Influence of Authentic Leadership Practices on Innovative Work Behaviour in Higher Educational Institutions: A Virtual Reality Perspective

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Abstract. Virtual reality is an emerging technology that has created immersive experiences and captured the interest of users and industry in various disciplines in the 21st century. The little research and scarcity reported in the literature in the field of using virtual reality technologies to stimulate creative behavior is considered a fundamental issue that needs urgent intervention. The current study intends to examine how four authentic leadership dimensions influence authentic leadership on innovative work behaviors through the moderating role of metaverse technology in higher educational institutions. Innovative work behavior at institutions of higher education has emerged as a difficult problem, according to a recent study in this area. Permanent faculty members from four private institutions of higher education located in Pakistan's Lahore city constitute the study's population. To collect information from higher education institution faculty, a survey study design was used. Ten percent of the entire population was selected as the sample size using a proportionate convinces based sampling method. The respondents' attitudes on two topics were assessed using the authentic leadership scale and the innovative work behavior scale, two measuring scales. On a five-point Likert scale, which was used to gauge the respondents' thoughts? Through the evaluation of experts and the Coronach alpha value the questionnaire's reliability and validity were examined in a pilot study. The Cranach alpha value for AL was 0.813 and for IWB was 0.817. Using SPSS version 25, a multiple linear regression technique was used to analyze the data. According to the four dimensions' the behaviors of "internalized moral perspective" and "relational transparency" have a statistically significant influence on faculty members' innovative work behavior in higher educational institutions, However, "self-awareness" and "balanced processing" have negative effects. To obtain a thorough and more universal understanding of the subject, instructors at higher educational institutions should conduct their studies across different parts of Pakistan. As far as the researchers are aware. This is the first study on faculty members' innovative work behaviors and the self-awareness of authentic leadership at higher educational institutions in Pakistan.

Keywords: Authentic leadership · Innovative work behavior · Virtual reality · Higher educational Institutions

1 Introduction

Virtual reality is considered a substitute for real reality, using a number of programs and platforms that increase interaction between people. The use of virtual reality technologies has increased by many people, and immersive experiences of virtual reality technologies have spread. Virtual reality applications are being used by many business models (Alfaisal et al., 2022). The popularity of virtual reality applications, such as the metaverse, has increased due to their advanced ability to provide superior technological services and experiences. Metaverse technologies have combined new experiences in many areas for users, such as education, health, sports, business, production processes, and others (Gai et al., 2023). The ease of using metaverse technologies and their technical ability to provide high-quality displays that allow the integration of virtual reality with real reality have made them more widely used. Investments in virtual reality technologies increased and reached $6.1 billion in 2020. The market for investments in metaverse technologies will reach $20.9 billion in 2025 (Dincelli & Yayla, 2022). Companies and educational institutions have focused on applying and using virtual reality technologies represented by the metaverse to increase user satisfaction and provide superior services (Xi et al., 2023). The virtual reality industry has changed the technological landscape and national strategy of many countries. Scientists have contributed to the development of metaverse technology and have shown tremendous interest. The literature has confirmed that metaverse technology in business models is the fundamental driver of creative user behavior (Pamucar et al., 2023). The higher educational institutions dynamic is a worldwide occurrence that is equally present in developing nations in the vein of Pakistan. Higher educational Institutions that instruct students in a variety of circles of life, are measured as the maximum sources of knowledge and awareness creation, according to Carter (Carter et al., 2023). Faculty personnel whose primary responsibilities are teaching, conducting research, or taking part in extracurricular activities at their institutes make up the academic staff. They are essential resources for any educational programs and institution's success. Therefore, academics' innovative work behaviors are crucial to the academic achievement of higher education institutions (Ефимова & Латышев, 2023). Innovative work behavior shows different attitudes towards their work circumstances and is a condition of faculty members' favorable attitudes towards their employment. Additionally, inventive work has been identified as the key component among faculty members (Saxena & Prasad, 2023).

Authentic leadership has a significant influence on employees' innovative work behavior; according to past studies, authentic leadership empowers and uplifts their staff by remaining truthful, open, and supportive of them. These qualities have been shown to be significant indicators of employee voice behavior. In particular, authentic leadership encourages openness in communications with employees, maintains high standards of ethical behavior, and clarifies data in an objective manner (Carvalho et al., 2023). By exhibiting these traits, leaders can increase followers' sense of safety and psychological support, which in turn encourages followers to take sensible risks (Kaya & Karatepe, 2020). This commitment empowers workers to express their unconventional thoughts and any point of view without fear. Mentioned the previously highlighted employee voice behavior (Teng & Yi, 2022).

Previous studies have supported the link between authentic leadership and innovative work behavior (Mubarak et al., 2021). Analyze the association between authentic leadership and innovative work behavior since it has been shown to have a positive impact on employee innovation in the workplace (Işık et al., 2021). Additionally, every organization must adopt risk-taking behavior in order to remain viable in the unpredictable and rapidly evolving business climate (Faulks et al., 2021).The connection between authentic leadership and innovative work behavior has received less attention in the past. In the setting of higher education institutions (Yamak & Eyupoglu, 2021). Encountered the significant influence of authentic leadership on innovative work behavior. In a comparable manner, it was claimed (Phuong & Takahashi, 2021). In the competitive and dynamic world of today's environmental conditions, innovation is crucial for the success of organizations ((Kleynhans et al., 2021). According to the professionals, leadership is one of the most crucial elements that affects both creativity and innovativeness (Grošelj et al., 2021).The rising academic attraction with innovative settings is also shown in authentic leadership, which has grown into a "widespread, developing social trend" and a "golden standard for leadership (Durrah & Kahwaji, 2022). The attention of professionals is increasing, as is the curiosity among academics. Along with education, innovation in the workplace is essential for workers, organizations, and societies. As such, it plays a significant role in the European Union's objectives for globalization and knowledge-based nations. At the organizational and national levels, innovation is an essential component of social and economic development, while at the individual level, innovation at work is a requirement for greater innovative work behavior (Geltzer, 2017).

Thus, the research that has already been done enables us to begin to comprehend the factors that affect employees' innovative work behavior. There have been numerous studies on both leadership and innovativeness, but few have examined the boundary conditions of the relationships between authentic leadership and innovative work behavior (Sethibe & Steyn, 2017).We are seeing varying empirical evidence on the relationship between authentic leadership and innovative work behavior, despite the research findings supporting the positive influence authentic leadership has on encouraging innovative work behavior. a multi-dimensional framework of organizational innovation: a systematic review of the literature (Mishra et al., 2019). Mostly insignificant information is known about the related boundary components that influence leaders' capacities to foster innovation in companies. Therefore; this is a good time to consider the criteria for authenticity and transformative leadership in cutting-edge workplaces. The broad theoretical framework of innovative knowledge environments serves as our guide (Isaksen, 2017). It contends that individuals who engage in innovative activities (for example, by working in innovative environments, such as research and development are better able to comprehend this phenomenon (Latynina et al., 2020).

Whereas variables at the foundations of an organization are affected by circumstances at the top levels, they are embedded in numerous different organizational levels of influence in addition, surroundings with attributes that beneficially impact people working creatively to generate new information or ideas, whether they do it alone, in teams, within a single organization, or in partnership with others, are important. This paper's goal is to contribute to the growing body of research literature on the interplay

between authentic leadership and the promotion of innovative work behavior. Authentic leadership in motivating innovative work behavior, captivating into explanation the relationship in motivating innovative work behavior (Grošelj et al., 2021).

Authentic leadership is outstanding for promoting innovative thinking and creativity considering its characteristics (Oh & Oh, 2017). An attribute of authentic leadership is the ability to learn from mistakes and use creativity and knowledge to advance their followers (Allen-Ile et al., 2020). Leaders who are more self-aware value and encourage inventive and creative behavior. More so than less authentic leaders, highly authentic leaders inspire innovative work behavior in their followers. The followers get motivated and excited when they believe their leader to be an authentic leader (Oh & Oh, 2017). Such supporters are more likely to grow novel ideas because they are more self-aware in their ability to apply novel ideas and are better able to deal with challenges and opportunities (Xu et al., 2017). Increase their followers' positive psychological capital, including their optimism, self-confidence, and adaptability (Novitasari et al., 2020). Their adherents are less fearful of rejection or failure, and they are more willing to attempt new things (Ribeiro et al., 2018). Even if the innovation fails, followers who believe their workplace encourages experimentation are more likely to continue (Sengupta et al., 2023). The major objective of this study is to determine how four authentic leadership dimensions influence faculty members' innovative work behavior through the moderating role of metaverse in private higher educational institutions.

1. To investigate how "Self-Awareness" influence faculty members' innovative work behaviour in higher educational institutions.
2. To investigate the influence of "Internalised Moral Perspective" on faculty members' innovative work behaviour in higher educational institutions.
3. To investigate how "Balance Processing" influence faculty members' innovative work behaviour in higher educational institutions.
4. To investigate the influence of "Relational Transparency" on faculty members' innovative work behavior in higher educational institutions.
5. To investigate the moderating role of "metaverse" in higher educational institutions.

2 Literature Review and Hypotheses Development

2.1 Authentic Leadership

It has been proposed that authentic leadership is a pattern of behavior that draws upon and promotes positive psychological capacities and a positive ethical climate in order to further promote more self-awareness, an internalized moral perspective, balanced information processing, and relational transparency on the part of leaders while working with followers. This encourages followers to grow professionally. The study of authentic leadership has grown in popularity in the field of Higher educational organizations behavior during the past ten years (Farid et al., 2020).

Authentic leaders encourage and motivate followers to accomplish goals (Crawford et al., 2020a, b). They do this with the help of increased awareness and effective communication. According to recent studies, authentic leadership may benefit organizations because it has been connected to a variety of outcomes, including individual creativity, performance, customer orientation, and employee retention (Duarte et al., 2021). An

authentic leader can increase innovative work behavior such as commitment, passion, sense of duty, contentment, and immersion to demonstrate better action for the growth of the organization and the welfare of the workforce (Kiersch & Peters, 2017).Authentic leadership embodies inspiration, creativity, and effective communication. He or she is self-developed and has a visionary spirit (Crawford et al., 2020a, b). Self-improvement is crucial for maintaining employee motivation. Authentic leaders consistently display both emotion and reason. They are always aware of the importance of their coworkers. They are adept at managing successfully (Bandura et al., 2019). Authentic leaders develop their teams, create open lines of communication with their employees, and always consider their wellbeing. They are aware that everyone should be treated with respect. Authentic leaders are self-aware, morally upright, and exhibit understanding of their own principles and beliefs. The initial element essential to the overall growth of an organization is for followers and leaders to engage positively. This form of connection relies heavily on confidence. The development of an organization is greatly influenced by a leader's self-assurance, bravery, helpfulness to subordinates, openness, and inventiveness Efficiency is seen as a feature of true leaders; authentic leaders are people who act as leaders by strongly encouraging their supporters to pursue higher employment (Saeed & Ali, 2019). An authentic leader is one who offers himself, declines to offer him, but never lends himself. The highest level of self-sacrifice is always expected of authentic leaders, and they are always built for modesty and self-effacement. Although authentic leaders can exhibit considerable self-sacrifice in the service of others, he never compromises his moral standards or permits him/her to be taken advantage of. At all costs, authentic leaders never waver from their beliefs and ideas. Authentic leaders' contempt the well-traveled path and is a surpassing intelligence with an exceptional creative personality (Azanza et al., 2013).

2.2 Innovative Work Behavior

A variety of definitions for innovative work conduct have been offered by researchers. Innovation in the workplace is "the production or adoption of useful ideas and idea implementation, which begins with problem recognition and the generation of ideas or solutions (Hashim, 2021). It is "the deliberate generation, promotion, and realization of new ideas within a work role, work group, or organization," according to Janssen (2000). In a similar vein, innovative work behavior is a process that should improve the efficiency and effectiveness of problem-solving in the workplace (Knezović & Drkić, 2021). According to a more current definition provided (Alnajjar & Hashim, 2020). It is "a set of repeated actions that are initiated by individuals and executed by groups within organizations based on continuous needs for improvement so that individuals, groups, and organizations would benefit" (Alhmoudi et al., 2022). Innovative work behavior encompasses several stages. Janssen (2000) recognized three stages of innovative work behavior: concept genesis, promotion, and realization. To enable innovation, employees must come up with fresh ideas or solutions to issues. This is known as idea generation. Building alliances, gaining support for the invention by outlining its benefits and success to prospective allies, and locating sponsors are all considered aspects of idea promotion (Akram et al., 2016). The creation of a sample or model of a novel product, system, or procedure that may be used as a component of standard procedures is also necessary for

idea realization (De Jong & Den Hartog, 2010). According to earlier studies, there is a significant connection between innovative work behavior and a number of outcomes, including employee performance commitment (Hashim, 2021).

2.3 Metaverse

In recent years, the concept of the "Metaverse" has exploded in popularity, attracting the attention of techies and business moguls alike. It represents a virtual, interconnected universe where individuals interact, work, play, and explore, using digital avatars and real-time simulations. Often touted as the next evolution of the internet, the Metaverse is a concept deeply rooted in science fiction, but it's quickly becoming a reality. The Metaverse is not a single entity or platform but rather a convergence of various technologies, including augmented reality (AR), virtual reality (VR), blockchain, and artificial intelligence (AI) (Hudson-Smith & Batty, 2022). The ultimate goal is to make a digital experience so smooth and compelling that it makes us forget we're in the real world. It offers the promise of a boundless, persistent digital space where users can engage in a multitude of activities, from socializing to working, shopping to attending events. The potential for the Metaverse to revolutionize interpersonal relationships is one of its defining features. Combining virtual reality and augmented reality allows users to build unique avatars and interact with others in ways that are nearly identical to the real thing (Maheswari et al., 2022). Imagine attending a virtual concert, where you're not just watching a livestream but also dancing and chatting with friends as if you were in the same physical space. This has profound implications for communication, collaboration, and entertainment. There are also profound ramifications for business on the Metaverse. It has the potential to completely alter the way we do business and hold meetings. Already, businesses are investigating the potential of online meeting rooms and workplaces to improve the communication and collaboration of distributed teams (Gokasar et al., 2023). Online shopping stands to gain as well, with virtual showrooms and experiences reshaping the way we shop from the comfort of our own homes. Blockchain technology's ability to record digital transactions and transfer of ownership is fundamental to the functioning of the Metaverse. Users can buy, sell, and trade digital real estate, virtual items, and even land. As a representation of this ownership in the Metaverse, NFTs (Non-Fungible Tokens) make it possible for users to prove they are the rightful owners of everything from digital artwork to virtual real estate. However, the development of the Metaverse also raises concerns. Privacy, security, and digital identity are paramount issues that need to be addressed. Strong data protection and identity verification are becoming increasingly important as more of our lives move online. Furthermore, it is important to guarantee access and equal participation in the Metaverse so that it does not exacerbate preexisting inequities (Njoku et al., 2023). Thus, we assume that:

1. "Self-Awareness" has a statistically significant influence on faculty members' innovative work behaviours in higher educational institutions.
2. The "Internalized Moral Perspective" has a statistically significant influence on faculty members' innovative work behaviours in higher educational institutions.
3. "Balance Processing" has a statistically significant influence on faculty members' innovative work behaviours in higher education institutions.

4. There is a statistically significant correlation between "Relational Transparency" and faculty members' innovative work behavior.
5. The relationship between authentic leadership and innovative work behavior will be stronger when metaverse is high.

3   Methodology

3.1   Research Design

To evaluate and describe a population's characteristics, such as perceptions, attitudes, or behaviors, the researcher can conduct a survey of a selected group of individuals from the sample or the entire population. After using a quantitative research technique in which all study variables are measured simultaneously throughout the same time, the researcher employs a cross-sectional research technique (Rahi, 2017). The goal of quantitative research is to identify the sample population, which is a particular group of people. To address the research issues, quantitative research relies on data that is measured or observed (Apuke, 2017).

In comparison to a longitudinal approach, which collects data from respondents' multiple times at various time intervals, a cross-sectional approach collects data from respondents only once and yields results relatively quickly the longitudinal approach is very useful for examining the dynamics of the research over a range of time periods. The benefits of survey research enable large amounts of data to be collected quickly and simply Scales for measuring and research instruments. To gather data for the current investigation, a survey instrument with structured but typical questions was created. To collect enough information from the target population, the questionnaire for the current study has been modified from previous research. The authentic leadership scale (AL) and the innovative work behaviour scale (IWB) was two measuring scales that were modified to create the questionnaire acknowledged that using a questionnaire is the quickest as well as most accurate method to get data from a large, representative sample. The self-administered survey for this study has 33 items in two portions, as indicated below (Table 1).

Table 1. Section of Research Instrument.

Sections	Variables	Dimensions	Items	Source
A	Authentic Leadership	Self-Awareness Internalized Moral Perspective Balance Processing Rational transparency	16	(e.g. Janssen, 2000; Kleysen & Street, 2001; Scott & Bruce, 1994)
B	Innovative work behaviour	Idea Exploration Idea Generation Idea Chomping Idea Implementation	17	Created by Walumbwa and associates

3.2 Sample Size

The population of Lahore, Pakistan's private higher education institutions is made up of their faculty staff members of the current study. The chosen demographic comprises of academic staff members who are between the ages of 24 and 42, have a Ph.D. and M.Phil. You have at least a year's worth of classroom instruction experience in a private higher education setting. All full-time teaching faculty members, or academics whose exclusive focus is on teaching in private higher education institutions in Lahore, are the study's target group.

Since none of their departments had any additional part-time administration positions. It was because Lahore, Pakistan, has so many private higher education institutions. The capital of Pakistan's "Punjab" state, Lahore, is home to 22 private higher educational institutions. Lahore is renowned for its diverse academic environment and is also known as "the city of colleges" due to the abundance of colleges, universities, and institutions that grant degrees. To pursue their academic goals, a diversified multicultural academic community of students, teachers, and researchers travel to Lahore city from all over Pakistan. High multicultural diversity in the academic community, the current study was concentrated in the city of Lahore. The public entity was not included in the current analysis because it only looked at private higher education institutions in Lahore. Only four private higher educational institutions colleges were chosen at the researcher's convenience out of the 22 private higher educational institutions located in Lahore city, keeping in mind the time limit, logistics, and resources.

4 Data Analysis

The sample size for the current study is 86, or 10% of the faculty members who make up the entire population. By applying the (Krejcie & Morgan, 1970) formula, this sample size was determined. In this study, the faculty at private higher educational institutions serves as the analysis's unit of analysis. To derive an accurate inference from the results of the current study, the researcher employed the probability sampling technique, which enables the researcher to draw statistical conclusions about the entire population. One example of such a method is the proportionate systematic random sampling methodology, which was used in current research. First, it was decided that 10% of the faculty members from each private higher education institution would be included in the required sample size. The researcher has chosen a sampling fraction of 1/10, which is 10% of the population of each private higher education institute, considering the total number of samples proposed for the study as well as to ensure that the number of samples is proportionate to the total population of each private higher educational institutions This makes sure that the sample contains an equal and proportionate representation of all private higher education institutions in the target demographic. Each private higher education institution's sample proportion size is further separated into four age groups: 24–30, 31–36, 37–42. The survey was then randomly dispersed regardless of how many people live in each stratum. Two to four weeks were provided for the responders to complete the survey. The researcher followed up by recalling the respondents through their department heads for any questionnaires that were not returned within the allotted four weeks. However, it took over three months for all the respondents to finish the surveys.

A pilot test was carried out for this study before the revised and improved version of the research instrument was distributed to the respondents. For the pilot testing (Zhu et al., 2008). Suggested 25 to 100 responders, which might not also be selected statistically. The researcher asked two experts in educational leadership, management, and higher education to review and provide their opinions regarding the content of the survey questionnaire for this study through email to verify the authenticity of the content of the questionnaire. They were asked to review the questionnaire for any mistakes and unclear questions. After conducting a pilot test, the reliability of the instrument was determined to be 0.813 for the authentic leadership scale (AL) and 0.817 for the innovative work behavior scale (IWB). The sample respondents received the revised questionnaire afterward (Table 2).

Table 2. Hypotheses testing and beta coefficients.

Path	Antecedents	Beta	p	Conclusions
Ha1	Self-Awareness	.074	0.775	Rejected
Ha2	Internalized-Moral Perspective Balance Processing	.265	2.323	Supported
Ha3	Relational Transparency	.047	0.372	Rejected
Ha4	Authentic Leadership*Metaverse	.402	3.601	Supported
Ha5		.563	4.652	Supported

The table show that the coefficient results as indicate that the beta value of 0.074 which means that self-awareness has a weak effect on innovative work behaviour Compared to through independent variable. Moreover, that the beta value of 0.265 which means that internalized moral perspective has a moderate effect on innovative work behaviour Compared to through independent variable. Furthermore, balance processing coefficient that for indicate that the beta value 0.047 as indicating that weak effect on innovative work behaviour. Moreover, relational transparency coefficient indicate that the beta value 0.402 positively significant effects on innovative work behaviour. In summary internalized moral perspective and relational transparency have significant effect on innovative work behaviour while self-awareness and balance processing have no significant effect on innovative work behaviour. The predictor variable authentic leadership has an r square value 0.178 indicating that the independent variable includes the model explain approximately 17.8% of the variance in the independent variable innovative work behaviour. The relationship between authentic leadership and innovative work behavior was stronger when metaverse was high.

5   Discussions and Conclusions

The current study sought to investigate the impact of four distinct authentic leadership antecedents on faculty members' innovative work behaviors at private institutions in Pakistan's Lahore metropolis. Quantitative research methods were used to carry out the

current study. Using SPSS version 25, the outcomes of the data collection were examined. According to the study's conclusions, "Internalized-Moral Perspective In contrast, "self-awareness" and "balance processing" have shown an insignificant influence on the innovative work behavior of faculty members of higher educational institutions. It can therefore be concluded that if faculty members of higher education institutions are satisfied with their work, they will remain with their higher education institutes for a long time. In private higher educational institutions, the faculty is more content if their leaders support their academic objectives, and they internalize a moral perspective and relational transparency. Most faculty members were happy with their leaders' relational honesty, then", "Relational Transparency ", whereas "self-awareness" and "Balance processing" have shown insignificant influence on the innovative work behavior of faculty members of higher education institutions, it can be concluded that if faculty of higher education institutes are satisfied with their work, they will stay intact with their higher education institutes for a long time, improving the quality of instruction. In private higher education institutions, the faculty is more content if their leaders support their academic objectives, and they internalize a moral perspective and relational transparency. Most faculty members were pleased with their leaders' interpersonal openness, which was followed by what they regarded to be an internalized moral stance. Ultimately, the Metaverse is an intriguing and revolutionary idea that has the potential to alter our relationships with digital surroundings, one another, and the physical world. A fully immersive, interconnected digital universe is getting closer to reality as technology develops. But solving many technical, ethical, and societal problems is necessary if the Metaverse is to reach its full potential. While virtual reality's future seems bright, its growth will benefit from thoughtful planning and good stewardship.

6   Limitations and Upcoming Studies

Only the city of Lahore was considered in the research. In the other cities of Pakistan, there are also many private higher educational institutions. To further validate the association between all variables, future study can be conducted in different geographical regions of Pakistan using the same model and one or more additional antecedents. A large sample size could not be researched due to logistical and time constraints as well. So, for more generalizability, further study can be done with a bigger sample size. To gain a deeper understanding of the connections between the research variables and innovative work behavior in higher education institutions, qualitative analysis can also be added.

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