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Leveraging social media, big data, and smart technologies for intercultural communication and effective leadership: Empirical study at the Ministry of Digital Economy and Entrepreneurship

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A B S T R A C T

The objective of this study was to evaluate the impact of social media, big data, and smart technology on intercultural communication and effective leadership inside the Ministry of digital & entrepreneurship. The main objective was to investigate the influence of these technical elements on organizational behavior and the efficacy of leadership within the particular setting of a government ministry dedicated to digital economy and entrepreneurship. In order to accomplish this goal, a thorough empirical inquiry was done, which included gathering data from important individuals involved in the Ministry. The study intentionally selected a sample size of 379 individuals, who represented various responsibilities within the Ministry. The process of data gathering entailed the distribution of surveys and the conduction of interviews to acquire valuable insights and viewpoints from the participants. The utilization of this approach yielded a resilient dataset that is well-suited for thorough investigation. The study explored the complex connection between the use of social media platforms, the implementation of big data analytics, and the incorporation of smart technologies in influencing the dynamics of intercultural communication and leadership inside the Ministry. The results emphasized the substantial influence of social media in promoting intercultural communication and cooperation among personnel within the Ministry. Moreover, the implementation of big data analytics has become a crucial element in improving decision-making processes, impacting several facets of leadership efficacy, strategic planning, and employee involvement. Smart technologies were recognized as crucial elements in establishing efficient communication channels and facilitating effective leadership practices. The study's findings emphasized the beneficial impacts of utilizing social media, big data, and smart technology in the Ministry of digital & entrepreneurship. The research highlighted the significance of government organizations incorporating these technologies in a proactive manner to foster a work environment characterized by improved multicultural communication, well-informed decision-making and efficient leadership. This study makes a substantial contribution to the comprehension of how technological improvements might influence organizational behavior and leadership practices in a government setting. It provides essential insights for policymakers, leaders, and researchers. The findings have broader significance beyond the Ministry, serving as a basis for additional investigation into the use of technology in intercultural communication and leadership effectiveness inside government institutions.

1. Introduction

The modern corporate environment is currently going through a period of transformation that is being expedited by the process (Jakubik et al., 20223). The impact that these technical pressures have on intercultural communication and leadership is becoming increasingly visible as organizations negotiate the dynamic interaction of these forces from a technological perspective (Wong, 2023). There has been a significant shift in the way that businesses carry out their operations and engage with their

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customers as a result of the advent of the digital paradigm (Dhiman, 2023). As a result of the great accelerators that social media platforms have displayed, the landscape of interpersonal connections has been rebuilt, and this new landscape includes connections that take place both within and outside of the boundaries of an organization (Carroll, 2023). In addition to the fact that the pervasiveness of social media has radically altered the way individuals communicate with one another, it has also developed into an instrument that is essential for working together and being involved (Jarrahi & Safari, 2023). It is becoming increasingly vital to have a full awareness of the complex relationship that exists between social media and intercultural communication (Nunkoo et al., 2023). This is because businesses are having a difficult time coming to terms with the repercussions of this change. On the other hand, throughout the same time, the growth of big data and intelligent technology has endowed businesses with capabilities that have never been seen before (Susanto et al., 2023).

Having the ability to harness large amounts of data for the goal of conducting comprehensive analysis, getting insights that are relevant to the situation, and making decisions based on that analysis has become a crucial component of strategic management (Huertas et al., 2022). This synergy between technical aspects not only influences the efficiency of operations, but it also establishes a foundation for leadership that is both flexible and forward-thinking (Whyte et al., 2022). These new prospects for cross-cultural understanding and responsiveness are made possible by the combination of big data and smart technologies. It is especially important to keep this in mind while discussing communication between different cultures. The significance of social media platforms has become an essential component of contemporary society, having an impact not only on the way individuals connect with one another but also on the configuration of the environment in which businesses and organizations operate. A significant reason for the significance of social media is that it possesses an unrivaled capacity to facilitate communication in real time, to encourage community engagement, and to amplify the distribution of information. Leveraging social media is not only about maintaining an online presence for businesses; rather, it is a strategic essential for creating a brand, interacting with customers, and reaching out to the market. Because of the dynamic nature of social media, firms can remain in tune with the ever-changing requirements and preferences of their audience. This enables organizations to respond in a nimbler manner and fosters a sense of community that transcends geographical boundaries.

Furthermore, big data is a disruptive force that has the ability to change the way in which businesses approach decision-making and operational efficiency (Elkhwesky et al., 2022). The ability of big data to handle and analyze massive datasets, thereby revealing patterns, trends, and correlations that were previously concealed, is the primary reason for its significance (Bolden et al., 2023). Organizations are able to make decisions that are informed and driven by data across a variety of aspects, including marketing strategies and supply chain management, thanks to the abundance of information available to them (Mugira, 2022). The utilization of big data gives businesses the ability to achieve a competitive advantage by locating opportunities, minimizing risks, and improving the efficiency of their processes (Persada & Nabella, 2023). Furthermore, big data analytics acts as a catalyst for innovation, propelling improvements in artificial intelligence, machine learning, and predictive modeling (Fischer & Sitkin, 2022). This ushers in a new era of strategic and forward-thinking organizational practices, which ushers in a new time period (Yusuf et al., 2023).

Smart technologies proved their efficiency in boosting the capabilities of a business, specifically the capacity to boost overall production as well as to reduce operational costs and increase efficiency (Bakker et al., 2023). The use of Internet of Things devices, for example, physical things can be connected to the digital sphere, which enables real-time monitoring and data collecting (Keith, 2023). Smart technologies provide capabilities that have never been seen before in terms of data analysis, pattern recognition, and decision-making (Kilag et al., 2023). Streamlining repetitive processes using intelligent technologies enables human resources to concentrate on higher-order cognitive functions rather than doing repetitive chores (Nabella et al., 2022). By adopting intelligent technologies, businesses not only ensure that they are up to date with the latest technical developments, but they also put themselves in a position to succeed in an era that is characterized by exponential innovation and constantly shifting consumer expectations (Deng et al., 2023).

The Ministry of Digital Economy and Entrepreneurship appears as a focal point for inquiry within the context of this panorama of technological convergence within the context of this panorama. This digital-centric society provides a fascinating backdrop for investigating the ways in which social media, big data, and smart technology influence leadership and communication across cultural boundaries. This research is being conducted with the intention of elucidating not just the individual influence of these technical forces, but also the linked influence that these technological forces have on one another. The following sections will, as we move forward with this investigation, dissect the theoretical underpinnings of these technologies, investigate the dynamic interaction that these technologies have with organizational behavior, provide specifics regarding the methodology that was utilized for data collection, and then present a comprehensive analysis and interpretation of the findings. All of these sections will be done in order. A deeper awareness of the implications that social media, big data, and smart technologies have for businesses in the digital era is the goal of this project, which aims to make a contribution to the growing body of knowledge concerning the impact of these technologies on intercultural communication and leadership.

2. Literature Reviews

2.1 Social Media

Because of the proliferation of social media, beneficial changes have occurred in the sphere of interpersonal connections and organizational dynamics. This is a driving force that has become a driving force. According to Ayers et al. (2023), the widespread influence and dynamic character of social media contribute greatly to the altering of the landscape of communication and strategic approaches. A catalyst for improved organizational behavior, social media platforms serve as vital tools for developing effective communication and collaboration within the framework of team dynamics (Fenton et al., 2023). These platforms also function as catalysts for improved organizational behavior. According to Jones et al. (2023), the real-time interactions that are made possible by these platforms assist the development of a workforce that is more integrated and engaged. Additionally, these platforms help to break down traditional communication boundaries and establish a sense of oneness among a group of individuals working together. According to Wies et al. (2023), teams that make use of social media platforms discover new channels via which they may share ideas, receive feedback, and cultivate a sense of community with one another. This, in turn, contributes to an increase in the overall cohesion and synergy occurring inside the business. Beyond the dynamics that occur within an organization, social media has a tremendous impact on how the organization is regarded by the outside world. According to Duffy & Meisner (2023), it is of critical importance in the transformation of public image, the management of reputation, and the cultivation of positive connections with stakeholders. A favorable impact on an organization's standing in the eyes of the general public can be achieved through the implementation of a well-managed and strategically designed online presence.

Strategic management that integrates active involvement with social media enables firms to develop connections with their audience that are both transparent and authentic, thereby fostering a healthy organizational culture that is aligned with the values and aims of the business (Li & Cho, 2023). Social media plays an important part in strategic management because it provides companies with the potential to make educated decisions based on a plethora of information (Saura et al., 2023). The real-time data and insights that social media provides highlight the significance of this contribution. According to Afful-Dadzie et al. (2023), social media analytics give businesses the ability to study market trends, fully comprehend client preferences, and keep track of the actions of their competitors, all of which contribute to an improvement in the process of making strategic decisions. On top of that, social media platforms offer corporations a one-of-a-kind venue in which they may demonstrate their dedication to corporate social responsibility (CSR) and sustainability. According to Liu et al. (2023), firms can promote corporate social responsibility (CSR) initiatives, environmentally friendly practices, and community participation activities through the effective utilization of social media. This has the potential to favorably influence their reputation and fulfill the growing need for socially responsible business practices. Nevertheless, a nuanced strategy is required to successfully incorporate social media into organizational behavior and management functions. It is necessary for organizations to negotiate issues such as concerns around privacy, the possibility of receiving false information, and the requirement for a consistent and genuine voice on the internet (Freiling et al., 2023).

According to Abbasi et al. (2023), to guarantee that actions taken online are in effective alignment with the objectives of the company, a comprehensive social media strategy needs to be integrated into the larger goals of the organization in a seamless manner. The conclusion is that the influence of social media on the behavior of organizations and the management of strategic initiatives is revolutionary. Through the purposeful exploitation of these platforms, there is the opportunity to promote internal collaboration, strengthen external connections, facilitate informed decision-making, and foster a positive culture within the firm. It is essential for businesses to recognize and capitalize on the opportunities presented by social media in order to achieve long-term success (Scully et al., 2023). This is especially true as organizations navigate the digital world. Based on the context, the following hypotheses is developed

H_1: *Using Social Media Applications positively affects improving intercultural Communication.*
H_2: *Using Social Media Applications positively affects Leadership.*

2.2 Big Data

A paradigm change has occurred in many aspects of modern society because of the rise of big data, notably in the context of redefining the landscape of healthcare. The utilization of enormous datasets has been shown to be of great assistance in improving medical decision-making, maximizing the quality of care provided to patients, and encouraging innovations in the delivery of healthcare (Shen et al., 2023). According to Wang (2023), the incorporation of data-driven approaches has resulted in the creation of unique opportunities and problems, which has had a substantial impact on the management of healthcare programs and the dynamics of contacts with patients. There is a significant role that big data plays in the field of healthcare workforce dynamics, namely in the process of deciphering complex patterns of behavior and performance among healthcare professionals. Organizations can get essential insights that may be utilized to boost collaboration, communication, and overall team morale (Lyu et al., 2023). These insights can be gained by analyzing a vast amount of data, which can range from communication patterns to healthcare results. According to Wali et al. (2023), the discovery of trends within this data trove not only makes it easier to have a detailed grasp of the dynamics of the workplace, but it also gives a road map for improving methods

for teamwork and tackling difficulties that are faced by the business.

Furthermore, the application of big data analytics makes it easier to personalize individual methods to staff management in healthcare settings. According to Arshad et al. (2023), this individualized strategy helps with personnel acquisition, training, and retention tactics, which ultimately contributes to the continued success of healthcare companies. According to Nowak & Yu. (2023), the ripple effect extends to the cultivation of a work environment that is more inclusive and supportive. This is accomplished by the utilization of diversity metrics and inclusion insights, which aid businesses in recognizing and correction of potential problems. By utilizing the power of big data analytics, healthcare organizations can cultivate a staff that is both diverse and collaborative, which will ultimately result in improved patient care and satisfaction. According to Hassani & Silva (2023), healthcare companies can make fast adjustments to their strategies, seize emerging opportunities, and manage risks when they have access to real-time insights provided by big data analytics. This adaptability is shown to be especially crucial in domains where prompt answers can make a difference in the results for patients and the overall efficiency of operations (Mubarakali et al., 2023). Analytics performed on large amounts of data also greatly improve risk management in the healthcare industry. Organizations can proactively detect potential risks and vulnerabilities by analyzing both real-time and historical data. This enables the deployment of preventive actions, which in turn helps to lessen the impact of unforeseen events (Zhao & Akoglu, 2023). According to Ren et al. (2023), this risk-aware strategy helps to contribute to the formulation of robust and resilient healthcare plans, which in turn ensures the delivery of high-quality treatment even when faced with uncertainty. Furthermore, big data analytics makes strategic planning in the healthcare industry, which has traditionally been a complicated process, easier to do. According to Shu & Ye (2023), predictive analytics, which is a component of big data, gives healthcare businesses the ability to foresee trends, comprehend the requirements of patients, and strategically position themselves while operating in a highly competitive healthcare environment. This foresight is shown to be extremely beneficial when it comes to aligning resources, establishing long-term goals, and navigating the complicated terrain of strategic management in the healthcare industry (Wickham et al., 2023). The ability of healthcare organizations to make educated decisions, which is made possible by big data analytics, serves to contribute to the overall resilience and adaptability of these organizations.

In the field of healthcare supply chain management, where a sophisticated understanding of demand trends, inventory levels, and supplier performance is essential for optimization (Khan et al., 2023), the impact of big data goes farther into the realm of supply chain management. Real-time monitoring of these components, which is made feasible by big data analytics, gives healthcare firms the ability to simplify supply chain procedures, hence lowering costs and improving operational efficiency (Yallop et al., 2023). The use of big data has brought about a revolution in customer relationship management (CRM) in the healthcare industry, particularly in the areas of patient care and engagement. It is possible for healthcare practitioners to modify their services, personalize treatment programs, and improve the overall patient experience by utilizing patient data (Hernández-Molina et al., 2023). According to Masidiqova et al. (2023), the capacity to monitor the behaviors and preferences of patients enables healthcare providers to make rapid adjustments to their services, so guaranteeing that they are in line with the ever-changing requirements of the patient population. A new era of data-driven decision-making, operational efficiency and patient-centered care has been ushered in because of the incorporation of big data into the landscape of the healthcare industry. The revolutionary impact of big data in the healthcare industry extends beyond the optimization of workforces to strategic management, the effectiveness of supply chain operations, and the involvement of patients. This brings with it the prospect of a future in which data analytics will be an integral instrument for the delivery of high-quality healthcare services. Based on the context, the following hypotheses is developed

H_3: *Using Big Data positively affects improving intercultural Communication.*
H_4: *Using Big Data positively affects Leadership.*

2.3 Smart Technologies

The use of intelligent technology has completely altered the way in which businesses work in both the public and commercial sectors (Lamnatou et al., 2022). The incorporation of modern data analytics enables firms to make decisions that are well-informed and based on insights that are current now (Hwang et al., 2022). In the public sector, this correlates to improved governance and policymaking because officials are able to examine vast datasets in order to discover trends and design successful plans (Toshpo, 2022). Through the utilization of intelligent technology, organizations in the private sector are able to improve their operational efficiency and achieve a competitive advantage in the market (Mahfuz et al., 2022). Smart technologies have several significant impacts, one of which is the automation of ordinary processes, which ultimately results in higher productivity in businesses (Kim et al., 2022). The implementation of intelligent systems has the potential to streamline operations that are both time-consuming and repetitive in both the public and commercial sectors (Ameen et al., 2022). This will enable staff to concentrate on activities that are more strategic and offer more value to the organization (Gastaldi et al., 2022). Not only does this increase overall efficiency, but it also contributes to the degree to which employees are satisfied with their jobs and creativity (Kumar et al., 2022). Additionally, in cyber security intelligent technologies are an essential component in the process of protecting sensitive data. A growing number of cyber risks are being faced by both the public and private sectors, and smart technologies are providing advanced solutions to address these concerns (Agarwal et al., 2022).The implementation of intelligent technology makes it easier for businesses to improve their efficiency in terms of communication and collaboration , and the use of intelligent communication platforms by government agencies in the public sector can improve the quality of

services provided to citizens, while the utilization of collaborative tools by private sector businesses can facilitate smooth teamwork (Agaard, 2023). This interconnection helps to foster a more agile and responsive organizational structure, which in turn enables businesses to quickly adjust their operational strategies in response to shifting market conditions (Alshamaila et al., 2023). Technology that is intelligent contributes to sustainability initiatives, which are beneficial not only to the environment but also to the reputation of businesses (Albayaydh & Flechais, 2023).

Smart infrastructure technologies help enterprises in public sector to maximize the utilization of resources and reduce the carbon footprint of cities; at the same time, businesses in the private sector make use of intelligent technologies to incorporate environmentally friendly practices into their operations (Schomakers & Ziefle, 2023). This demonstrates the organization's commitment to corporate responsibility and attracts customers who are environmentally sensitive based on collecting and analysis of large amounts of data using intelligent technology enables businesses in both commercial and industrial sectors to take more focused and individualized approaches (Abdllahi et al., 2023). It is possible for governments in the public sector to adjust policies and services to the requirements of citizens, which can result in an increase in overall satisfaction (Vijayakumar et al., 2023). Businesses in the private sector can make use of client data to develop individualized marketing plans, which will ultimately result in increased customer loyalty and retention methods (Khang et al., 2023).

To satisfy the ever-changing requirements of customers, businesses in the private sector make investments in the research and development of intelligent products and services (Nesterenko, 2023). The construction of smart cities and other government programs that make use of technology to improve the quality of life for inhabitants are examples of innovation that can be found in the public sector (Hammouri et al., 2023). It may be concluded that the impact of smart technologies on businesses, whether they are in the public or private sector, is numerous and complex (Alzagheer et al., 2022). As a result of their ability to improve efficiency and productivity as well as strengthen cyber security and sustainability initiatives, these technologies have become indispensable to the success and development of companies (Almajali et al., 2023). The use of intelligent technology not only places businesses in a position of leadership within their particular industries, but it also makes a contribution to the overall development of services and experiences for both customers and citizens alike (Ghasawneh et al., 2023). Based on the context, the following hypotheses are developed:

H_5: *Using Smart Technologies positively affects improving intercultural Communication.*
H_6: *Using Smart Technologies positively affects Leadership.*

2.4 Intercultural Communication and Leadership

Individuals who come from various cultural backgrounds can communicate with one another through the exchange of information and ideas through intercultural communication (G'aniyevna, 2023). To develop understanding and collaboration, it requires negotiating a variety of communication styles, conventions, and beliefs (Sarvinozkhon, 2023). Effective intercultural communication is crucial in today's globalized world for the purpose of developing cooperation among people from different areas of the world, promoting cultural awareness, and building strong relationships between individuals from different regions of the world (Sabirjanovna, 2022). Being knowledgeable of different cultures is an essential component of effective intercultural communication (R'boul, 2022). Recognizing and honoring each other's cultural backgrounds is essential to preventing misunderstandings and fostering an environment that is welcoming to all (Iswandari & Ardi, 2022). It makes it possible for individuals to understand different points of view, which in turn reduces the risk of encountering ethnocentrism and stereotypes (Ibragimjanovna, 2022). Furthermore, cultural knowledge makes it possible for people to build empathy, which in turn encourages individuals to approach conversation with an open mind and a willingness to learn from one another (Qodirova, 2022).

Communication methods and nonverbal clues within different cultures are frequently dissimilar from one another (Islam & Idris, 2022). Certain societies place a high importance on communication that is both direct and explicit, while others may rely on expressions that are indirect and implicit (Fernández et al., 2022). It is essential to have a solid understanding of the subtleties of nonverbal communication, which includes things like gestures, facial expressions, and body language (Baldwin et al., 2023). As a result of the fact that misinterpreting these cues can result in misinterpretation, it is essential to be sensitive to cultural differences in both verbal and nonverbal communication (Armstrong et al., 2022). One of the most potent tools for expressing one's cultural identity is language; not only does it consist of words, but it also incorporates nuances, idioms, and cultural references that are specific to a given group (Álvarez et al., 2023). When it comes to international communication, having a strong command of the language is essential; nevertheless, having cultural awareness is also essential for effectively comprehending communications (Dervin & Jacobsson, 2022). Increasing the effectiveness of communication and facilitating the formation of connections across linguistic and cultural divides can be accomplished by acknowledging that language is more than just words; it also conveys cultural nuances (Liu et al., 2022).

To establish true connections, it is necessary to first acknowledge and then challenge these unconscious biases (Nam et al., 2023). It is possible to contribute to the dismantling of stereotypes by promoting good representations of other cultures and encouraging intercultural education (Hua et al., 2022). The creation of a global society that is more accepting and tolerant of others can be accomplished by cultivating an atmosphere in which individuals are encouraged to question their own preconceived notions (Schouten et al., 2023). Now, technology plays a crucial part in fostering communication between people of

different cultural backgrounds (Harvey et al., 2022). Through the use of platforms such as social networking, video conferencing, and instant messaging, people from all over the world are connected, hence removing geographical barriers (Simpson, 2023). On the other hand, it is of the utmost importance to be aware of the potential misconceptions that may arise as a result of these disparities in online communication styles and the influence that technology has on cultural exchanges (Gong et al., 2022). Communication between different cultures is especially important in the workplace, as workers from different backgrounds work together to accomplish shared objectives (Dvorianchykova et al., 2023). The development of cross-cultural competency among employees is something that is necessary to cultivate a positive working environment and to maximize productivity (Nabiyevna, 2022). Employers can support this initiative by providing training programs that target the enhancement of employees' cultural intelligence (R'boul, 2022). These programs enable employees to effectively traverse cultural differences and contribute to a workplace that is both harmonious and varied (G'aniyevna, 2023). The significance of communication between different cultures is anticipated to increase as the globe continues to become more interconnected (Sarvinozkhon, 2023). The capacity to communicate successfully across cultural barriers will be a skill that will be valuable in a variety of professions, including business and diplomacy, as well as education and healthcare (Sabirjanovna, 2022). For individuals and communities to succeed in a world that is becoming increasingly interconnected, it will be vital for them to embrace variety, promote cultural understanding, and refine their ability to communicate across cultural boundaries (R'boul, 2022).

Leadership is an essential component in the achievement of success and long-term viability for any organization (Iswandari & Ardi, 2022). It plays a critical part in guiding businesses in the direction of their desired outcomes and goals (Ibragimjanovna, 2022). In its most fundamental form, leadership is characterized by the capacity to motivate, direct, and exert influence over individuals or groups to achieve a common goal (Qodirova, 2022). In the context of businesses, good leadership is a driving force that helps to cultivate a constructive organizational culture, supports innovation, and boosts overall productivity (Islam & Idris, 2022). The concept of leadership in businesses is multidimensional, including a variety of approaches and styles (Fernández et al., 2022). For example, transformational leadership places an emphasis on the leader's capacity to inspire and encourage colleagues, with the goal of motivating them to exceed their own expectations (Baldwin et al., 2023). On the other hand, transactional leadership places an emphasis on establishing distinct structures and providing incentives to accomplish particular goals (Armstrong et al., 2022). When effectively implemented, both styles contribute to the establishment of an organizational environment that is dynamic and responsive to the needs of the organization (Álvarez et al., 2023). The ability to make strategic decisions is one of the most important qualities of a leader in a company (Dervin & Jacobsson, 2022). The leaders of an organization are accountable for determining the course of the organization, establishing its objectives, and developing plans to accomplish those objectives (Liu et al., 2022). They can make sound decisions, particularly during times of uncertainty, which has a direct impact on the adaptation and resilience of the establishment (Nam et al., 2023). The most effective leaders are able to handle challenges, recognize opportunities, and make choices based on accurate information that are in line with the organization's goal and values (Hua et al., 2022). In addition, leadership is an essential component in the process of developing a constructive culture in the workplace (Schouten et al., 2023). The beliefs, conventions, and behaviors that characterize the environment of an organization are shaped by the leaders of that organization (). Encouraging employee involvement, fostering teamwork, and attracting and retaining talent are all outcomes of a culture that is both healthy and inclusive (Harvey et al., 2022). When leaders make the creation of a supportive work culture a priority, they contribute to increasing levels of job satisfaction, decreased rates of employee turnover, and general improvements in the morale of the firm (Simpson, 2023).

The relevance of leadership in businesses extends beyond the day-to-day operations of the company; it has a direct influence on the organization's ability to function well and sustain itself over the long term (Gong et al., 2022). One of the most important aspects is the capacity of leaders to motivate and enable the members of their teams (Dvorianchykova et al., 2023). A sense of purpose and dedication among members of a team can be fostered by a leader who effectively communicates a compelling vision, aligns that goal with the values of the firm, and gives employees the authority to contribute to the realization of that vision (Nabiyevna, 2022). There is an increase in the level of dedication and involvement displayed by the workforce (R'boul, 2022). Leadership is another important factor that contributes to innovation within companies (G'aniyevna, 2023). Leaders are required to cultivate a culture that supports creativity and adaptation to cope with the ever-changing terrain of the commercial world (Sarvinozkhon, 2023). The creation of new ideas, procedures, and products is prompted by a leader who places a high value on innovation and actively fosters its development (Sabirjanovna, 2022). Not only does this strengthen the company's competitive advantage, but it also ensures that it will be able to adjust to the ever-changing conditions of the market (R'boul, 2022). A further benefit of excellent leadership is that it contributes to the agility of the organization (Iswandari & Ardi, 2022). Companies that have leaders that can negotiate ambiguity, make decisions based on accurate information, and quickly adjust to change are able to prosper in situations that are dynamic (Ibragimjanovna, 2022). Having this level of agility is necessary in order to react appropriately to changes in the market, advances in technology, and unexpected obstacles (Qodirova, 2022).

An organization that has leadership that is nimble is better able to seize opportunities and overcome challenges, which ensures that the organization will continue to expand and be successful (Islam & Idris, 2022). In addition, the development of employees is intimately connected to leadership in companies (Fernández et al., 2022). Those that are effective as leaders make investments in the development and improvement of their teams' skills (Baldwin et al., 2023). In addition to providing mentoring, they also offer chances for professional development and cultivate a culture of learning throughout the organization (Armstrong et al., 2022). This dedication to employee development not only improves the capacities of each individual worker, but it also makes a contribution to the overall adaptability and competency of the company as a whole (Álvarez et al., 2023). Finally, leadership

is an essential component of organizational success (Dervin & Jacobsson, 2022). It plays a crucial part in directing businesses toward the achievement of their objectives, cultivating constructive cultures, encouraging innovation, and assuring the organization's continued viability over the long term (Liu et al., 2022). Companies that have leadership that is both strong and effective are better able to negotiate problems, make the most of opportunities, and create settings in which both the firm and its personnel may flourish (Nam et al., 2023). And finally, based on the context, the following hypotheses are developed.

H7: *Enhancing intercultural communication positively affects improving leadership.*

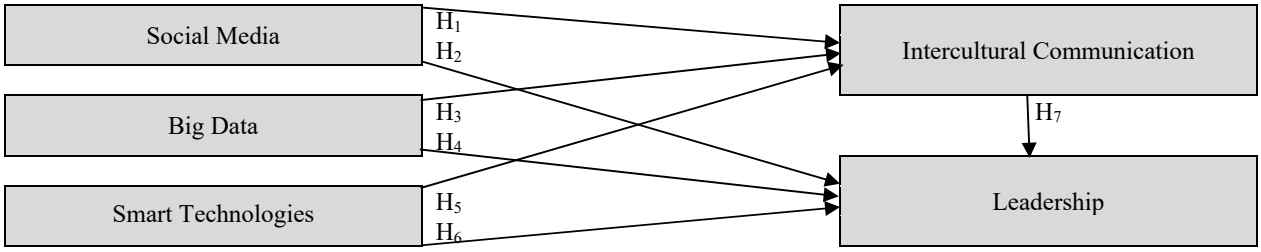

Fig. 1. The proposed study

3. Research Methodology

Within the context of the Ministry of digital & entrepreneurship, the objective of this study is to evaluate the effects that social media, big data, and smart technologies have on intercultural communication and effective leadership. Significant research ideas that were published on Google drive were rated by the participants with the assistance of a Likert scale. This scale suggests that a response range of 1 indicates a strong disagreement, while a response range of 5 indicates a strong agreement with the statement being made. PLS, which stands for partial least squares, was the technique that we employed to ascertain whether or not our hypothesis was correct. Following the end of the process of cleaning the data, we arrived at the judgment that 379 of the responses provided by the participants were suitable for further discussion and analysis in relation to the hypotheses that were being investigated in our study. Particularly noteworthy is the fact that the data that was collected exhibited an extraordinary level of precision that was superior to the estimates that were anticipated. The accuracy was increased by a factor of ten, which allowed this to be performed.

4. Research Results

Experiments were conducted to acquire information regarding the validity and reliability of the measuring method. These experiments were carried out to gather information. Through the utilization of Cronbach's alpha, the researchers were able to successfully complete the examination of the survey's internal consistency and reliability. We took the decision to use a cutoff value of 0.70 in accordance with the proposal that was given by Hair et al. (2006). Cronbach's alpha coefficients for each of the scale's subscales are included in Table 1, which we have provided for your review. We hope you find this information useful.

Table 1
Reliability and validity test

Code	Variable	Factor's Loading	VIF
Social Media (SM)	(Cronbach's Alpha: 0.656, CR: 0.550, AVE: 0.589)		
SM1	Influence and Authority	0.652	1.250
SM2	Response Time and Customer Service	0.674	1.267
SM3	Engagement	0.643	1.344
Big Data (BD)	(Cronbach's Alpha: 0.595, CR: 0.613, AVE: 0.592)		
BD1	Variability	0.588	1.459
BD2	Veracity	0.610	1.432
BD3	Added Values	0.589	1.766
Smart Technologies	(Cronbach's Alpha: 0.539, CR: 0.581, AVE: 0.662)		
SM1	Sensors and Actuators	0.564	1.788
SM2	Machine Learning	0.531	1.698
SM3	Connectivity and Communication	0.523	1.764
Intercultural Communication (IC)	(Cronbach's Alpha:0.563, CR: 0.583, AVE: 0.637)		
IC1	Strategic Planning	0.548	1.569
IC2	Resource Allocation	0.550	1.653
IC3	Organizational Performance	0.591	1.786
Leadership	(Cronbach's Alpha: 0.554, CR: 0.694, AVE: 0.635)		
L1	Transformational Leadership	0.570	1.641
L2	Transactional Leadership	0.561	1.820
L3	Servant Leadership	0.531	1.640

To determine whether a measurement instrument possesses convergent validity, Fornell and Larcker suggest employing a

critical threshold of 0.70 or higher for the construct reliability (CR) test and a threshold of 0.50 or higher for the average variance extracted (AVE) test. Both thresholds are used to evaluate the performance of the instrument. Taking into consideration both levels is important. The rates of failure that are displayed in Table 1 do not fulfill the standards. This includes the failure rates of the various components as well as the total failure rates at the end of the table. It was found that strong links were present when the path loadings for each component were larger than 0.50. This was the conclusion that was reached. Following is a table that contains the results, which corresponds to the evaluation of the validity of the hypothesis within the context of the study paradigm. Table 2 shows the results. A favorable evaluation of the research model was demonstrated by the table that was presented earlier. As a result, we are now allowed to proceed to the subsequent step, which is to conduct an analysis of the research hypotheses that we have produced now that we have finished the previously mentioned phase.

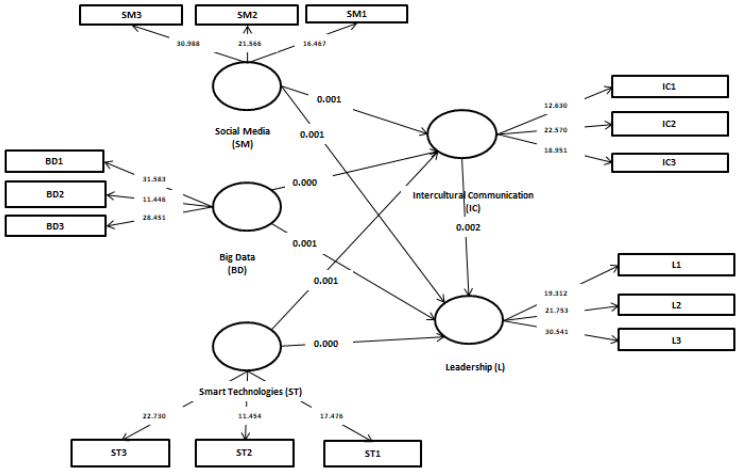

Fig. 2. Research bootstrapping model

The study hypotheses have been successfully validated in their entirety, as demonstrated by the diagram that has been presented. As a result, this is represented by the diagram, which illustrates the direct influence of the correlations that exist among the variables that are being researched.

Table 2
Discriminant Validity

Construct	SM	BD	ST	IC	L
SM	0.278				
BD	0.254	0.254			
ST	0.267	0.267	0.269		
IC	0.260	0.258	0.263	0.231	
L	0.251	0.276	0.230	0.249	0.211

We used the Fornell-Larcker criterion to prove that it was discriminately valid. Assuming the component-level correlations are less than the AVE, we may say that this requirement has been met. In comparison to component correlations, the bolded square roots of average variances extracted (AVEs) show lesser magnitudes. It is clear from this finding that discriminant analysis is a valid and useful tool. After the measurement model was cleared, the structural model was reviewed, and the result was an R^2 score of 50.1%. Based on the standards set by Hair et al., the R^2 value is higher than 25%.

Table 3
Research Hypotheses Test

	Research Hypotheses Test	Beta	P-Value	Results
H1	Social Media → Intercultural Communication	0.264	0.001	Supported
H2	Social Media → Leadership	0.257	0.001	Supported
H3	Big Data → Intercultural Communication	0.281	0.000	Supported
H4	Big Data → Leadership	0.229	0.001	Supported
H5	Smart Technologies → Intercultural Communication	0.238	0.001	Supported
H6	Smart Technologies → Leadership	0.216	0.000	Supported
H7	Intercultural Communication → Leadership	0.243	0.002	Supported

Table 3 provides additional evidence that all hypotheses are supported by the supplied information, as low p-values are observed. The results of our study indicate that leadership and intercultural communication are both significantly impacted by social media. This correlation is indicated to be statistically significant by the coefficients (β= 0. 264, $p < 0.05$) and (β= 0. 257, $p < 0.05$). The results provide credence to the first two hypotheses. Similarly, it should be mentioned that big data

significantly impacts both leadership and intercultural communication (β = 0.281, p 0.05) and (β = 0.229, p 0.05), thereby lending credence to Hypotheses 3 and 4. Ultimately, it has been found that smart technology application significantly improves both leadership and intercultural communication (β = 0. 238, $p < 0.05$) and (β = 0. 216, $p < 0.05$), thus lending credence to Hypotheses 5 and 6. In addition, the existing data provide credence to hypothesis H7, which asserts that fostering intercultural communication positively affects the improvement of leadership in businesses. Moreover, you can see that this effect has a substantial statistical value (β = 0.243, $p < 0.05$).

5. Future Research and limitations

Within the Ministry of digital & entrepreneurship, there is a rich environment for innovative research that explores the interaction of social media, big data, and smart technologies. A comprehensive investigation into their synergistic impact on intercultural communication and effective leadership has the potential to unlock significant advancements in understanding and application. Given the rapidly evolving technological landscape and the intrinsic dynamism of a government ministry, gaining a nuanced understanding of the intricate relationships among these elements becomes imperative. Understanding how the Ministry makes use of smart technology, social media, and big data to improve cross-cultural communication and leadership is an important area that needs more research. Within the specific framework of a government agency concerned with the digital economy and entrepreneurship, researchers conducting this study have a chance to investigate how these technologies could improve methods of communication, streamline decision-making, and inspire new ideas. Academics and Ministry practitioners alike will benefit from this investigation, which will help them better understand the complex relationship between new technologies, good leadership, and cross-cultural communication techniques.

Additionally, the empirical study of the influence exerted by social media, big data, and smart technologies on the organizational behavior within the Ministry of digital & entrepreneurship holds the promise of offering invaluable insights. Researchers can scrutinize how these technologies impact collaborative dynamics among employees, communication patterns, and the overall organizational culture. This involves examining the role of social media platforms in streamlining internal communication, the utilization of big data for analyzing employee performance, and the integration of data mining techniques to enhance talent management practices. Nevertheless, it is crucial to acknowledge the inherent limitations in this field of research. The rapid pace of technological advancement, particularly within the realm of digital economy and entrepreneurship, poses a significant challenge for researchers to keep pace with evolving technologies. This dynamism makes it challenging to establish findings that remain relevant over time. Moreover, the influence of social media, big data, and smart technologies on intercultural communication and effective leadership may exhibit variations within the Ministry due to contextual factors such as the regulatory environment, market dynamics, and the size of the organization. The complexity of evaluating and quantifying the influence of these technologies introduces subjectivity and variability into research findings. Successfully navigating these obstacles is crucial for deepening our understanding of how the Ministry of Digital Economy and Entrepreneurship can leverage social media, big data, and smart technologies to improve intercultural communication and leadership. Researchers must navigate these intricacies to contribute to a nuanced and applicable body of knowledge in this evolving field.

6. Research Conclusion and Implication

The major goal of this research is to find out how the Ministry of Digital Economy and Entrepreneurship has used smart technology, big data, and social media to improve leadership and intercultural communication. The use of these technological components within the specific setting of the Ministry is the primary subject of this research. Our main objective is to fully grasp how these sophisticated aspects enhance leadership practices, intercultural collaboration, and communication techniques.

According to the first three hypotheses and the fifth hypothesis, the Ministry of digital & entrepreneurship's intercultural communication is greatly affected by social media, big data, and smart technology. On the flip side, these technology components are heavily involved in improving intercultural communication according to hypotheses 1,3,5 and the organization's effective leadership practices according to Hypotheses 2, 4, and 6. The research data analysis seeks to reveal strong correlations, which will provide insight into the consequences for effective leadership and intercultural communication inside the innovative government agency devoted to the digital economy and entrepreneurship.

We need to investigate the impact of smart technologies, social media, and big data on the overall efficiency of government agencies that operate in the digital sphere more thoroughly. The Ministry's continuous attempts to adapt and thrive in the fast-changing technology environment could be greatly enhanced by these discoveries. Also, the study is in line with previous research that has drawn parallels to related studies in related disciplines which conducted in one of governmental enterprises (e.g., Wong, 2023; Dhiman, 2023; Carroll, 2023; Jarrahi & Safari, 2023; Ahmed & Amiri, 2022; Nindie, 2022; AlNuaimi et al., 2022; Schomakers & Ziefle, 2023; Abdllahi et al., 2023; Vijayakumar et al., 2023).

The effects of social media on the Ministry of Digital Economy and Entrepreneurship's communication plans, brand administration, and consumer involvement are all part of the probe into the phenomenon. The research also explores how big data might improve innovation, operational process optimization, and decision-making efficiency. To improve organizational

learning inside the Ministry, use predictive analytics, and extract important insights are the main goals of the data mining inquiry. the study is in line with previous research that has drawn parallels to related studies (e.g., Nunkoo et al., 2023; Susanto et al., 2023; Wickham et al., 2023; Khan et al., 2023; Yallop et al., 2023; Grint & Jones, 2022; Erhan et al., 2022; Fatimah & Syahrani, 2022).

Considering elements like regulatory dynamics, market competitiveness, and technological advancements, this research endeavors to provide detailed insights into how the effects of social media, big data, and smart technologies might differ depending on the particulars of the Ministry of digital & entrepreneurship. The study will meticulously measure and quantify these variables, taking into account the possible influence of subjective elements that could cause variability in the study's results and this is in line with following in the footsteps of earlier studies (e.g., Simpson, 2023; Gong et al., 2022; Dvorianchykova et al., 2023; Simpson, 2023; Gong et al., 2022; Dvorianchykova et al., 2023; Nabiyevna, 2022; R'boul, 2022).

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