note that the characteristics of the study sample, which is composed of professional respondents where many were exposed to foreign cultures, possibly foreign business leaders, and/or work for global organizations, could have impacted the results where they can have less tolerance to a destructive leader and a high-power distance culture. Employees and managers who frequently travel abroad on business and/or encounter foreign business leaders might be facing cultural differences that alter their beliefs and expectations of their leaders.

On the other hand, it is possible that older employees "above 56" might be more tolerant of the unequal distribution, as some of them might be serving in some leadership positions and are becoming a part of this cultural imbalance. According to the above finding, future research studying age and organizational positions might shed light on the interplay between these relationships.

Characteristics of a Destructive Leader as Perceived by the Followers

Figure 3 shows the respondents' rating of destructive leaders based on the 11-item leader's behavior provided in Table 2. In addition, Figure 3 shows the rating of the destructive behavior by subordinates.

Autocratic Behavior

Study analysis shows that 172 out of the 216 participants, or 79.6%, agree or strongly agree that a destructive leader behaves in an autocratic way. Please refer to Sub-Figure 3.1. This leadership style is characterized by the desire of the leader to use power and authority in working with others (e.g., concentrated in the leader, whereas authoritarian leadership reflects a domineering style that has negative implications. According to Harms et al. (2018), an autocratic leader is impersonal, dictates the group's activities, is dismissive of feedback, and disregards followers' opinions.

Poor Ethics/Integrity

The above results are consistent with other studies' findings; for example, Van Vught et al. (2004) asserted that an autocratic style could threaten the stability of a group. Similarly, Oh et al. (2023) concluded that this style of leadership negatively impacts an organization's trust, and Luqman et al. (2020) suggested that an autocratic style of leadership demotivates and negatively impacts employee commitment, which results in employee counterproductive work Behavior. Accordingly, it is no surprise that the study respondents rated this style negatively.

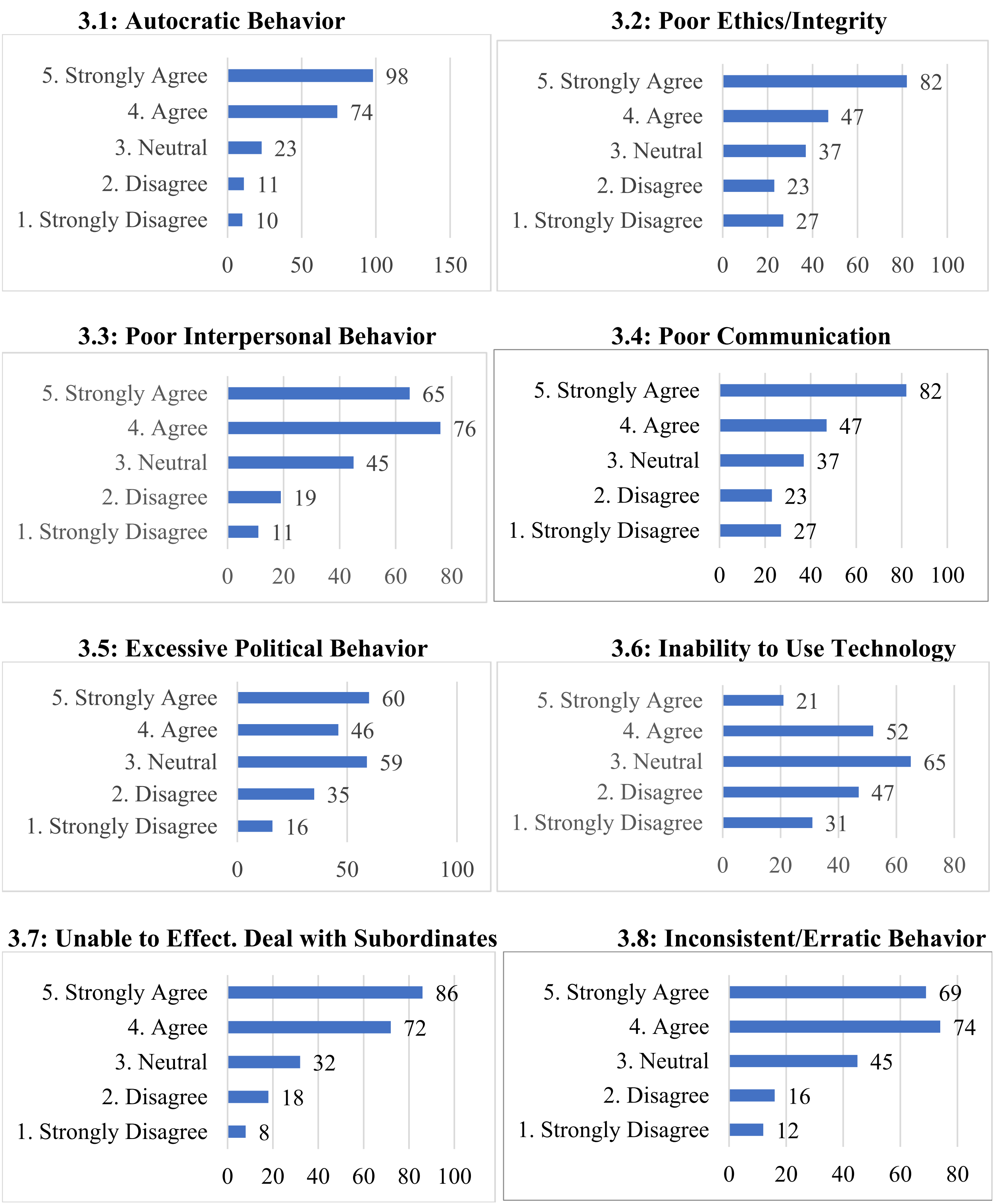
As shown in Sub-Figure 3.2, 129 out of the 216 participants, or about 60%, agree or strongly agree that a destructive leader has poor ethics/integrity. Sajari et al. (2017) posited that ethics and integrity are integral components of good corporate governance. In addition, integrity or ethical behavior is not limited only to corruption or fraudulent behavior; it is also the quality or characteristic of the leadership behavior; it encompasses the leader's moral values, standards, and the rules that are accepted by the organization's members and society as a whole.

This result aligns with other studies that suggested that leaders can influence employees' perceptions of the organization's ethical climate through their ethical leadership behavior (e.g., Demirtas & Akdogan, 2015; Yesiltas, 2017). The absence of this kind of exchange relationship or the presence of poor ethics and integrity by the leader might lead to employees' lack of identification with their organization, which could cause various adverse impacts, including dissatisfaction and the lack of commitment (see also Al-Jabari & Ghazzawi, 2019).

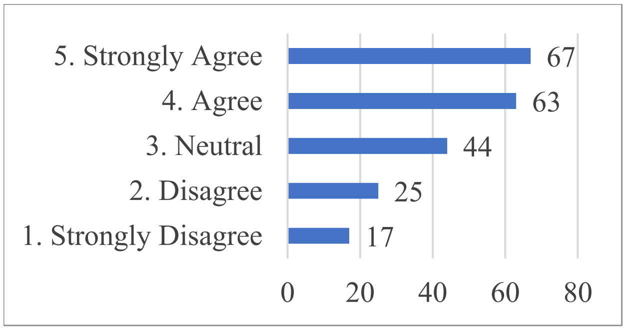
Poor Interpersonal Behavior

It is not surprising that 141 out of the 216 study participants, or about 65%, agree or strongly agree that a destructive leader is someone who has poor interpersonal behavior. This is consistent with the findings of Kessler et al. (2013), which state that poor interpersonal behavior from the leader leads to interpersonal conflict with coworkers and supervisors and to counterproductive work behavior directed toward the organization or other people. Similarly, research studies asserted that destructive leadership can be associated with the personal traits of leaders, which affect the interpersonal and organizational dimensions. This poor interpersonal behavior reflects their personality characteristics (e.g., Aravena, 2019; Kaiser, 2015).

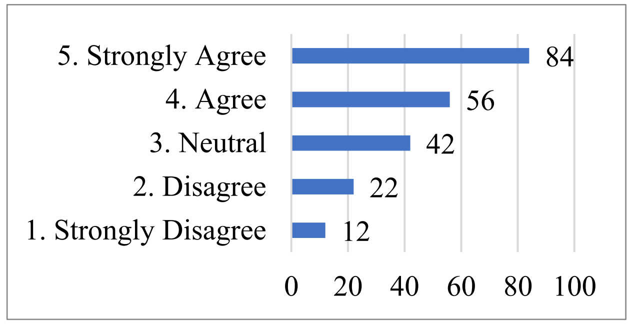
Figure 3: Respondents' Rating of Destructive Leader Characteristics*



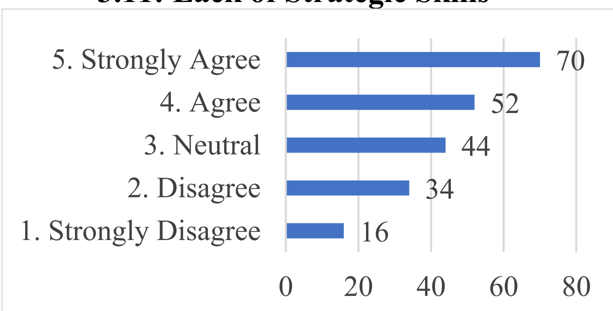
3.9: Poor Personal Behavior



3.10: Micromanagement



3.11: Lack of Strategic Skills



* The numbers in the above figures are the actual numbers of respondents who answered each category. Accordingly, the number of occurrences is the same as the number of respondents.

Poor Communication

129 out of the 216 study participants, or about 60%, agree or strongly agree that a destructive leader is someone who has poor communication. Research studies confirmed that communication is one of the most important determinants of Leadership (e.g., Clements, 2015; Giudici & Filimonau, 2019). According to Arsovski & Nikezić (2012), leaders spend 70-90% of their time communicating.

The lack of effective communication brings about various organizational problems, leading to confusion and failure of various organizational priorities, including planning, goals, and objectives. Leaders' poor communication impacts employees' confidence, negatively impacting performance and productivity (e.g., Dlamini et al., 2022; Kalogiannidis, 2020). It also negatively impacts employees' motivation and satisfaction (e.g., Rajhans, 2012; Saputra, 2021). In addition to the consequences of leadership, poor communication, as evidenced by research, is the possibility of turnover intention and turnover (e.g., Efobi, 2022; Hayes et al., 2006; Nwagbara, 2013).

Excessive Political Behavior

Excessive political behavior creates a negative image in the employees' eyes and minds, as evidenced through research (e.g., Iqbal, 2016). Political behaviors shift employees' focus from work activities to non-work behaviors. Political behaviors have been defined through two approaches: means and ends. While the means approach defines organizational politics as action(s) taken through sanctioned or not sanctioned by someone and constitutes assertiveness, rationality, exchange of benefits, blocking, coalition, and ingratiation, the end approach of organizational politics takes into account those actions that are self-serving and against the interest of the organization (Iqbal, 2017). These self-serving actions lead to dissatisfaction and deviant organizational behavior (e.g., Hussain, 2020).

In this study, 106 out of the 216 study participants, or about 49%, agree or strongly agree that a destructive leader is someone who practices excessive political behavior. Chang et al. (2009) suggested that a positive relationship exists between perceived organizational politics and other constructs such as strain, turnover intentions, job satisfaction, affective commitment, task performance, and organizational citizenship behaviors. The same study concluded that work attitudes mediated the effects of perceived politics on employee turnover intentions. Similarly, De Clercq and Belausteguigoitia (2017) suggested that organizational politics negatively affect the individual and the organization as it might reduce employees' engagement in organizational citizenship behavior.

Inability to Use Technology

Unsurprisingly, only seventy-three out of the 216 study participants, or about 34%, agree or strongly agree that a destructive leader cannot use technology. Research investigating leadership and the ability to use technology concluded that the leader's inability to access technological knowledge is not a predictor of leadership competency (e.g., Gençer & Samur, 2016). However, the use of technology will help create and identify knowledge (e.g., Kumar, 2014).

Good leadership requires technical/applied knowledge and expertise in the field, as opposed to technological knowledge, unless technology is the focus of this applied knowledge. Regardless, literature did not support a positive relationship between the inability to use technology and destructive leadership.

Unable to Effectively Deal with Subordinates

As dealing with subordinates is a key leadership function, study results confirmed that 158 out of the 216 study participants, or about 73%, agree or strongly agree that a destructive leader is someone unable to deal with subordinates effectively. McCartney & Campbell (2006) suggested that a failed leader is someone who is not able to deal with subordinates and build a team due to poor selection of team members; she/he is unable to mold the members into a team and cannot enact paradoxical skill sets to deal with various organizational issues. Alvesson &

Sveningsson (2003) asserted that the inability to deal with subordinates' results in subordinates avoiding communicating problems with the leader, and they are inclined to deal with their leader.

Inconsistent/Erratic Behavior

This characteristic is synonymous with a leader's unpredictable or illogical behavior (e.g., Souba & Souba, 2018). Behaviors include but are not limited to changing priorities, unclear expectations, reactive management style through putting out fires as opposed to making rational decisions, and being overly critical and short-tempered, which might create uncertainty for employees (e.g., Hogan et al., 2011; Kotter, 1999). It is not surprising that 66%, or 143 out of the 216 study participants, agree or strongly agree that a destructive leader is someone with inconsistent/erratic behavior, as this behavior is typical among destructive leaders.

Poor Personal Behavior

Poor personal behavior can be associated with the personal traits of leaders, which adversely affect interpersonal relationships and organization. In this study, 130 out of the 216 study participants, or about 60%, agree or strongly agree that a destructive leader is someone with poor personal behavior. Behaviors such as being unprofessional, arrogant, inconsistent in their actions, and engaging in negative gossip behavior about others (e.g., De Clercq, 2021) along with bullying and having a bad attitude (e.g., Dellasega, 2020), excessive control and abuse of power (e.g., Aravena, 2019) are a few examples of such poor personal behavior by leaders that negatively impact employee motivation and job satisfaction.

Micromanagement

140 out of the 216 study participants, or about 65%, agree or strongly agree that a destructive leader is someone with a micromanagement style. Micromanagement is a toxic management style where the leader "manager" oversees the most minor details of the work. Employees are subjected to a strict managerial/operational process where their thoughts, feelings, and actions are closely scrutinized, which impacts their integrity and self-confidence. It also results in uncertainty and negatively impacts performance (e.g., Allcorn, 2024; Ghazzawi, 2023).

Lack of Strategic Skills

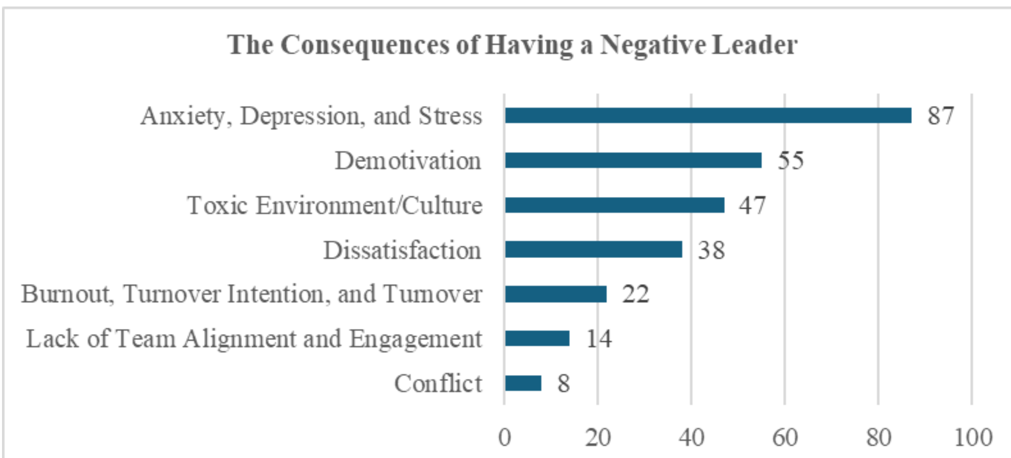
122 out of the 216 study participants, or about 56%, agree or strongly agree that a destructive leader lacks Strategic skills. Aravena (2019) concluded that poor strategic skills contribute to the subordinate's perception of destructive leadership behavior. The organizational factors that hinder the effectiveness of the leader include but are not limited to the lack of planning and control, lack of synergy between performance and goals, lack of cognitive complexity, the lack of problem-solving ability, the lack of higher cognitive capacities, and the lack of intellectual capacities (e.g., Mumford et al., 2007).

The Consequences of Destructive Leadership

Figure 4 presents the frequency of terms associated with the consequences of destructive leadership, derived from an analysis of responses from 216 participants. To provide a clearer understanding of recurring themes, related terms were grouped. For instance, mentions of "anxiety," "stress," and "depression" were consolidated into a single category to reflect their combined frequency.

It is important to note that the values in the chart represent the total number of mentions in the dataset, meaning that a single participant may have referenced the same consequence multiple times. The discussion in this study focuses on the most frequently mentioned consequences, as identified through the text-mining analysis.

Figure 4: Consequences of Destructive Leadership



Anxiety, Depression, and Stress

Among the most frequently mentioned consequences, anxiety, depression, and stress appeared eighty-seven times in participant responses. These issues often arise from a range of factors, from subtle behaviors like unjustified reprimands by a leader to more pervasive ones. Bullying from the leader or work overload are just examples leading to these factors (Jacobs, 2019). Similarly, Pyc (2017) concluded that negative employee outcomes, anxiety, and depression are linked to negative supervisors.

The prevalence of these terms suggests that destructive leadership poses a critical risk to psychological well-being. Organizations should prioritize mental health interventions and supportive leadership training to mitigate these adverse effects.

Demotivation

The theme of demotivation appeared fifty-five times in the dataset, emphasizing its significance because of destructive leadership. According to Musah (2023), "*Effective leadership and a well-motivated workforce can never be downplayed if an organization must meet its set goals*" (183). Destructive leadership disrupts motivation, leading to reduced commitment, engagement, energy, and innovation (e.g., Al-Jabari & Ghazzawi, 2019; Musah, 2023).

In a study relevant to design management and projects, Oyedele (2013) concluded that the underlying demotivation is a result of seven factors that include: (1) organizational injustice, (2) project-induced stress, (3) dysfunctional design team, (4) poor interpersonal relationships, (5) perceived career decline, (6) negative leadership behaviors, and (7) poor organizational culture.

This study's findings align with Oyedele's conclusions, reinforcing that destructive leadership exacerbates multiple demotivating factors, eroding workplace productivity and employee engagement. Addressing this issue requires leadership strategies that promote fairness, recognition, and a supportive organizational culture.

Toxic Environment

The term "toxic environment" appeared forty-seven times across participant responses, making it one of destructive leadership's most frequently mentioned consequences. This aligns with research by Padilla et al. (2007), which describes a toxic environment as characterized by four factors: (1) an unstable working environment might lead to apathy, disengagement, and unilateral decision-making; (2) perceived imminent threat. This is a natural consequence of a toxic environment, as employees are unaware of the future, (3) cultural values. The absence of a culture that emphasizes cooperation, group loyalty, identity, and solidarity leads to dysfunction and conflict, and (4) the absence of checks and balances and institutionalization.

According to Finkelstein and Hambrick (1990), managers and leaders should be free to an extent from institutional constraints and need discretion to do their Jobs. However, this freedom allows destructive leaders to abuse their power (see also Padilla et al., 2007). To counteract these effects, leaders must foster workplace positivity and create a positive environment.

Job Dissatisfaction

The theme of "job dissatisfaction" appeared thirty-eight times in the dataset. This finding aligns with research by Qian et al. (2017), who concluded that abusive supervision was positively related to job dissatisfaction.

The lack of job satisfaction creates a negative attitude toward the job and the organization, reducing employee commitment (e.g., George & Jones, 2012; Ghazzawi, 2023). Similarly, De Clercq et al. (2019) asserted that subordinates who interact with an abusive leader are more likely to be unhappy and experience dissatisfaction with their jobs. Such dissatisfaction leads to a lower propensity for undertaking voluntary efforts to assist others in their organization.

Burnout, Turnover Intention, and Turnover

Mentions of "burnout," "turnover intention," and "turnover" collectively appeared twenty-two times in the dataset. This suggests that these consequences remain significant, although less frequent than other themes.

According to Ghazzawi (2023), when subordinates deal with a superior/leader who is not compassionate or supportive, their emotional dissonance is a more significant source of stress. The consequences of prolonged burnout might lead to mental and physical health issues. Physical health issues include high blood pressure, heart disease, and respiratory problems, among others.

These health-related consequences might also lead to turnover intention and turnover. Turnover intention is defined as the cognitive precursor of exiting behavior from an organization; turnover is the voluntary act/behavior of someone exiting the organization (e.g., Coomber & Barriball, 2007; George & Jones, 2012; Ghazzawi, 2023).

Lack of Team Alignment and Engagement

Mentions of "lack of team alignment and engagement" were recorded fourteen times in the data. While less frequently mentioned, this theme reflects the broader impact of destructive leadership on organizational cohesion. Employees' alignment and engagement with their organization, and therefore performance, have always been related to their identification with their leader or organization (e.g., Yesiltas, 2017).

Destructive leadership contributes to this misalignment or disengagement because of the lack of trust, communication, and low morale exist in this organizational culture. As trust is most meaningful in situations where one part, i.e., the employee, is at risk or vulnerable to another party, the employer becomes critical in relationships between leaders and followers. Followers lacking trust in their leader tend to be less aligned and less engaged (e.g., Bligh, 2017).

Similarly, the lack of communication between the leaders and followers creates a sense of disintegration. A Good leader must build and maintain positive relationships, facilitate positive communications, and inject a sense of purpose and meaning in the members' tasks, so engagement and alignment are the foundation of the relationship (e.g., Ghazzawi, 2023; Komives et al., 2013).

The lack of trust, communication, and other underlying organizational factors contribute to followers' low morale. Komives et al. (2013) suggested that a leader who projects negative energies reduces people's morale level and brings about unneeded distractions and drama, which naturally leads to a lack of alignment and engagement on the part of the followers.

Conflict

The theme of "conflict" appeared only eight times in the dataset, making it the least frequently mentioned consequence of destructive leadership. While existing research has extensively examined conflict management styles at the individual and small group level (e.g., Saeed et al., 2014) or on the task conflict and emotional conflict (e.g., Xin & Pilled 2003) or specific leadership style and conflict resolution (e.g., Jit et al., 2016), there is a lack of research that focuses on the conflict as a consequence of having a destructive leader. A study of destructive leadership on followers' conflict might be a suggested future study.

CONCLUSION

The dark side of leadership in Brazil has often been lamented in the literature and has been subjected to limited scholarly inquiry. This study is among the first empirical studies to explore this dark side of organizational leadership in Brazil, focusing on its perception, causes, and consequences.

What is clear from this study is that 68% of the participants encountered a leader who is considered destructive. A significant finding of the study is that the encounter with a destructive leader is significantly associated with age, as study results showed a reverse U-curve, suggesting that the percentage of participants who encountered destructive leaders increases until age 56. After the age of fifty-six, the chance of encountering destructive leadership is reduced. Other than age, the study did not show any significant analysis with other demographics.

As to how people described a destructive leader, 79.6% of the study participants believed that a destructive leader behaves in an autocratic way, 60% stated poor ethics/integrity, 65% suggested poor interpersonal behavior, 60% suggested poor communication, 49% suggested the practicing of excessive political behavior, 34% believed the lacks the use of Technology, 73% suggested said pattern of leadership cannot effectively deal with subordinates, 66% believed this leader is someone with inconsistent/erratic behavior, 60% stated poor personal behavior, 65% describe this behavior is connected to micromanagement style, and 56% suggested the lack of Strategic skills when commenting on the leader's destructive behavior.

Regarding the consequences of destructive leadership behavior, the dataset revealed frequent mentions of anxiety, depression, and stress, with these themes appearing eighty-seven times. Demotivation was another significant consequence, mentioned fifty-five times, followed by toxic environments, which were cited forty-seven times. Job dissatisfaction was experienced thirty-eight times, while burnout, turnover intention, and turnover collectively appeared twenty-two times. Less frequently mentioned were the lack of alignment and engagement (14 mentions) and conflict (8 mentions), suggesting these themes, while present, were less prominent in the responses. These results emphasize destructive leadership's widespread and multifaceted impact on employees and workplace dynamics.

MANAGERIAL AND PRACTICAL IMPLICATIONS

As this study clearly shows, leadership is a complex entity. Therefore, effective leadership is needed for employee motivation, well-being, satisfaction, empowerment, and sustainable organizational growth. The presence of ineffective/destructive leadership leads to anxiety, depression, stress, demotivation, the creation of a toxic environment, employee-job dissatisfaction, burnout, turnover intention and turnover, and misalignment, disengagement, and conflict.

Accordingly, the study findings have important implications for organizational leaders and academics. They could help foster effective leadership that benefits employees and avoid destructive leadership behavior. Current research focuses on the need for a more proactive approach to identifying leadership competencies and developing effective organizational leaders.

Therefore, the study findings have important implications for organizational leaders and academics who identify leaders who have a positive impact on their subordinates and minimize the existence of destructive leaders in an organization; these implications include the following:

(1) **Rigorous Interviews:** These interviews are needed for managerial and leadership positions that not only assesses technical skills (i.e., the specialized/relevant job knowledge and skills required to perform the job), but also leadership ability, potential, and ethical character. These interviews could utilize special techniques such as scenarios, meaning structured interviews/situational behavior types of interviews requesting that simulate a potential situation the interviewee might face and the behavioral reaction to these specific situations (e.g., Heimann et al., 2020; Randall, 2006). Additionally, if an internal job interview is conducted, this method ensures the promotion of positive role models.

(2) **Reference Check:** While a thorough reference checking of potential applicants for leading positions confirm that submitted positions confirm that submitted information on resumes and employment applications, such as employment dates, titles, duties, and other information, is also helpful in predicting performance, leadership behavior, and potential. A thorough check will help identify positive applicants and the possibility of weeding out negative ones.

(3) **Provide Leadership Development:** To cultivate leadership qualities, leadership development is continuously needed for all sorts of positions in the organization. Such training and development should focus on positive styles of leadership, ethical decision-making, empowerment, and a leader's emotional intelligence, among other things that are needed by the organization.

(4) **The Creation of an Open Culture**: An Open Culture encourages subordinates to provide honest feedback to the leader directly or through anonymous organizational-supported methods and/or open communication channels. This open culture ensures that organizational values and principles are reinforced.

(5) Ensure Consequences for Destructive Leadership Behaviors: A final implication is for the organization to act when a leader or a manager exhibits destructive behavior by quickly taking disciplinary action against the person. Doing so reinforces organizational values and reassures the organization's positive/ethical culture, as action is more powerful than words.

LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

The current study attempts to contribute to the literature on the dark side of leadership, but it has several limitations, and subsequently, the study conclusions are made with caution.

One limitation of the study might be a respondent bias, based on the belief that some study participants might not be able to assess the questions objectively and thoroughly before responding. Therefore, the study results could have been overstated.

Another study limitation is its generalizability since its sample resided in Brazil, i.e., South America, because of this geographical and, in turn, cultural limitation, comparative future research in various countries in South America and other geographical regions is needed to enhance the generalizability of the results and allow for future meta-analyses.

A third and final limitation of the study is related to its use of a convenient sample of 216 managers who participated in executive certificate programs in strategic management or project management. Based on this fact, the current study can make no claims to the representations or generalizability of its results, as other research studies with a larger and random demographic sample in Brazil might produce different results.

Future research using a quantitative approach may empirically test the factors influencing the likelihood of encountering destructive leadership. Demographic factors (e.g., management rank, gender, age, organization type, number of employees, and years on the job) may predict exposure to destructive leaders. In addition, individuals' perceptions of destructive leadership behaviors may shape their likelihood of identifying such leaders.

A logistic regression model can be applied, with the log odds of encountering destructive leadership as the dependent variable and demographics and perceived leader behaviors as independent variables. A survey-based study across diverse organizations would provide insights into how individual and contextual factors influence destructive leadership experiences.

To strengthen validity, longitudinal designs could track whether perceptions of destructive leadership change over time. Additionally, multi-source data collection incorporating self-reports, peer evaluations, and organizational assessments would reduce common method bias and enhance reliability.

Future research would benefit from comparative studies and semi-structured interviews with focus groups of employees, managers, and leaders to further enhance the depth of understanding. These qualitative approaches could provide contextual insights into how destructive leadership manifests across different organizational settings.

In addition, while people over fifty-six showed more tolerance to destructive types of leadership, future research where age, organization position, and gender are the dependent variables could provide a better clue to such a relationship.

Future research could also explore cross-cultural comparisons of leadership and effectiveness, examining how nationality influences perceptions and outcomes. Comparing results between countries like Brazil and the USA or Brazil and other Latin American nations would be particularly valuable. Such studies could illuminate culturally specific leadership behaviors and inform the best practices for managing diverse teams within multinational corporations operating in these regions. Understanding these nuances would be crucial for optimizing international leadership development programs and maximizing organizational performance in global contexts, especially for transnational organizations.

Finally, given that only a few participants cited inter-organizational conflict, future studies should explore whether distinct types of leadership behaviors lead to inter-organizational conflict. By integrating these methodological approaches, future research can clarify how personal, organizational, and contextual factors contribute to the perception and prevalence of destructive leadership.

Despite these limitations, the study results do, however, provide important findings and valuable contributions to the ongoing research and literature on the dark side of leadership.

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